

Interdisciplinary learning activities

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In this document, learning activities are assembled for each of the [four stages of interdisciplinary learning](#). In the table below, the four stages are described shortly, and learning activities per stage are suggested in the right column and described on the next pages.

Interdisciplinary learning stage and learning objectives	Learning activities
1 DISCIPLINARY GROUNDING	
Disciplinary grounding involves having a basic knowledge and understanding of the involved discipline(s) as well as ways in which their knowledge is constructed, validated and communicated.	<ul style="list-style-type: none"> • Writing in your discipline • What is a discipline? • Core concepts (group) • Core concept journal (individual)
2 PERSPECTIVE TAKING	
Perspective taking involves analyzing the problem from the position of each interested discipline and identifying their commonalities and differences. It also encompasses an attitude of open mindedness to- and valuing of different perspectives, and the willingness to reflect on of one's own biases and assumptions.	<ul style="list-style-type: none"> • The fictitious dialogue • College Tour • Point-of-view • Visual analysis • Figure-storming • Breaking news • Adding a perspective
3 DISCOVERING COMMON GROUND	
Discovering common ground which is the shared basis between conflicting disciplinary insights or theories. This is a creative process that involves modifying or reinterpreting disciplinary elements that conflict. Assumptions from two or more disciplines are made explicit and are compared, and some degree of overlap between disciplinary perspectives are identified. It creates a common vocabulary that can be applied to the object of study.	<ul style="list-style-type: none"> • Text-ballooning a journalistic essay • Pro & Contra Debate • Data-management table • Finding a shared horizon • An edited volume • Letter to a friend
4 INTEGRATING PERSPECTIVES	
Integrating perspectives involves generating a new understanding that would not have been possible using a single discipline. It includes being able to use integration techniques (e.g. models, metaphors) to find new holistic understanding. The new metaphor, interpretation, or model is also tested or used to solve a problem or guide research, and communicated clearly.	<ul style="list-style-type: none"> • Analyzing a text • Analyzing a speech • Concept-maps • Interdisciplinary paper • Interdisciplinary research proposal

The learning activities are described below.

Descriptions of the learning activities

Writing in your discipline

Interdisciplinary Stage: Disciplinary grounding

Objective of this assignment is to create awareness of differences in communication styles between disciplines. This assignment asks students to explore the rhetorical conventions of writing in a particular discipline. The assignment could consist of several parts:

- (a) interviewing a professional in your field, and/or
- (b) identifying and analyzing texts that exemplify key rhetorical conventions, and/or
- (c) writing an essay that explores what you have learned about writing in your discipline, and (d) presenting in class what you have learned about writing in your discipline.

What is a discipline?

Interdisciplinary Stage: Disciplinary grounding

As interdisciplinary studies draw on disciplines, it is important to be aware of the defining elements of a discipline. Defining elements of a discipline are the phenomena they study, their epistemology, assumptions, theory, and methods. In this assignment students, try to describe the defining elements of the discipline, see hand out. Since this is quite a difficult assignment, cooperation with others is allowed, the use of internet as well.

- Time: 2 hours (in class hours)
- How: Teacher introduces the assignment and provide instruction. Students work on the assignment in pairs, in class, use of internet or books, and teacher help is permitted.
- Assessment: plenary evaluation, and short student reflection, no grades.
The results of students' work is discussed plenary. Students then get 15 minutes to reflect on what they learned from this exercise and are instructed to store their reflection in their portfolio's. If you want you can ask students to share their reflections with the group.
- Objective: Learning which phenomena are being studied in the 4 disciplines and how (basic disciplinary concepts, theories, epistemology, assumptions).

Hand out: Defining elements of your discipline (see Repko et al. 2014)

- Phenomena are the subjects, objects, and behaviors that a discipline considers to fall within its research domain.
- Epistemology is the study of nature and basis of knowledge that answers questions including the following: What is the nature of knowledge? How can I know what I know? What is truth? How much can we know?
- Assumptions are things that are accepted as true or certain. Assumptions reflect mostly epistemology, but captures elements of ethics, metaphysics, and ideology when these are particularly important.
- Methods are particular procedures or processes or techniques used by a discipline's practitioners to conduct, organize, and present research.

