

Multidisciplinarity

Jigsaw puzzle, 9 sessions, 1 week

This set of interconnected sessions introduces a range of skills and concepts through participatory activities focused on a specific question. The example in the video concerns the social determinants of under-five mortality in Uganda.

Students:

- Reflect on the philosophies of knowledge within their own disciplines.
- Recognise the contribution of other disciplines and the importance of multidisciplinarity.
- Learn efficient ways to search for, read, critique, summarise, and reference academic articles.
- Identify, through a literature search, their discipline's contribution to exploring, describing and evaluating interventions in order to understand the specific question you have chosen.
- Understand and use the concept of social determinants of health and the social levels at which they operate.
- Collectively construct a research framework.

Preparation

Engage resource people well in advance of the sessions. In addition to yourself/selves as facilitator/s, identify and invite a researcher or librarian to introduce database searches and support students as they work.

Watch this video to prepare for the session:



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://pressbooks.pub/cartacurricula/?p=24#oembed-1>

To schedule these sessions over the course of a week, you could use or adapt CARTA's sample timetable.

Monday	Tuesday	Wednesday	Thursday	Friday
8:30	Session 2: Form Disciplinary Teams Session 3: Discuss Epistemology	Session 5: Read Academic Articles		Session 9: Conduct a Multilevel Analysis of Social Determinants of Health
10:30 Break	Break	Break	Break	Break
10:45	Session 3 continued	Session 6: Manage References	Session 7: Synthesise Findings	
12:45 Lunch	Lunch	Lunch	Lunch	Lunch
13:45	Session 4: Search Databases	Session 6 continued	Session 8: Present Contributions by Discipline	
15:45 Break	Break	Break	Break	Break
16:00 Session 1: Introduce these sessions	Session 4 continued	Session 6 continued	Session 8 continued	Reflections on the week
17:00				Evaluations



Download the [curriculum](#) for this jigsaw puzzle.

Sessions

Session 1. Introduce Multidisciplinarity | 30 minutes

Announce the question that you have chosen as a focus for this jigsaw or series of interlocking sessions. In the video example, the question was:

What does your discipline contribute to our understanding of the determinants of mortality and morbidity among under-fives?

Explain that students will research what their discipline contributes to our understanding of this question by conducting a literature review. To do this effectively, the next sessions will support them to discover:

- How their discipline has studied and learned about the topic and with what methods.
- How to define their literature search and use databases such as PubMed®, POPLINE, Cochrane Library.
- How to read and analyse academic papers.
- How to manage citations.

In addition to working within their own disciplines, students will exchange knowledge about their disciplines with peers in the larger group. They will recognise the value of sharing knowledge from different perspectives to address challenges in public health (or any other field).

In the last stage of this jigsaw, students will focus on the social determinants of health. Drawing from the findings of their literature reviews, students will identify the different levels at which factors have impact, from individual to global. Together, they will then map the causal factors per level, in order to create a research framework.

Session 2. Form Disciplinary Teams | 2 hours

PhD students may come from a range of different disciplines. In public health, they may study – for example – medicine, nursing, environmental health, epidemiology, demography, therapeutic sciences, psychology, or sociology. This introductory activity serves to break the ice, as well as forming the groups in which students begin research into their specific disciplines.

Preparation

As the facilitator

- Decide on a specific public-health issue as the focus of these sessions, such as the determinants of mortality and morbidity among under-fives. Prepare a set of statements to read out, as in the examples in Step 1.
- Prepare the task instruction on a flipchart or PowerPoint slide.
- Choose or clear an open space for the students to move around in.

Outcome

By the end of the session students can define their own discipline.

In addition, students get to know each other.

Steps

Time	Step	Who
45 minutes	1. Form teams	Facilitator with full group
15 minutes	2. Introduce the task	Facilitator
1 hour	3. Describe each discipline	Students in teams

Step 1. Form teams by discipline

45 minutes

Invite the students to gather in the open space. Explain that they should move between two sides of the room in response to each of your statements:

- One side labelled 'agree', that is, 'this is true for me'.
- The other side labelled 'disagree', that is, 'this is not true for me'.

