

Interdisciplinary Dialog-Facilitating Activities

Disseminating Stage

Activity 7.

“Making of knowledge” Research-cycle Flowchart.

A research process flow-chart to help educators explain the steps their disciplines take in turning complex, organic realities into discrete, structured idea-frameworks.

Activity 8.

“Good Cop, Bad Cop” Team-Teaching Role Play Lab.

A team-teaching role-play lab to help educators troubleshoot the way they communicate interdisciplinary work to novices.

Activity 9.

“Eight Frames” Communication with Audiences Storyboard.

A comic-style illustration activity to help presenters condense their messages to one vivid sentence, explained by a coherent visual narrative of essential moments.

Activity 10.

“Interdisciplinary Principles Reflection” Synthesis of Experiences and Insights Journal.

A journal meta-reflection to distill all the lessons that participants have realized about making collaborations work.

Activity 7.

“Making of knowledge” Flowchart.

WHEN: As participants begin preparing to share their interdisciplinary research, knowledge, or experiences with novice audiences (students, the public).

WHY: To practice explaining the strengths and boundaries of knowledge-building in each discipline.

HOW: Analytically describing the steps of producing knowledge in one's own field—including the challenges, benefits, and limits of that approach—and making a map to help summarize that cycle people outside your field.

STEP 1. Describe your Level of Experience in your Field.

On a blank sheet or [[Research Flowchart Handout](#)], begin by listing the research methods, in your field of study, that *you understand* well enough to:

- (a) feel comfortable *doing*;
- (b) feel comfortable *describing*, and could do with a little prep or help; or
- (c) know that the method *exists* in your field, but aren't well-versed in yourself

STEP 2. Three Memorable, Valuable Pieces of Research.

Now, in the next section, think of a few studies from research literature in your field that stand out in your memory as *really valuable* (well-researched, well-presented, important/interesting findings). Describe:

What *methods* they use.

What *sources* they seek (people, places, things) for evidence.

How they *extract/organize data* from these sources (collection processes/actions/tools).

What *data* this provides them (that product's form/function).

What they do, *analytically*, with this data (interpretation processes/actions/tools).

What *findings* they draw from this process (information about [a phenomenon], knowledge on [a topic], theories of [a big-picture concept],).

STEP 3. Challenges and Limits of Research.

Reflect on your own research experiences (e.g., coming up with a question, designing a protocol, collecting and analyzing data, looking for something worth saying in those results) and those of others.

Put a human face on these research approaches—the challenges and limits of *Sources*, *Data*, and *Reality* within your field:

Describe the realistic (potentially problematic) *attributes* of your research Sources, Data, Selective Aspects of Reality.

List some of these *problems* that you've seen or experienced regarding Collection (e.g., contaminating source-material), Analysis (e.g., corrupting data), Findings (e.g., biasing analysis, over-reaching claims).

Name some of the *boundaries* for these methods: outside of what they show really well, what do these Sources, Data, Selective Aspects of Reality not allow you to see into well?

STEP 4. The Question-to-Questions Cycle of Research.

On a [[Big Blank Page](#)], draw a picture that illustrates the research experiences you've outlined above—the practical flow:

from *motives/ideas* (the for-whom & why), to *plans/strategies* (the where/when & for-what), to *actions/responses* (the how), to *findings/boundaries* (the next layer of why...)

in building out a knowledge-field—dotted with challenges, surrounded by external factors that press in on that flow. Make it clear for yourself, so you can make it clear for your students: this is research.

(In my field. At this point in history. As I have experienced it).

The Real Story of “Making Knowledge”

(Research Flowchart Activity)

Every Knowledge-Field has, by trial-and-error, developed specialized ways of researching questions about *some aspect of* human reality. Each Field's way of researching a question—and working toward a fuller, more accurate understanding of that topic—has particular *strengths* (what that type of inquiry highlights, isolates, distinguishes, or connects) and particular *limits* (its blind-spots, biases, distortions, unexamined edges).

As a Member of your field (however recent or established) you have seen these issues playing out—in literature, labs, sites of research. This experience makes you a *valuable asset* to your students, in conversations about research: what it is, how it {or the lack of/need for it} impacts their lives, what types of questions they're interested in, what types of research might be used to explore those topics or issues, and why MANY fields are needed to create a full picture of any real-world issue.

***Leading those conversations begins with you acknowledging where your expertise lies—and the boundary lines, beyond which you are still a learner. Showing both sides of your expertise (specific knowledge; limits of knowledge) sets the tone for an interdisciplinary learning environment: honest, explicit, humble, respectful, collaborative, supportive.** So make sure you are ready to do that, when the moment calls ... Making a map might help you:

Step 1 – “Off the top of my head...”

Warm up your brain by listing off research methods, in your field of study, that you (a) feel comfortable doing; (b) feel comfortable describing, and could do with a little prep or help; and (c) know others do in your field, but aren't well-versed in yourself.

MY FIELD: _____			
<p>My Research O --- --- ^ /... \ Experiences</p>	I can do...	I can understand...	I've heard about...

Step 2 – “A few of my favorite (researched) things.”

Which studies that you've read, in research literature from your field, stand out to you? *Ones that you see as really valuable (well-researched, well-presented, important/interesting findings). What methods do they illustrate ? What sources (people, places, things) do they seek? By what processes (extraction tools/actions) do they collect data from these sites? What kind of data (its form, function) does this give them? What do they do, analytically (interpretation tools/actions), with this data? What sort of findings (information about ___ phenomenon, knowledge on ___ topic, theories of ___ big-picture concept) do they draw out from this process?

Here! Use this chart to tell the story of that basic protocol:

A Study(ies) I really liked _____ learned what it learned, in this way:		
Method:	Sources:	→ processing:
	Data:	→ analyzing:
	Findings:	
Method:	Sources:	→ processing:
	Data:	→ analyzing:
	Findings:	
Method:	Sources:	→ processing:
	Data:	→ analyzing:
	Findings:	

Step 3 – “A closer look.”