Discipline:	
Phenomena	
Epistemology	
Assumptions	
Methods	

Core Concepts

Interdisciplinary Stage: Disciplinary grounding

In this exercise, students in groups each adopt 3-4 core concepts (e.g. democracy, sustainability, equality) at the beginning of the year. During the 1st year, the students describe these concepts from all various perspectives. At the end of the year students share their concepts with the teachers, which finally should lead to a shared understanding of the courses core.

Students work in groups and don't need much guidance. But at the end of each block, they could use some encouragement and class time to work on it in their groups.

Core concept Journal¹

Interdisciplinary Stage: Perspective taking

A key component of finding common ground (the next stage) is to understand the need and value of clear communication, particularly in acknowledging different understandings of key concepts and the necessity of defining concepts clearly. Some concepts are shared across disciplines, but might have different meanings in different fields. In this assignment, students are asked to keep a journal of concepts and notes about ways they translate across disciplines. For example, the term "efficiency" has quite different meanings for economists (money out/money in), biologists (energy out/energy in), and political scientists (influence exerted/political capital expended). In such a case, the journal entry would compare and contrast the diverse ways that disciplines use the same concept, noting disciplinary-specific definitions or examples and discussing ways disciplines might better understand each other's use of the concept.

The fictitious dialogue

Interdisciplinary Stage: from Perspective taking to Finding common ground

Group assignment. In this assignment, student teams of 2 or 4 are asked to write and perform a dialogue about an issue relevant to the course. For the dialogue, two 'thinkers' are chosen, for example Plato, Marx, Mill, Darwin, and students are asked to imagine that they are this person, and invent a dialogue between the two. In groups of 4, two students prepare one side of the dialogue, and the other two the other person. The four of them put the dialogue together, and two students perform it in class. The personalized arrangement, and speaking in the 'I'-form intensifies the experience. This learning activity stimulates perspective-taking and to take an effort to truly engage with different perspectives. The assignment could also be turned into an individual assignment. Students then have to write an essay shaped as a dialogue.

College Tour

Interdisciplinary Stage: Perspective taking

Objective: Applying insights from two disciplines (ethics, economics) to a real-life case, becoming aware of the validity/usefulness of multiple perspectives; effective collaboration. Description of the assignment: one or more different sessions will be organised which are based on the format of the television programme 'College Tour', in which an invited expert is interviewed by a journalist and the audience. In each session the focus will be on a real-life problem, which can be viewed from both an economic and an ethical perspective. The students are divided into subgroups by the teachers and instructed to prepare and come up with a series of good questions related to the field of the expert(s). The remaining students can participate in the debate after the primary group has posed its questions.

Ideally, there will be two experts per session: one with an economics - and one with an ethics background. One student subgroup is asked to introduce the particular topic by means of a short (Power point, Prezi) presentation; the other subgroups will either focus their preparation on the economics side of the problem, or on the ethical side thereof: in groups of around 5 students, a series of relevant questions will be prepared. Possible topics: Organ donation (regulation vs 'free market trade'), Allowing or forbidding the production of medicinal cannabis, Regulation of Airbnb or Uber, Stricter regulation of meat production (environmental issues, health issues).

Point-of-view

Interdisciplinary Stage: Perspective taking

A simple method to help students cultivate awareness of different perspectives is to assign students to examine an issue through a specified lens other than their own. For example examining a new policy, plan or project through different public and private organizational lenses. This could be used as a group assignment, followed by a discussion in class.

Visual Analysis²

Interdisciplinary Stage: Perspective taking

¹ Source: Oakland University, CAP 115 Interdisciplinary Writing, Parker:

https://oakland.edu/Assets/upload/docs/AIS/Syllabi/Parker_Common_Ground_Journal.pdf

² Source: Oakland University, CAP 115/123: https://oakland.edu/Assets/upload/docs/AIS/Syllabi/Parker_VRA_Prompt.pdf

This assignment helps students understand that worldview, assumptions, methods, and inquiry distinguish the disciplines, by critically analyzing and interpreting visuals. For this assignment, students compose an essay that rhetorically analyzes a visual (picture, cartoon, poster, etc). Students select an image that depicts one of the topics of the course and are assigned to analyze and interpret the image from two (or more) disciplinary perspectives.

Figure storming³

Interdisciplinary Stage: Perspective taking

In figure storming, the group picks a well-known figure who is not in the room—it could be a boss, a fictional character, or a well-known public figure—and discuss how that person would approach the problem or think about this idea. For example, you might ask: *How would Oprah Winfrey approach this problem?* It seems like a silly question, but putting yourself in someone else's shoes can help you and your team approach the problem a different way.