Make your series of statements. In response, students choose which side of the room to move to. Encourage a relaxed atmosphere to break the ice; students first get to know each other through responding to non-judgemental and possibly amusing statements.

You might state, for example:

- "I have travelled to East Africa before."
- "I watch football."
- "I can ride a bicycle."
- "I can drive a car."
- "I like to do karaoke."

You can also prompt revelations and brief comments about gender norms and roles.

- "I have a child."
- "I have changed a baby's nappy/diaper."

After a while, make statements about disciplines, such as:

- "I am a medical doctor/specialist."
- "I am an epidemiologist/biostatistician."
- "I am a sociologist/anthropologist."

Students who choose 'agree' after these last statements are now forming disciplinary teams. Keep going until everyone is grouped. You may need to split or join groups until each team has three to five members. If you only have one dentist, for example, you might have them join a small group of clinicians. If you have too many social scientists, you could divide them into smaller teams, such as sociologists and anthropologists.

Step 2. Introduce the task

15 minutes

Introduce the overall task for this series of sessions, in relation to the specific public-health issue that you have chosen. Ask a question, for example: What does your discipline contribute to our understanding of the determinants of mortality and morbidity among under-fives?

Explain that each team will research what their discipline contributes to our understanding of the issue by conducting a literature review. It is important that they limit their search to key papers from their discipline only. After an initial search, the group must agree on 10 papers that make the greatest contribution.

For now, though, in this first step, each group discusses what their discipline is. You may combine those with related expertise in one group, for example grouping epidemiologists with biostatisticians.

Step 3. Describe each discipline

1 hour

In their teams, students define their discipline. They begin to develop a list of search terms, and a search strategy, to identify literature on the contribution of their discipline to the issue. This process continues through other sessions in this set.

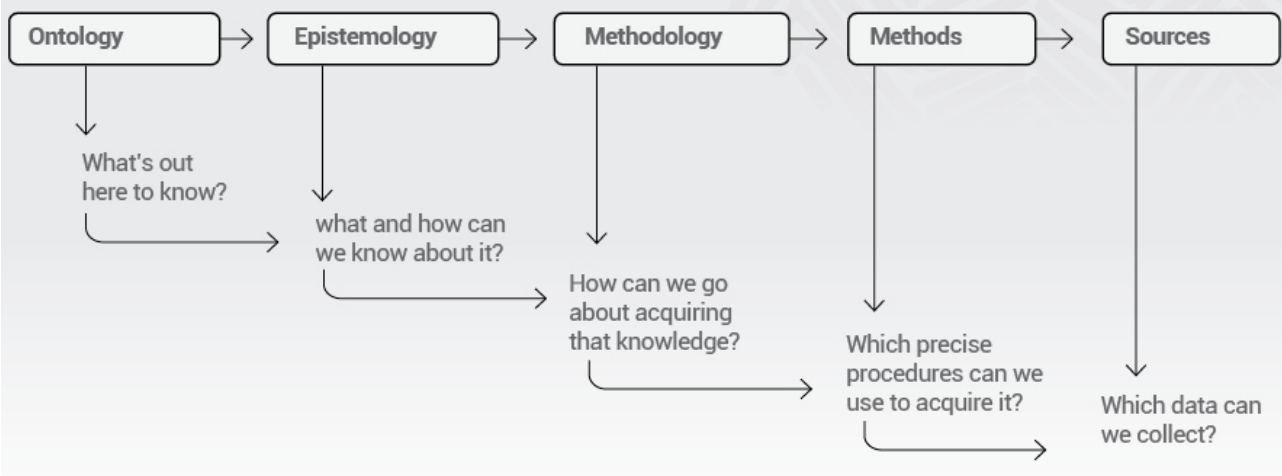
Session 3. Discuss Epistemology | 2 hours

Different paradigms – perspectives on reality and knowledge – imply different ways of doing research. With reference to their own disciplines, ask students to trace the connections between:

- Ontology (what is reality?).
- Epistemology (how can I know reality/what and how can we know about it?).

- Methodology (how do I go about acquiring this knowledge?).
- Methods (what methods do I use?).