Presumably, you've done some of these types of research, yourself: come up with a question, designed a protocol, collected and analyzed data, looked for something worth saying in those results. Put a human face on these research approaches—what potential problems do you see, and have to avoid (contaminating source-material, corrupting data, biasing analysis, over-reaching claims)? List some of these problems that you've seen or experienced. What are the boundaries of these methods: outside of what they show really well, what do they not allow you to see into well?

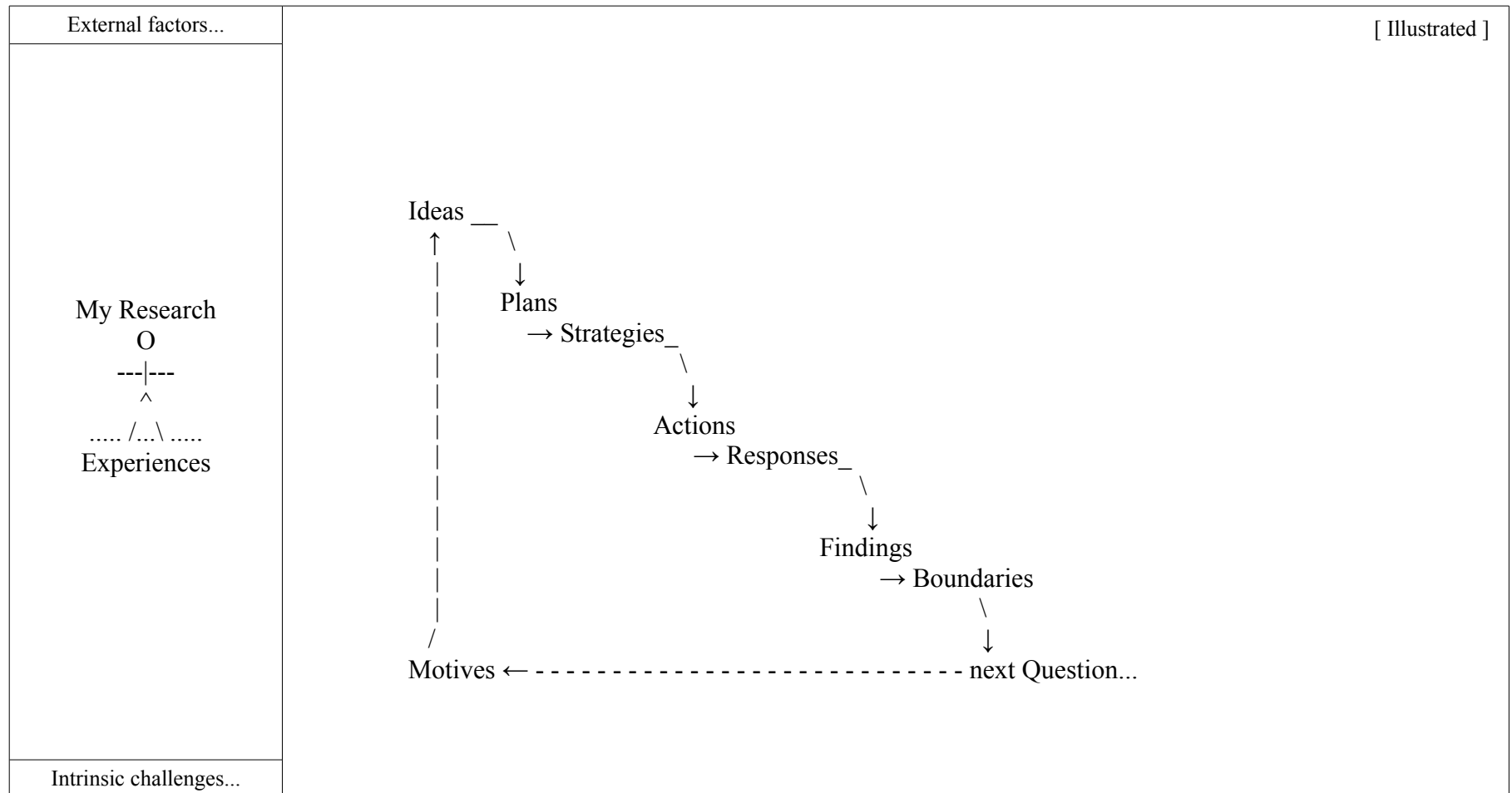
Use this chart to guide your reflection through research experiences—first-hand, or that you've seen in the work of those around you:

Doing this research _____ is challenging because:	
Sources are ...	And Collection can be ...
(descriptors)	(challenges)
	(limits)
Data are ...	And Analysis can be ...
(descriptors)	(challenges)
	(limits)
Reality is ...	And Findings can be ...
(descriptors)	(challenges)
	(limits)

4 – “Bringing it all together.”

Draw a picture on a blank page (you can sketch out initial ideas on the image below), that illustrates the research experiences you've outlined in Steps 1-3: the flow of practical actions from initial research *motives/ideas* (the for-whom & why), to *plans/strategies* (the where/when & for-what), to *actions/responses* (the how), to *findings/boundaries* (the next layer of why...)—all dotted with challenges, surrounded by external factors that press on, complicate, put limits on that flow.

Make it clear for yourself, so you can make it clear for your students: this is research.



Activity 8.

“Good Cop, Bad Cop” Team-Teaching Role Play Lab.

WHEN: As participants prepare to work with students in classrooms on interdisciplinary topics.

WHY: To practice working with students’ beginner attitudes and ideas about interdisciplinary research, using resources we’ve created to focus and clarify these educational exchanges.

HOW: Role-playing as Teachers and Students, imagining potential struggles, and testing strategic approaches for (a) answering questions quickly and satisfactorily for students, while (b) keeping to your main point.