Teammates can sometimes be ashamed or hesitant to put forth their creative ideas, but if someone else's name is attached to the ideas—Oprah's, for example—they are more likely to share it. Also, this brainstorming method removes some barriers that usually restrict creative thinking, like budget and time.

Breaking News⁴

Interdisciplinary Stage: from Perspective taking to Finding common ground

Group or individual assignment. Students are introduced to the rationale of the issue or theme of the course, and are then challenged to react to 'breaking news' (an alternative view, or shortcoming of the given rationale). This requires them to reconsider the given perspective and its related knowledge framework, and encourages them to keep an open eye and agile mind.

Procedure:

After students are informed of the basic principles and theory that follow from a specific knowledge framework, the breaking news is presented, for example by means of a video clip or an article. The following questions could be used, either to start a group discussion or to write a short individual paper:

- How does this breaking news complement/contrast with the current perspective?
- Which assumptions within the current perspective have to be reconsidered?
- Is it possible to incorporate the implications of the breaking news into the current perspective? (for example by adjusting or extending the assumptions or theory)?

Adding a perspective⁵

Interdisciplinary Stage: from Perspective taking to Finding common ground

In this group assignment, student add a perspective to an academic paper. To prepare for the meeting, students read the assigned literature, which is an academic paper, and prepare for their role for the meeting (possibly a PowerPoint presentation).

During the meeting each group has a different role:

Group 1 – Presents the paper

Group 2 – Explains the discipline behind the paper (how do they recognize the paper as being from ...: concepts, assumptions, methods, ...)?

Group 3 – Brings insights from the other discipline (how can the other discipline collaborate to answering the research question tackled in the paper?)

Group 4 – Leads the discussion on finding common ground

The meeting lasts from 2 to 3 hours. A possible schedule looks as follows: 25 minutes – Presentation group 1 20 minutes – Disciplinary grounding (group 2) 15 minutes break 20 minutes – Perspective taking (group 3) 30 minutes preparation => each group goes to a break-out room to find a common ground between the two disciplines 30 minutes – Discussion: finding a common ground (group 4)

³ Source:<https://www.wework.com/ideas/worklife/effective-brainstorming-techniques>

⁴ Based on an activity described in; Christoph et al., (2015), p. 28.

⁵ Source: Julia Swart, PPE, UU

Text-ballooning a journalistic essay⁶

Interdisciplinary Stage: from Perspective taking to Finding common ground

Individual assignment. Read text X (non-scientific, for example a relatively short policy document, a speech, or a long newspaper article). Do the following:

- Add at least 10 comments in comment balloons (in Word or PDF) where you pinpoint or question arguments made in the text, based on your insights from at least 2 disciplines and the literature presented and discussed in this course. Make explicit in which discipline your comment is grounded.
- Identify at least 4 instances in the text where insights from at least 2 disciplines converge. Also do this with comment balloons and explain how they converge.
- Swap your file with comments with that of another student. Write a 1x A4 response that addresses at least 6 comments made by this other student, as if you were the author of the original piece. Ensure that your response is one coherent narrative.

Assessment criteria: 1 the student explains how the argument is grounded in a discipline, for example referring to: - The way concepts are used, - The underlying question, - The methods or data that are used - ... 2 the student explains how the insights converge, on what level they converge or differ (assumptions, theories, methods, concepts) 3 the response shows open-mindedness of the 'author' (genuinely tried to understand the comments, non-defensive, builds on the comments, or argues why (s)he does not agree, ...?)

Forced debate

Interdisciplinary Stage: Perspective taking

Let students debate in pairs. Students must defend the opposite side of their personal opinion. It encourages them to step away from their own beliefs and teaches them to look through a different colored glass once in a while. Variation: one half of the class takes one position, the other half takes the other position. Students line up and face each other. Each student may only speak once so that all students on both sides can engage the issue.

Pro-contra Debate⁷

Interdisciplinary Stage: from Perspective taking to Finding common ground

In this activity, students debate over an issue relevant to the course. Teams of 3 or 4 students are formed. Two teams debate one issue, so in a class of 20, four debates on four different issues could be organized. One team is assigned to defend the pros, and the other team defends the contra position. Teams must include various disciplinary perspectives in their defense. Prior to the debate, students are provided (or asked to find) two or more articles that represent different viewpoints. The students use these articles as a starting point to build their rhetoric to be presented in the debate..