Figure 1: The interrelationship between their building blocks of research



Source: Figure adapted from Hay, 2002, p. 64

Preparation

The session must be highly interactive, even conversational. Draw students into the issues, intervening in the discussion with definitions, information or clarification, as necessary.

Your objectives as facilitator are to:

- Demystify the philosophy of knowledge.
- Establish or reinforce different paradigms of research and how these link to different methodologies.
- Analyse which research paradigms and methodologies are applied in different disciplines.
- Introduce students to a mental map and appropriate concepts to navigate different methodologies and methods that they will apply as researchers.

For your presentation (Step 2):

- Read James [Scotland](#): *Exploring the philosophical underpinnings of research: relating ontology and epistemology to the methodology and methods of the scientific, interpretive, and critical research paradigms.*
- Use or adapt the figure *The interrelationship between the building blocks of research.*
- Use or adapt the table *Perspectives of reality and knowledge have implications for research approaches.*

Outcomes

By the end of the session, students can:

- Discuss epistemology and the links to methodology.
- Describe the epistemology of their own discipline.

Steps

Time	Step	Who
30 minutes	1. Discuss questions about knowledge	Small groups
30 minutes	2. Present answers	Full group
15 minutes	3. Present: Implications of perspectives for research	Facilitator
45 minutes	4. Discuss the epistemology of each discipline	Teams by discipline

Step 1. Discuss questions about knowledge

30 minutes

Organise students into at least five mixed-discipline groups and assign questions for each group. If you have more than four, some groups can discuss the same set of questions.

Group 1

- What is 'knowledge'?
- What are we trying to know and why?
- What is 'research'?

Group 2

- Whose knowledge counts?
- What do we use the knowledge for?

Group 3

- Whose knowledge counts?
- What do we use the knowledge for?

Group 4

- What is 'evidence'?
- Is there a difference between 'evidence' and 'proof'?
- Does 'evidence' count, and why?

Group 5

- What types of research are commonly used?
- What is 'the best' type of research?

Step 2. Present answers

30 minutes

Each small group presents their answers to the full group. Explain that they should not repeat or duplicate if they have the same answers, add only new ideas.

Step 3. Present: Implications of perspectives for research

15 minutes

Begin by consolidating the ideas emerging from students' presentations. In your presentation:

- Show the links between ontology, epistemology, methodology and methods
- Present different research paradigms
- Outline the epistemology and methodology that link to each paradigm

Step 4. Discuss the epistemology of each discipline

45 minutes

Students return to their disciplinary groups. Each group discusses the ontology and epistemology of their discipline. Students consider which research paradigms are dominant.

In a later session in this series, each disciplinary group will present the main points from their discussion. For now, they prepare two or three slides to outline the methodology and methods commonly used within their discipline. How do they answer research questions such as the one that they are tackling?

What does **your discipline** contribute to our understanding of the determinants of mortality and morbidity among children under five?

Session 4. Search Databases | 6 hours

Students are introduced to useful scholarly databases and learn to search effectively for information for specific research needs. A librarian or researcher presents and demonstrates key sites and tools. They remain available to support students as they put their new skills into practice.

Preparation

- As the key facilitator, brief the resource person/people on the learner-centred, participatory approach. You can show them what it looks like in [this](#) and other videos. <https://youtu.be/KU9YzKJDEk4>
- Identify in advance the databases that are available to your group of students. Ensure that the resource person is familiar with them and uses them in their presentation.
- Equipment: Each student needs their own laptop and Wi-Fi access. The resource person needs a projector connected to their laptop and a screen to project onto. Test all equipment in advance.

Guides for the resource person and/or students:

- [Hinari training portal](#) for low-income countries only (does not include Nigeria or South Africa).
- US National Library of Medicine [PubMed Tutorials](#), accessible to all.

Additional reading:

- Evers, J.E. (1998). [Searching bibliographic databases effectively](#). *Health Policy and Planning* 13, 339-342.
- Shultz, M. (2007). [Comparing test searches in PubMed and Google Scholar](#). *J Med Libr Assoc.* 95(4): 442-445.