STEP 1. “Lesson Plan.”

Grab a partner. The two of you are now a teaching team. Pick a topic, related to your disciplines (that both know in common, or each understand an aspect of), to discuss with your “class” (i.e., rest of the group).

* *Choose a topic you enjoy, and can sell to us (your students) as interesting/important!*

* In your lesson, explicitly discuss the value of bringing together multiple disciplines’ (A) perspectives, (B) approaches, and/or (C) methods. Help students see how the fields involved help one another to more deeply (a) perceive different aspects of the issue/problem, (b) analyze and think through potential roads to address that issue, and/or (c) collect information and utilize data to inform and support practical progress regarding that topic.

* Map out the main points you want to make, and any examples/analogies/questions you will use to drive home those points for a non-specialist audience. Aim to “teach” for about 5-10 minutes.

STEP 2. “Classroom Time.”

Teach us (we are your “class”). Each of us will choose to be one of two types of (open gender) students: **Dawn/Don the Dreamer**, and **Bobbie/Bobby the Bullhead**. As you teach, we will use the sample [[Disciplinary Novice Questions](#)] to think of questions and comments that will challenge you to be clear and stay focused on your main point.

As **Teacher 1**, your job is to (1) show understanding and respect for those students’ novice ideas as thoughtful and genuinely felt, while **Teacher 2** (2) clarifies the Reality of interdisciplinary research collaboration, explaining reasons why events play out differently than a novice might imagine. As a team, transition from showing students they’re understood to explaining what further realities they need to understand.

* **Switch Roles!** Trade between being the “Good (Empathetic, Respectful) Cop” who sees and voices what is valid and relevant in students’ tangential points, and the “Bad (Assertive, Direct) Cop” who steers that topic persuasively back toward the main points of your lecture.

* **Student Mindsets:** *Dawn/Don* has a general-but-uninformed appreciation for interdisciplinarity—and feels resistant to the notion of “going deep” with any one field’s approach or vision, for fear that “marrying” into one discipline undermines the open-minded utopia of being with ALL disciplines {Mmm}. *Bobbie/Bobby* rolls eyes at most disciplines, except one (their favorite one)—and thinks that other disciplinary perspectives are less valid and interesting (conceptually/morally), less useful and relevant in life (practically), and/or less rigorous and predictive in their findings and models {OoOoh}.

* **Key Points** to consider explaining for students: the necessity of *discrete disciplinary specialties* withIN a collaborative utopia; the *complimentary work that different approaches bring* in creating a stronger, more complex and accurate view of a research topic; and the *challenges and rewards* intrinsic to that cross-cultural building of knowledge—as you have experienced it.

* **Use your resources:** *the journals, maps, and notes you’ve created—they’re part of your resources for teaching now!* (e.g., *Knowledge-Making Flowchart*, *Disciplinary Crib-Sheet*, *Dialog Journals*)

Disciplinary-Novice Questions

Sample Questions – from Idealists (*Dawn/Don*):

- How does this approach incorporate the perspectives of ____ (unrelated/irrelevant here) field?
- If this approach to this problem is mostly using ____ and ____ perspectives, how is it truly “interdisciplinary” in the full sense of the term? That's just two disciplines.
- If you're asking us each to look at this problem from a certain specific discipline's lens, isn't that working *against* being interdisciplinary?
- I don't believe in pigeon-holing myself in one specific discipline's dogma—where do I go to get research experience with true interdisciplinary academics?

Sample Questions – from Skeptics (*Bobbie/Bobby*):

- This approach doesn't utilize (my favorite) method, questions/ideas, conceptual lens. That would make this better.
- This problem could be addressed using (my favorite) disciplinary tools and frameworks alone. Why does it need to force in these other laborious perspectives?
- Maybe these other perspectives bring in good initial questions, but (my favorite) one discipline's methods of research and reporting would be much better at following through and providing answers to those questions.
- The (my favorite) strategies for thinking through problems and methods for researching topics are well-structured and time-tested for dependable / reproducible / useful results. Why do I need to know about these other fields' methods—that I'm *not* interested in, and that I'm *already* well-equipped without?

STEP 3. “Teacher Meeting – How was Class?”

Once all groups have taught—and everyone has been both an expert Teacher and a novice Student—discuss what went well, what was challenging, what did and did not help in addressing those challenges ... and what teaching principles you can take away from that, for the future.

* **Be specific!** Remember what students asked; analyze what made it distracting/off-putting or otherwise hard to turn into a teaching moment, and direct back to the lecture. Remember what you said; what well-chosen words, logical connections, or concrete examples helped bridge the gap between the students' minds and yours?

* **Generalize!** What notes-to-self can you take away from this, for the next time you're in a position to explain complex interdisciplinary work to a group of disciplinary beginners?

ACTIVITY STEPS: Team-Teaching Role-Play

Lesson Plan — Grab a partner. Plan out a mini-lesson (about 5 minutes long) on a topic, related to your disciplines, that you enjoy! to discuss with your “class” (i.e., rest of the group). In your lesson, help students to see how bringing together multiple disciplines can (A) highlight different aspects and nuances of an issue, (B) offer multiple ways to analyze and think through ways to address that issue, and/or (c) provide additional sources of data to inform and support that research. Map out the main points you want to make, and any examples/analogies/questions you will use to drive home those points for a non-specialist audience. (~10 minutes to prep)

Classroom Time — Introduce your lesson, and then take questions. Decide who each of you will be: **Teacher 1** is to show understanding and respect for students’ novice ideas as thoughtful and genuine, while **Teacher 2** explains the reasons why the Reality of interdisciplinary research collaboration plays out differently than a student might imagine. As a team, you'll transition from showing students they’re understood to explaining what further realities they need to understand.

As a class, the rest of us will choose to be one of two types of (open gender) students: **Dawn/Don (idealist)**, and **Bobbie/Bobby (skeptical)**. As you teach, we will ask questions and comments that will challenge you to be clear and stay focused on your main point.