- 1) The "affirmative" team will start discussion with their speaker. The speaker's speech should be about 5 minutes long.
- 2) The "negative" team will ask questions and the "affirmative" team answers them. All members of both teams should involve into asking and answering questions. Asking and answering questions should take 3 minutes.
- 3) The speaker of the "negative" team will present his/her ideas and opinions. Their speech should be about 5 minutes long.
- 4) The "affirmative" team will ask questions and the "negative" team answers them. All members should involve into asking and answering questions. Asking and answering questions should take 3 minutes.
- 5) The debate ends after 20 minutes.
- 6) The observing teams are asked to find common ground between teams.

To extend the exercise, students could be asked to:

- Start with some research on the issue, and write (multidisciplinary) position papers before starting the debate and hand these in;
- Design debating criteria: Find good examples of debaters on the internet, discuss these examples in class, and derive criteria of good debating techniques and styles from these examples. These criteria are used later on to provide each other with feedback.

⁶ Source: Gijs Jan Brandsma & Julia Swart, PPE, UU

⁷ Based on Milius, Oost Holleman (2001). Pro en contra, in *Werken aan academische vorming: ideeën voor actief leren in de onderwijspraktijk*, p.201 (2001).

Data management table⁸

Interdisciplinary stage: Finding common ground

Helpful sources of information at the start of your literature research are review articles. Once you have identified the most relevant literature, it is helpful to make a data-management table, see below. A data-management table not only provides an overview of the relevant disciplinary insights, it will also help you in the next step where you will be trying to find common ground.

Full reference to the book or article.....			
Discipline / sub-discipline	Theory/ hypothesis	Concepts	Assumptions/methodology
Name the specific field and specialization	Explain what the insight entails; describe the relation between the (f)actors that are considered to be relevant (e.g. cause x and effects Y + Z, or the correlation between different (f)actors; or why a certain intervention is thought to be useful in helping to overcome the problem.	Analyze the key building blocks of the explanation or conceptualization. Give clear definitions of them.	Analyze the basic assumptions underlying the theoretical framework. Those assumptions can have an epistemological, methodological, or cultural philosophical nature, i.e. they can be related to our views of reality, and to our views of how we can gain knowledge about that reality, about how science can best study reality, and about how science can contribute to society.
Full reference to the next book or article.....			
Full reference to the next book or article.....			

Data-management table as developed by Menken & Keestra (2016). An introduction to Interdisciplinary research; theory and practice.

Finding a shared horizon⁹

Interdisciplinary stage: Finding common ground

In this activity students get to read papers on one of the course themes from two disciplines, try to find a shared horizon between the two authors, and write a short paper about their findings. In the LAS course 'connective writing', teachers use texts from a reader called 'The new humanities', by Miller and Spellmeyer for this activity. In their preface, Miller and Spellmeyer (2006, p. XX) suggest that searching connections is a creative process, not just comparing and contrasting texts. A shared horizon 'is more inclusive than either text alone and often connects them on the level of implications, not explicit claims'.

a. Group Set up

Connective writing group exercise on one particular topic of the course, Students work in small groups to read a text from each of the two disciplines in order to find a connection between the arguments, assumptions, or implications advanced in the texts. They prepare a short group presentation of 10 min, that identifies an overarching, shared horizon between both texts.

- The other groups could be assigned to each review one of the other groups' presentations
- The group presentation is discussed plenary
- The students work on different texts so that they explain their texts to the other groups.

⁸ Source: Institute for Interdisciplinary studies (2015). Interdisciplinary learning activities.

⁹ Source: Liberal Arts & Science, UU, and PPE, UU, teachers of track Democracy in Decline

b. Individual set up

The assignment could read like “Read the literature prescribed for today’s class session (for example 2 journal articles rooted in 2 different disciplines). Write a one-page essay that analyses (aspects of) the literature and argues towards a conclusion which shows the shared horizon between the texts as well as the differences. It cannot be limited to a summary of the literature only. So, look out for communalities in the literature, and then for similar conclusions, important differences, falsifications, novel points of departure, important things that some of the literature seems to ignore, et cetera.”

An edited volume¹⁰

Interdisciplinary stage: Finding common ground

In this assignment, students are asked to produce an edited volume centering a theme. The group crates a framework, then each student writes one individual chapter, and the group writes a lengthy introductory chapter together.