Outcomes

By the end of the session, students can:

- Identify and access electronic databases appropriate to their discipline/s.
- Understand how to use database search techniques and search terms such as keywords/text words and subject headings.
- Transfer search skills to other databases.
- Store and organise information systematically and transparently.
- Understand how to keep track of the search process and to stay up to date.

Steps

Time	Step	Who
2 hours	1. Introduce and demonstrate databases and searches	Resource person with full group
4 hours	2. Search for relevant papers in your discipline	Students

Step 1. Introduce and demonstrate databases and searches

2 hours

The resource person presents information using a projector to demonstrate steps. Here is one possible sequence. Your resource person may offer alternatives.

Develop a search strategy

- Define 'search strategy' and explain its importance.
- Explain keywords, synonyms, truncation, wild cards, and controlled vocabulary such as Medical Subject Headings (MeSH).

Introduce PubMed® and title/abstract searching

- Apply filters such as study design (e.g. systematic reviews), age and date of publication.
- Scan initial results for relevance.
- Make any amendments to strategy if necessary and re-run the search.

Customise search strategies developed for use in other databases

- Tailor this to the databases that are accessible in your and the students' institutions.
- Find out which symbols each specific database uses, e.g. * or ?
- Run searches and scan the results for relevance.
- Re-run the search if necessary.

Introduce Research4Life using Hinari Access to Research for Health Program as an example to access full-text journal articles.

Step 2. Search for relevant papers in your discipline

4 hours

Students apply what they have learned in order to search for relevant papers from their own disciplinary perspective. Teams define their search strategy.

Facilitator/s and resource people help students to search in the most appropriate database, with the appropriate search terms and syntax for each. Crucially, they remind students to *exclude* references that may be relevant but are not from their discipline.

Session 5. Read Academic Articles | 2 hours

Students learn effective ways to read and analyse journal articles and to synthesise scientific evidence for their literature reviews for this particular activity, their doctoral research, and their future careers as researchers.

Preparation

As the facilitator

- Select a journal article for students to analyse and print copies or share the link.
- Watch and prepare to introduce the video [How to read a journal article](#).
- Download and prepare to use or adapt the PowerPoint presentation: [How to read a scientific paper](#).

Additional reading:

- Ecartot, F., Seronde, M. F., Chopard, R., Schiele, F., & Meneveau, N. (2015). [Writing a scientific article: A step-by-step guide for beginners](#). *European Geriatric Medicine*, 6(6), 573–579.

Outcomes

By the end of the session, students can:

- Describe how a journal article is organised.
- Explain the key steps in reviewing a journal article.
- Identify the challenges of reading journal articles and explain how to mitigate them.
- Analyse a journal article relevant to their research.

Steps

Time	Step	Who
20 minutes	1. Watch a video introduction	Students
40 minutes	2. Present: How to read a journal article	Facilitator
30 minutes	3. Analyse a journal article	Students in pairs
30 minutes	4. Present and discuss analyses	Full group

Step 1. Watch a video introduction

20 minutes

Encourage students to pay attention to key points in the video: [How to read a journal article](#). Project it onto a screen or share the YouTube link for students to watch on their own laptops. Invite questions and discussion afterwards.

Step 2. Present: How to read a journal article

40 minutes

Use or adapt the PowerPoint presentation: [How to read a scientific paper](#). If relevant to your field, explain the IMRaD format for the structure of scientific papers: Introduction, Methods, Results, and Discussion. Invite questions and discussion.

Step 3. Analyse a journal article

30 minutes

Students pair up to do a critical analysis of the journal article you have chosen. Explain that each pair should review the title, abstract, introduction, methods, results, and discussion sections of the article. They should check for keywords that are relevant to their search terms or research topic, and then answer these questions:

- Is the title informative?
- Does the abstract include relevant keywords?
- Does the introduction contain the aim of the study?
- Do the methods relate to the primary outcomes?
- Do the results answer the research question?

- Does the conclusion emanate from the results?

Step 4. Present and discuss analyses

30 minutes

In the full group, pairs take turns to present their analysis of the paper. Allocate time for discussion after each short presentation.