Sample Idealist Questions:

- How does this approach incorporate the perspectives of _____ (unrelated/irrelevant here) field?
- If this approach to this problem is mostly using _____ and _____ perspectives, how is it truly “interdisciplinary” in the full sense of the term? That's just two disciplines. Isn't looking at this problem, from a specific discipline's lens, working *against* being interdisciplinary?

Sample Realist Question:

- This approach doesn't utilize (my favorite) method, questions/ideas, conceptual lens. That would make this better.
- This problem could be addressed using (my favorite) disciplinary tools and frameworks alone—which are well-structured and time-tested for dependable, reproducible, useful results. Why does it need to force in these other perspectives? They seem unnecessary.

Teacher Meeting — Once everyone has been both in both roles—an expert Teacher and a novice Student—discuss as a group what went well, what was challenging, what helped in addressing those challenges, and what teaching principles you can take away from that, for the future. * **Be specific!** Remember what students asked; analyze what made it distracting/off-putting or otherwise hard to turn into a teaching moment, and direct back to the lecture. Remember what you said; decide which well-chosen words, logical connections, or concrete examples helped bridge the gap between the students' minds and yours. * **Generalize!** What notes-to-self can you take away from this, for the next time you're in a position to explain complex interdisciplinary work to a group of disciplinary beginners?

Activity 9.

“Eight Frames” Storyboard.

WHEN: As group members prepare to present interdisciplinary work to mixed expert audiences (e.g., at conferences or in publications).

WHY: To craft a story that is accessible to multiple single-discipline perspectives.

HOW: Distilling the most important points of a complex project to a single sentence, and illustrating the progress of those elements together in eight (or fewer!) image panels.

STEP 1. The Point (One Sentence).

Everyone take out [Scratch Paper] and a [Pen]. Fold your paper into 3 equal parts—top, middle, bottom—and start writing about your work, in 3 stages:

◇ **Verbs, nouns, phrases: what *most important* terms do you need to tell your story?**

* Think about your story's topic, as concretely as possible. What are you looking at (places, things, people, events, interactions, patterns)? From what angle (theoretical perspective, practical concern)? With what tools (field recorders, microscopes, computer simulators, historical logs)? To find/explore/expand what detail (something focused, definite, important to you)? To change or improve what in the world (a common idea, definition, attitude, belief, practice)? WRITE! Stream-of-consciousness, simple concrete, non-linear, clumped and/or scattered, all over the top 1/3 of your page.

◇ **State the main point of your paper in 1 sentence.**

* If it's hard to write out your complex sentence from a cold-start, try starting with a series of your *single words* and/or *simple sentences*: write them down, think about how they relate, and assemble them into a more complex sentence that captures your point. (not all the details, just the essence.) Draft/edit/cross-out/re-arrange this sentence into something you like, in the middle 1/3 of your page.

◇ **Summarize the story leading to that point in a stream-of-consciousness paragraph.**

* Look at all the parts you listed, relating to the main point. Don't think! *Just start writing*: what is *true*, what is *important*, what have you *learned*? What's the *problem*, where is *more/better* needed, how can this work *help*? What do many people *not know/misunderstand*, how do you *clarify/define* this idea, what makes it *valid/trustworthy*... State the Potent Facts, Relevant Situations, and Defining Details that make your topic compelling (i.e., that persuade someone with fresh ears: “I should listen to this”). Write this out in the bottom 1/3 of your page.

STEP 2: The Journey to that Point (8 Frames).

Now everyone will need a [Large Sheet of Paper] and [Mid/Large Sized Sticky Notes]. Pick up your pen:

◇ **Prepare the story space.**

* At the top of your large sheet of paper, copy (from your drafting page) that 1-sentence summary of your work as a guiding mantra.

◇ **Break the story into visual moments.**

* Now read over that sentence, and your paragraph that outlines the story/journey leading to that central thesis, and start illustrating the *key moments* inside this narrative: they can be from *your* perspective (a personal “Aha!” moment) or a *universal* one (an archetypal real-world situation), framed around a *small* detail (a single neuron sparking) or a *broader* situation (a city filling with traffic), showing *objective* realities (an adult intensely scolding a child) or *subjective* experiences (a fiery monster reflecting in that child's eyes). Draw each moment on a sticky note, capturing the essential points in whatever visual way you think is clearest. (Rely minimally on words, here.)

◇ **Group the moments and boil them down to 8 main ones.**

* Some of your moments may be a *string* of First-Then-Next scenes, or a *clump* of These-Details-All-Lead-To-X, or *parallel* tracks of While-This-Here/Also-That-There, or a *contrasting* dialog of A-Valid-Point/But-On-The-Other-Hand. Can you combine or boil-down these moments into a more synthetic single image? Is there one moment in a clump that communicates most of the meaning on its own, even if the others are removed? Look at your main thesis again and think about what is essential: narrow down your note-cards into 8 essential frames.

STEP 3. The Order of Frames.

Now that everyone has their key elements selected, start arranging and composing them visually in a manner that fits the content, that reflects the movement and energy and emphasis, of the story. Use a table-top or the “big sheet” itself to plan this layout:

◇ What comes first? First frame.

* Take a step back from what you know; slip into the fresh mindset of a *learner*, hearing your story for the first time. Where do you start? Not necessarily what comes first chronologically, but what is the *first image* you want to immerse your audience's mind in? Is it a *big picture* that sets a scene? Is it a powerful emotional/visceral/*vivid action* that persuades their personal investment? Is it a *relevant end-point* that highlights the purpose or ideal outcome of your work? Or is it a *clearly defined object* that signals to them your topic? Decide on what base you want to build up your audience's understanding.

◇ What will keep them here? Middle frames.

* *Time* will probably guide your arranging of many frames (clearly, X leads to Y). But let a few other principles also inform the order that you decide on for these middle frames.