Letter to a friend

Interdisciplinary stage: Finding common ground

In this assignment, students write a fictitious letter to a friend, addressing an issue that concern them.

- As a preparation for meeting 1 students read the assigned paper before the first meeting and add 5-10 comments in comment balloons where they pinpoint or question arguments made in the text.
- During meeting 1 the literature is discussed plenary. Students then decide on the main question which they want to address in their letter (e.g. Can we rely on national policies to solve the plastic waste problem?). Students start writing their letter.
- As preparation for meeting 2, students read the second assigned rooted in another discipline and add 5-10 comments in comment balloons where they pinpoint or question arguments made in the text.
- During meeting 2 the literature is discussed plenary. Students then finalize their letter.

Assessment criteria:

1. the student explains how their arguments are grounded in the disciplines, for example referring to: - The way concepts are used, - The underlying question, - The methods or data that are used - ...
2. the student explains how the insights converge, on what level they converge or differ (assumptions, theories, methods, concepts)
3. the response shows open-mindedness of the ‘author’ (genuinely tried to understand the comments, non-defensive, builds on the comments, or argues why (s)he does not agree, ...?)

Integrating insights: Analyzing a text

Interdisciplinary stage: Integration

In this assignment, students are asked to read an interdisciplinary paper/text as a preparation. You can also provide more than one text and let students choose one.

In class, students in pairs or trios analyze:

- the way the author integrated the insights from the different disciplines, and
- how this lead to a new insight on the problem/issue.

Integrating insights: Analyzing a speech

Interdisciplinary stage: Integration

In this assignment, students are asked to watch a video, for example this one:

<https://sa2015.iiasa.ac.at/blog/speakers/scheffer/>

In class, students in pairs or trios analyze:

- the way Scheffer integrates the insights from the different disciplines, and
- how this might lead to new insights regarding the particular problem/issue discussed in the course.

¹⁰ Source: Ria van der Lecq

Concept-maps

Interdisciplinary stage: Integration

Individual or group assignment.

Concept-maps are graphical tools for organizing and representing knowledge. They allow students to structure their knowledge about an issue from diverse disciplinary perspectives and synthesize knowledge (hierarchical and/or linear and/or loops) between them. The instruction for students includes:

- Write down major terms or concepts you know about (the selected topic) on separate sticky notes
- Sort through the sticky notes, putting terms you don't understand or those that don't relate to another one aside
- Arrange the sticky notes so that related terms are close. Leave space for lines.
- Draw lines between the terms you think are related and write on each line the nature of the relationship between them
- Go back to the ones you put aside and see if some of them fit into the concept-map. Create new sticky notes for new concepts that you think of.
- Finish your concept-map and don't forget to put the topic at the top or the center.

Concept-maps are also used in interdisciplinary courses as an assessment tool¹¹. Criteria might include; comprehensiveness/completeness; Organization and connections; Correctness and accurate understanding.

Writing an interdisciplinary paper

Interdisciplinary stage: Integration

Writing an interdisciplinary paper is generally a course-wide assignment, in which students write an academic paper based on literature research on a topic of their choice, in which insights from different disciplines are integrated. A generic guideline, based on Repko, can be found [here](#).

Writing an interdisciplinary research proposal¹²

Interdisciplinary stage: Integration

Writing an interdisciplinary research proposal is a large assignment, which can take up to a whole course assignment. In the master course Societal Challenges for Life Scientists the assignment is introduced as follows:

Call for proposals

Future Food Utrecht brings together fundamental research of Utrecht University related to health, behaviour, and innovations for future food production.

By connecting our knowledge, we aim to provide sustainable and healthy food solutions for the next generations.

In this call, we aim to bring together researchers of different disciplines and to support interdisciplinary Food-related research proposals.

Conditions:

- Each proposal has to be submitted by UU master students from at least two different programmes (teams of 4 students).
- External partners (e.g. companies) can join an application.
- The proposal should be made according to the standard format provided here (Introduction; 500 words), the description of the approaches (500 words), integration of the multiple disciplines (800 words) and a conclusion (200 words).

¹¹ Borrego, M. et al (2009). Using concept-maps to assess interdisciplinary integration of green engineering knowledge. *Advances in Engineering Education*, Winter 2009.

¹² Designed by Mieke Lumens and Geert Ramakers of the Graduate School of Life Sciences