Session 6. Manage References | 6 hours

This session introduces students to the basics of reference management software (RMS) to enable them to:

- Create a library of references.
- Automatically build a bibliography/reference list in MS Word.
- Collect and store both citations and full-text articles from literature searches across various databases.

Preparation

As the facilitator

- Engage a suitable resource person/people in plenty of time. Ensure that they are familiar with the software, the steps and the participatory approach to learning and teaching.
- Review resources to use with your students, such as:
- Webinar: [How to use Mendeley Reference Manager](#).
- Webinar: [Discover Mendeley Reference Manager](#).
- PowerPoint: [Mendeley Software Features](#).
- Various [Reference Management Tools](#).

For the students

Students need laptops and Wi-Fi. They download free Mendeley software before the session.

Outcomes

By the end of the session, students can:

- See the value of using RMS to keep track of reading materials and to enable effective and consistent referencing.
- Store and organise references in a searchable database.
- Easily convert referencing styles to suit publication requirements.
- Apply key functionality within RMS to effectively save, organise and edit references, and to access a range of referencing styles.
- Produce accurate, consistent in-text citations.
- Generate reference lists or bibliographies within academic writing by linking an RMS to MS Word using the 'cite while you write' feature.
- Share collections of references (libraries) with others for collaborative purposes.

Steps

Time	Step	Who
20 minutes	1. Introduce reference management	Facilitator
20 minutes	2. Create a library	Students
30 minutes	3. Populate a library	Students
20 minutes	4. Download a web importer and MS Word plug-in	Students
30 minutes	5. Create citations and generate a bibliography	Students
4 hours	6. Search and export references	Students

Step 1. Introduce reference management

20 minutes

Explain reference management software (RMS) and compare Mendeley and other packages. Use a PowerPoint presentation from [Research4Life: Author's Hub](#).

Step 2. Create a library

20 minutes

Guide students to create a library and explore the library interface.

Step 3. Populate a library

30 minutes

Each student populates the library they have created, manually and from databases.

Step 4. Download a web importer and MS Word plug-in

20 minutes

Students become familiar with using these tools. Support them to:

- Download a Mendeley web importer to the MS Word to allow “cite as you write” in MS Word.
- Install a Mendeley MS Word Plugin using Mendeley Desktop application.

Step 5. Create citations and generate a bibliography

30 minutes

Students use the Cite While You Write (CWYW) feature to create citations and generate a bibliography automatically.

Step 6. Search and export references

4 hours

Supervise students as they apply newly learned techniques to search for relevant papers. They use RMS software to export references to the Mendeley library they have created. Guide them to:

- Search and identify articles on “under-five mortality” (or key words from their own research topics) in PubMed or CINAHL.
- Save relevant articles in Mendeley Web version using the Web Importer and then synchronise with the Mendeley Desktop version.
- Search another database such as Elsevier ScienceDirect and repeat the steps above.
- Practise citing references from Mendeley Desktop version in an MS Word document or in a manuscript they are developing.
- Generate a References list at the end of the document.
- Choose a citation style such as APA 7th edition or BMC Public Health and check how citation styles adjust themselves in the manuscript.

Session 7. Synthesise Findings | 2 hours

In discipline-specific teams, students conduct a literature search, select and discuss 10 key papers, and prepare a presentation to describe the contribution of their own discipline to our understanding of (for example) under-five mortality.

Outcomes

By the end of the session, students can:

- Select discipline-specific papers that address the issue.
- Synthesise findings from key papers.
- Develop a short presentation as a group.

Steps

Time	Step	Who
20 minutes	1. Introduce the task	Facilitator
20 minutes	2. Conduct a literature search	Students
20 minutes	3. Select key papers	Students
30 minutes	4. Discuss and synthesise findings	Students
30 minutes	5. Prepare a short presentation	Students

Step 1. Introduce the task

20 minutes

Ask students to answer the question:

What is the contribution of your discipline to our understanding of under-five child mortality?

Explain the steps to follow.

Step 2: Conduct a literature search

20 minutes

Individual students use their literature search skills to identify papers that address the topic. Emphasise that they must choose only papers from their own discipline.