First, what is *important*? If the audience stops listening mid-way (because the room catches fire), what do you want to make sure they leave there thinking about? Get to that as soon as possible. You can add details later, that fill in and enrich ... but start with the big, valuable nuggets.

Second, what is *convincing*? If the audience agrees with you, “This is valid, useful, relevant-to-me information,” then they will pay eager and respectful to you as you speak. But you have to earn that attention, from the outset. So make sure that “What” (the topic) and “Why” (the value) are elements present early in the images of these moments.

Third, what is *new/surprising*? Once you have defined the scene and set up the tension/curiosity, deliver! Show people something that draws them beyond their common sense, their quotidian expectations, their cultural think-boundaries and into that “Aha!” moment that you had: the driving spirit or warrant of your thesis.

◇ What will help them remember? Last Frame.

* You have been ordering these moments so that they flow *intuitively*, building from a *familiar/clear* base to a *novel/stimulating* end. What is the image that encapsulates, synthesizes, *resolves* your flow of moments? What pulls the story together so that it fits neatly as a whole—story, chapter, snapshot—into your audience's mind? Make that the last image.

STEP 4. Finalize.

Give people [Pencils] and [Bold-lined Markers], maybe [Colors]. Now that you have a vision in mind, map out that story on the big sheet.

◇ Bring the frames together! Drawing a big picture.

* Arrange your 8 sticky-note moments as you want them to flow, on your scratch paper, as a guide. Moving to your big paper, start with pencil and *map out* how these 8 images will flow: left-to-right? Columns? A snaking S-shape? Then *trace-and-draw* in more detail with ink, and *add highlights* of color/shading.

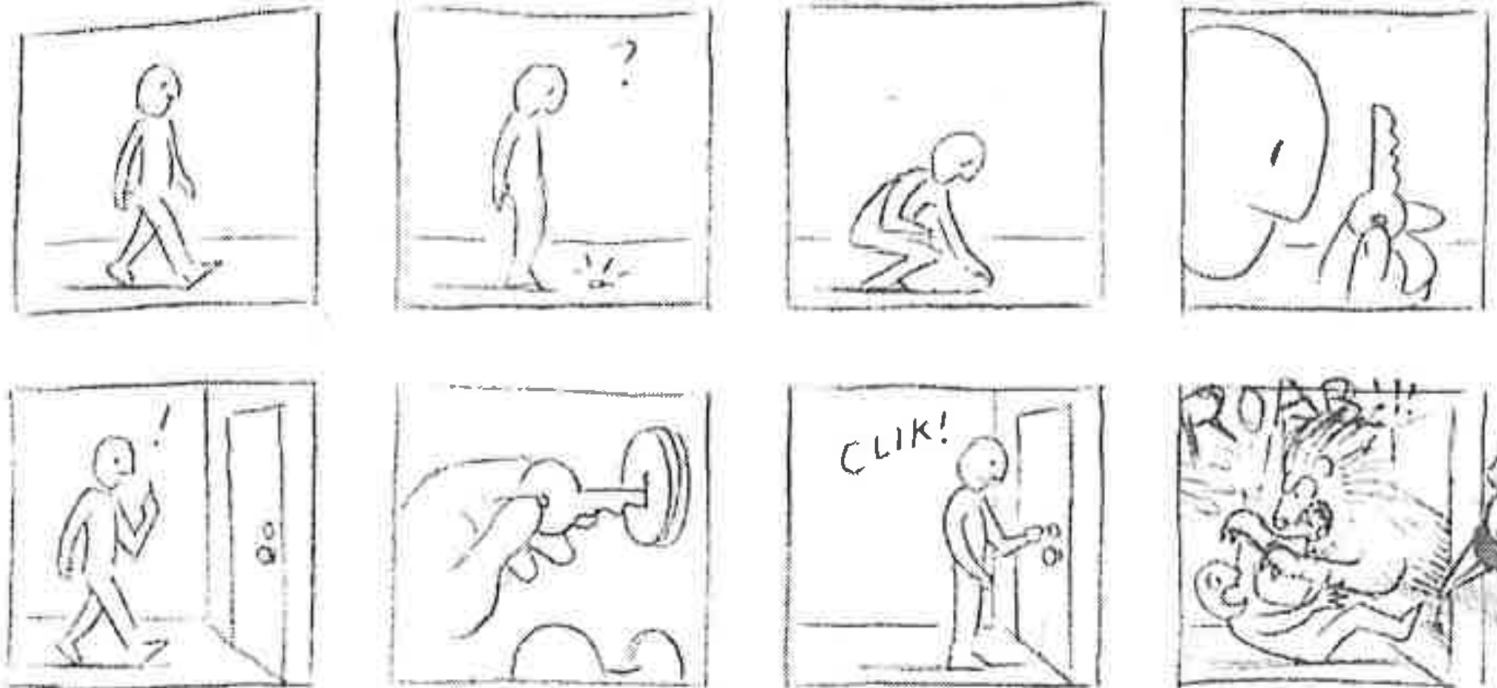
Take a step back and enjoy: your story, told on one page, as a clear and dynamic flow of moments.

Introduction: “Storyboarding an Interdisciplinary Learning Process”

To make an interdisciplinary project clear to your audience, you must **remember your own learning path** to seeing how disciplines work together. What *confused* you, in each field's scholarship (ideas, techniques, terms)? What helped you make *sense* of those key details (e.g., examples, analogies, explanations)? And what *connections* did you start seeing, across those perspectives? Starting with the **Main Point** that you'd like to make about this topic, then trace the path of **Key Moments** in your learning process that lead to that point, and decide in **What Order** these moments should unfold to help the audience follow along your path of learning.

Clear Communication through Choice of Moment & Frame

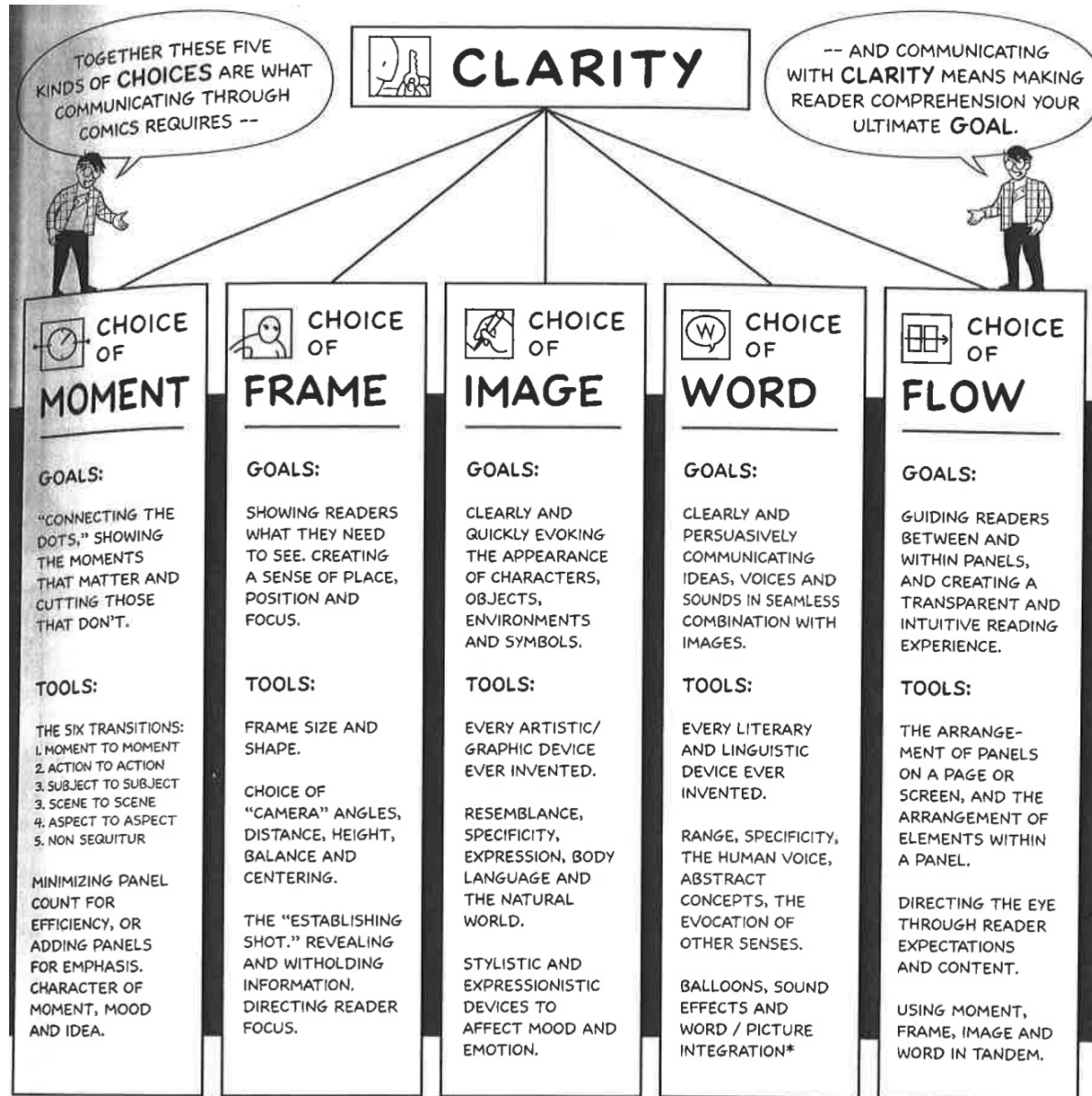
(Scott McCloud, *Making Comics*, 2006)



“Man is walking (1), finds key on the ground (2-4), takes it with him and then comes to a locked door (5), unlocks the door (6-7) and a hungry lion jumps out (8).”

* **“Key frames”** are the essential moments of a story-as-image. Once YOU identify your story's (i.e., research paper's, etc.) main point, you can look at ALL of its pieces (*definitions, data, analysis, synthesis*) and intentionally select those moments that are most crucial to reaching that main point: the *core ideas* (e.g., in crucial summary sentences and visuals) and *key transitions* that connect these core ideas.

* Of course, you can always add more information in, but it's important to begin here: with **what is essential** (i.e., take any frame away, and it changes/makes less clear the main point).



* From there, you can further improve clarity and persuasive power of your storyboard by refining your choice of Moment (remove panels for efficiency, add for emphasis), as well as Frame (change size/shape, angle/ distance, etc., to direct reader focus), Image (add detail, expression, posture, resemblance among objects), Word (adding ideas/voices/sounds), and Flow (arrangement, direction to guide viewer).

ACTIVITY STEPS: “Eight Frames” Storyboarding

The Point (One Sentence) — Take out [Scratch Paper] and a [Pen]. Fold your paper into 3 equal parts—top, middle, bottom—and start writing about your work, in 3 stages:

- ◇ **Verbs, nouns, phrases: what *most important* terms do you need to tell your story?** Write stream-of-consciousness, simple concrete, non-linear, clumped and/or scattered, all over the top 1/3 of your page.
- ◇ **State the main point of your paper in 1 sentence.** Start with a series of your *single words* and/or *simple sentences*: write them down, think about how they relate, and assemble them into a more complex sentence that captures your point (not the details, just the essence), in the middle 1/3 of your page.
- ◇ **Summarize the story leading to that point in a stream-of-consciousness paragraph.** Look at all the parts you listed, relating to the main point. Don't think! *Just start writing*: what is *true*, what is *important*, what have you *learned*? bottom 1/3.