Step 3: Select key papers

20 minutes

In their discipline-specific teams, students narrow the list of papers to 10 key ones.

Step 4: Synthesise findings

30 minutes

Each team discusses the findings from the key papers and then synthesises what this demonstrates in answer to the question:

What is the contribution of your discipline to our understanding of under-five child mortality?

Step 5: Prepare a presentation

30 minutes

Each team prepares a presentation to summarise their answers to the question. Recommend one slide per minute and give a time limit of eight minutes per presentation.

Session 8. Present Contributions by Discipline | 2 hours

In this learner-led session, students present the contribution of their discipline to the understanding of a public health problem. They also share their insights into the epistemology of their discipline.

Preparation

As the facilitator

- Watch or re-watch the CARTA video: [Multidisciplinarity](#). Note that this is an aid to your preparation, not for students.

Outcomes

By the end of the session, students can:

- Discuss the role of the different disciplines in solving public health problems.
- Discuss how the epistemology and methodologies of any discipline shape the types of contributions that that discipline can make.

Steps

Time	Step	Who
90 minutes	1. Present: The role of our discipline	Discipline-specific teams to whole group
30 minutes	2. Discuss presentations and insights	Whole group

Step 1. The role of our discipline

90 minutes

Each team takes a turn to present their findings in PowerPoint. They have eight minutes per group, plus five minutes for follow-up questions of clarity.

Step 2: Discuss presentations and insights

30 minutes

Invite the full group to identify any 'Aha!' moments and what caused them. Ask:

What did you learn for the first time from these presentations?

What have you learned from the jigsaw so far?

Session 9. Conduct a Multilevel Analysis of Social Determinants of Health | 2 hours

Drawing on their literature reviews, students work in discipline-specific groups to cluster social determinants at different levels: individual, household, community, national, and global. They explore the links between them. Together as a full group, students map out a conceptual framework.

Preparation

As the facilitator

- Watch or re-watch the CARTA video: [Multidisciplinarity](#). Note that this is an aid to your preparation, not something to show students.
- Prepare a presentation to define and explain 'social determinants of health'.
- Bring sticky notes in five different colours, and string.
- Set up a board with headings matching the colours of the post-it notes:
- Individual | Household | Community | National | Global

Outcomes

By the end of the session, students can:

- Explain the social determinants of health.
- Apply a multilevel framework to analyse how social determinants operate at different levels.

Steps

Time	Step	Who
20 minutes	1. Present: Social determinants of health	Facilitator
30 minutes	2. Identify social determinants	Students in discipline-specific groups
60 minutes	3. Create a multilevel framework	Full group
10 minutes	4. Trace the impact of social determinants	Volunteers, full group

Step 1. Present: Social determinants of health

20 minutes

Introduce the concept to the whole group, with examples. Invite questions and comments. Explain the activity to come and distribute sets of sticky notes. Explain which colour signifies which level: individual, household, community, national and global.

Step 2: Identify social determinants

30 minutes

In their discipline-specific groups, students draw on the findings from their literature searches to identify various social determinants of the specific public-health issue. (The example in the video is under-five mortality and morbidity in Uganda). For each determinant, the group discusses the level at which it operates: individual, household, community, national or global. Examples could be:

- Health knowledge at the individual level.
- Household income at household level.
- Distance from the nearest clinic at community level.
- Policy at national level.
- Migration at a global level.

They write down each social determinant on a sticky note in the relevant colour.

Step 3: Identify social determinants

60 minutes

In the full group, invite a spokesperson from each small group to place their sticky notes in the relevant section (as demonstrated in the video). For each determinant, the student explains why they decided it should fit at that level and how it operates as a social determinant. Encourage discussion, especially if the determinant is not placed at the correct level.

Explain that, together, the group has created a research framework, and populated it. Discuss the ways in which different disciplines contribute important and often very different kinds of knowledge.

Step 4: Trace the impact of social determinants

10 minutes

Describe a different case – for example, a 40-year-old man who develops Diabetes Type 2. Invite one or more volunteers to use string to trace how social determinants might influence health outcomes in this case.