The Journey to that Point — Now everyone grab a [Large Sheet of Paper] and [Mid/Large Sticky Notes]:

- ◇ **Prepare the story space.** At the top of your large paper, copy that 1-sentence summary of your work as a guiding mantra.
- ◇ **Break the story into visual moments.** Read over your paragraph about that central thesis, and start illustrating *key moments* inside this narrative. Draw each moment on a sticky note, in whatever visual way (rely minimally on words, here).
- ◇ **Group the moments and boil them down to 8 main ones.** Some of your moments may be related (first, then __; details, leading to __; this, meanwhile that __). Can you combine these moments into a more synthetic single image? Are their frames you can remove and still understand the main thesis?: narrow down your note-cards into 8 essential frames.

The Order of Frames — Now start arranging and composing your 8 key elements visually on the “big sheet.”

- ◇ **What comes first? First frame.** Slip into the mindset of a *learner*, hearing your story the 1st time. Where do you start?
- ◇ **What will keep them here? Middle frames.** *Time* will probably guide your arranging of many frames. Consider also: What is *important*? (center this) What is *convincing*? (highlight this) What is *new/surprising*? (build toward this)
- ◇ **What will help them remember? Last Frame.** End with an image that resolves, synthesizes, pulls the story together.

Finalize — Start with [Pencil] and *map out* how these 8 images will flow. Then *trace-and-draw* in more detail with [Bold-lined Markers], and add [Colors] to *highlight*. Take a step back and enjoy: your story, told on one page, as a clear and dynamic flow of moments.

Activity 10.

“Interdisciplinary Principles Reflection” Synthesis Journal.

WHEN: Toward end (or before breaks) in a project, when experiences and learning are fresh. Do with participants first. Then share these anonymized insights with leaders, who can do their own reflection.

WHY: To summarize patterns recognized, practical strategies learned, attitudes and ideas developed about doing interdisciplinary work.

HOW: Reflective journaling, using prior journals (activity 6) to stimulate recall, to synthesize personal experiences in the group, clarify personal take-aways, and share those perspectives with each other.

STEP 1. Pick a time to Reflect.

Periodically, at big junctures—say, right after a phase-shifting breakthrough in the project, that everyone recognized; or after the completion of a major goal—take a page to reflect on the larger arc of your progress and learning:

Pick a time and a relaxed, quiet location (a small cafe, a restaurant patio, a shaded courtyard) to meet. Prepare to bring with you, each person individually, a synthesis of your journal insights—see next steps.

STEP 2. Review the Progress of Journals.

Look back at your old entries and see how your perspective has changed (what initial ideas / attitudes / habits been reaffirmed and refined? What statements do you now look on as simplistic or inaccurate? Which observations do you see as most essentially valuable and consistently relevant in your fluency and awareness as an interdisciplinary thinker, researcher, teacher, group member?

STEP 3. Write about your Learning.

Open a blank journal-page or a [Synthesis Journal Template]. For these moments of wider-lensed reflection, invert the proportions of the previous journal pages, making more effort to:

- (1) Be succinct and clear in describing the arc of concrete progress, and patterns observed there (distill your order of revelations in practice, and the path of learning/refining that you have worked through), and
- (2) Spend time expanding your commentary on what works and doesn't in yours/peers' direct experiences, and principles that help you to make sense of possible reasons behind those moments of success or failure (clarifying the practical elements that worked in these particular situations, and the general ideas that might help people translate those successes in other unique, distinct interdisciplinary situations).

STEP 4. Share.

Come together as a team, to acknowledge challenges, appreciate helpful efforts, and bring together your insights by sharing these reflections—to maximize the benefit of these experiences for the group.

***The goal here is NOT for you to elucidate the ultimate, end-all-be-all truth of Interdisciplinary Research in its best possible form, but RATHER for you to name more explicitly what was true and useful for you in Learning to do IDR, personally, in specific situations.**

If you have a facilitator or dedicated note-taker, collect these ideas and feedback into an [Anonymous Participant Reflections sheet] that can be shared with the group's leaders, so that they can benefit from these candid participant views—potentially using these insights to adjust the project structure, or future projects that they lead, looking forward.

Synthesis Journal Template

Name: _____

Project: _____

Story – what changed; the flow of learning:

Narration – your personal take-away from these learning experiences:

Patterns – prominent archetypes, important details and interconnections that you recognize:

Principles – general notions as foundations for others' practice in new, unique situations:

Example Synthesis Journals: *Grizzly Reintroduction Project*

SAMPLE 1: 6/6/2017 – Ideas from journals

- Ecologists tend to dominate the discussion, perhaps we need to step back or bring in more from other disciplines
- Don't be afraid to ask questions – what is that term, should we consider this other perspective
- Reactions from biologists to human subjects/research on humans, clear we don't feel comfortable with this - lack of understanding of methods for political science
- Make connections to different disciplines – Dr. B connecting SI methods to history (detective story, go with what you got) – talk about similarities and differences between methods
- Moments of realization that the ways of thinking are different between disciplines
- Disciplines use the same words in different ways, or they mean different things (e.g. evidence)
- Keep mind open, don't react quickly, think about it

Principles:

1. Keep your mind open – play the believing game

This is the first principle one needs to grasp if working in an interdisciplinary group, and it is certainly easier said than done. Keeping your mind open means not immediately rejecting ideas that make you uncomfortable or with which you do not necessarily agree. It is all right to feel uncomfortable; in fact, it is important to acknowledge the feeling and ask yourself why you might be feeling that way. Why does the statement the ethicist made make me feel uncomfortable? What is different about the way they are thinking from the way I think? It could help to take a moment and play the believing game: try to imagine the other person's (or discipline's) point of view and why they value that method, line of questioning, etc. This can help you understand where they are coming from and how it may be similar or different to your perspective.

2. Ask questions!

Once you have attempted to understand the other discipline's point of view, it may be that there are some unresolved questions you have about their statement, methods, or other topics. It is important to speak up and ask: "What do you consider evidence?" "How do you find your sources?" Frequently there are terms that might be unknown or used in a different way in your discipline, and for a productive discussion it may be necessary to directly ask to have those terms defined.

3. Create glossary to define terms

With a multitude of terms that are either unique to a discipline or used by disciplines in different ways, it could be helpful to put them all together into a glossary for future reference. Each time a new term comes up, or a disagreement about what a term means, add it to the glossary.

4. Talk openly about process of research (questions, methods, assumptions, etc.) and compare similarities and differences

One notable area of difference (and similarity) in our group is the methods by which disciplines pursue lines of inquiry. The grizzly group made a point of having individuals talk openly about their methods and reasoning, followed by a discussion about how those methods might be similar or different to other disciplines. It was clear from some of these conversations that there were methods that were less comfortable for certain disciplines (for example, methods of philosophers for ecologists, or methods of studying humans for ecologists). However, there were also instances where similarities were found between disciplines; for example, stable isotope analysis was compared to research in history and found to have a similar tone of detective work based around clues left behind. To productively work together as an interdisciplinary research group, we must have an understanding of how the different disciplines go about asking questions, finding answers, and interpreting those answers. To do so, it is important to openly discuss the process of research of each discipline.

5. If one discipline encompasses the majority of the group, be aware of the other perspectives

Finally, in a situation where there are a large number of individuals from one discipline (in our case, ecology/environmental science), it is important for those individuals to be aware that there are other perspectives in the room. It may be necessary to take a step back to allow other voices to be heard, or to directly ask the opinion of other disciplines if there is a concern that their perspective hasn't been heard. I saw this done well and done poorly in our group, and we are more likely to have a truly interdisciplinary discussion when each person is aware of their discipline's need to step up or step back.

Sample 2: Big Reflection/Distillation toward better Teaching Practices:

Based on my experiences this year in the Grizzly group and in the GRAD210 Pedagogy course, I feel that I have better insight into, and am equipped with a more robust toolkit in order to understand, educational dynamics and communication dynamics within an academic setting. My big takeaway (possible pedagogical value), and its attendant facets/explanations/sub-takeaways/sub-values, from these experiences can be distilled as such:

1. Be able to read the room/know your audience/be responsive to changing classroom situations while still remaining “true to yourself” as a person, student, researcher, mentor/mentee, educator, etc..
 - a. Anticipate and embrace (helpful) discomfort as this might indicate people grappling with threshold concepts. Be open to having open dialogue so people can talk out/explain what they’re having trouble with, ask questions, verbalize their feelings, etc.
 - b. Try to be aware of when and in what ways one might have “disciplinary blinders” on. Relatedly, even if not “disciplinary” per se, be aware of what your vested interest is in the topic being discussed—what’s your dog in the fight? Are you interacting in a way that might not be helpful/productive/the best use of time because you are specifically invested in this subject/person? Do you treat speakers equally? Should you?
 - c. We all (can) learn together → we learn by interacting with others; a learning environment never has to be a one-way street or a zero-sum game.
 - d. Cognitive and affective domains are often inextricable in learning settings, perhaps even more so in interdisciplinary/multidisciplinary settings. Humor and humility is a great olive branch/bridging element.
 - e. Be aware that people are only human – we are all in some way prone to the frailties, inconstancies, vulnerabilities, etc. of the human condition. Be mindful of what people pay attention to and why they might pay attention to it. Similarly, be aware of what you pay attention to and why you might pay attention to it—thinking this through might help elucidate some hidden biases in yourself that you were previously unaware of. Understanding your own biases can help you mitigate or eliminate these biases, thus making you a more constant and effective teacher.

Sample 3: Overall take away from Journaling about Grizzly Seminar Spring Quarter 2017:

I especially enjoyed the speakers on black bears. I think this is because they seemed the most realistic and down-to-earth. They understand the interdisciplinary notion of conservation. They do not label themselves as just ecologists and biologists, they are writers of children’s books, they are educators, they have been around conservation for so long they “get it”. Conservation is not an academic discipline used to further one’s career but a never ending attempt to push the world to be more sustainable. Its emotional, its challenging, it involves community and it goes far beyond and outside Academia.

Education is something necessary before, during, and after reintroduction projects. Education is communication. It is the skillful exchange and discourse of knowledge, information, ideas, values, and desires which outline the nature of our lives together on this planet. It is not an after-the-science-is-done thing.

My biggest take away from my journals is that I believe grizzly reintroduction and projects like it will not work with the type of scientists who thinks science is tops or even that academia is tops. It will not work with people who think social science methods are just some qualitative bullshit. Many scientists do not even know what social science is yet they think their science methods are superior. These assumptions I see scientists make are NOT SCIENTIFIC!!!

Educators think analytically about how to interact and how important that interaction is allllll thhheee timmmmmme. We pick up on power dynamics and work to dismantle them as they are occurring. We embrace conflict, disagreement, and are generally looking to better the world. Applied Academia, you can call it. On a similar note, why the hell have we not consulted indigenous groups about their opinion? I have suggested it to Dr. X, Y, and Z a few times. We have some ancient wisdom right here in our backyard within the Chumash Band. Chumash, a people who managed to live peacefully without killing off grizzly bears for thousands of years. There is always some excuse that sounds something like “Academics know best”. That is NOT CRITICAL THINKING! Indigenous lands around the world represent some of the most biodiverse land on the planet. In other words, most of the remaining primary forest habitat is owned and preserved by indigenous groups. As an example, the first nation people in and around Princess Island off the coast of BC, where the spirit bear lives, have exhibited some of the most profound bear conservation and stewardship ever known yet somehow they are not experts...why? Because they are not mainstream? Or is it because they are not white? Is it because they do not gloat about their knowledge in science journals? My journal entries reflect that I am concerned about all this and I guess I am the jerk that is saying something.