Interdisciplinary Learning Activities

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Interdisciplinary learning activities

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Interdisciplinary learning activities is a handbook for faculties that want to incorporate interdisciplinary learning goals into their educational practice. It is based on almost 20 years of experience with interdisciplinary teaching and learning. The materials and practices of the Institute for Interdisciplinary Studies at the University of Amsterdam contributed significantly to the framework of competencies and ILAs presented in this handbook. We are also grateful for the contributions from the bachelor programme Interdisciplinary Social Sciences at the University of Amsterdam and the US-based Association for Interdisciplinary Studies.

You can find more information about the Institute for Interdisciplinary Studies at http://iis.uva.nl

You can find more information about the Association for Interdisciplinary Studies at http://www.units.muohio.edu/aisorg

We also greatly appreciate the support of all the contributors who generously shared their experiences and provided us with useful information:

Introduction

A changing society

In the last few decades, technological advancements and globalisation, among other things, have had a wide-ranging impact on the ways we live and work. We are living in a networked society in which information is becoming increasingly digitalised. A wealth of information is just a mouse click away and a multitude of systems disclose that information to us. In addition, knowledge is growing exponentially. This ever-increasing rate of innovation and information exchange results in complex real-life issues. A modern and highly flexible workforce is required to tackle these problems and navigate the road to the future.

Modern professionals

A globally-oriented, knowledge-intensive economy is driven by a different type of employee than in the past; modern professionals that excel at applying state-of-the-art knowledge to their fields and linking it to the world around them. This calls for the capacity to retrieve, prioritise, analyse, create, integrate and distribute knowledge related to the issues at hand, in contrast to the mere retention and application of relatively static knowledge in a production-oriented economy.

The need for both specialists and generalists is increasingly felt. The fast pace at which knowledge is renewed can no longer be matched solely by individuals maintaining broad areas of expertise. Further specialisation is, therefore, a must. New subspecialists arise, such as neuroendocrine surgeons, forensic family pedagogues or behavioural economists.

Simultaneously linking these super specialists is essential in order to conduct business on a daily basis and keep innovation within reach. Typical new generalist positions have arisen for this purpose, such as information managers, social media specialists, transition managers (transisionists), corporate sharing managers or aging specialists.

Interdisciplinary teamwork

Interdisciplinary higher education aims to foster interdisciplinary understanding or interdisciplinary thinking. This can be defined as:

‘The capacity to integrate knowledge and modes of thinking in two or more disciplines or established areas of expertise to produce a cognitive advancement — such as explaining a phenomenon, solving a problem, or creating a product — in ways that would have been impossible or unlikely through single disciplinary means.’ (Boix Mansilla, Miller & Gardner, 2000).

As such, interdisciplinary thinking is a complex cognitive skill (Van Merriënboer & Kirschner, 2013). A complex cognitive skill consists of a set of interrelated constituent skills that together enable successful job performance. Constituent skills of interdisciplinary thinking are, for instance, critical thinking, perspective taking and collaboration. These abilities tap into the 21st century skills that have been identified as essential for a modern workforce dealing with demands of the knowledge economy (Voogt & Roblin, 2012). These aspects of interdisciplinarity will be further elaborated on in the next chapter of this handbook preluding the collection of concrete learning activities that focus on teaching interdisciplinary thinking.

As argued there are strong arguments for developing interdisciplinary skills. ‘However, interdisciplinary thinking does not occur spontaneously. It can take a considerable amount of time for students to achieve an adequate level of expertise in its practice. In addition, students need help in order to be able to synthesize two or more disciplines.’ (Spelt et al., 2009). There are few resources that faculty staff in higher education can rely on when they want to know more about how to teach and foster interdisciplinary skills. This handbook contains concrete suggestions in the form of examples of learning activities that support interdisciplinary collaboration skills of students. It suggests activities to use in your classroom and assignments to give your students to promote their development as interdisciplinary professionals.

The purpose of this handbook is to provide faculty staff with a variety of Interdisciplinary Learning Activities (ILAs). These activities are designed to give you some ideas about how to incorporate interdisciplinary learning goals into your educational practice. While the higher education community provides a diverse range of learning activities, this manual presents a condensed set of activities aimed at explicitly stimulating the development of interdisciplinary skills among undergraduate and graduate students.
How to use this manual

It is important to ensure that there is alignment between learning activities, learning outcomes and assessment criteria in your courses. A correct match between your teaching aims, student learning outcomes and assessment criteria helps to make the overall learning experience transparent and meaningful to students. Having a clear idea of what you want to achieve with your course and especially which aspects of interdisciplinarity you want foster, is essential when deciding on learning activities. This is called ‘outcome-based course design’, which is our recommended choice for educational design (Biggs, 2003).

This handbook offers a repertoire of learning activities specifically suited to teaching interdisciplinarity. For that purpose, interdisciplinary thinking is made tangible in the next chapter by describing a number of skills and characteristics of interdisciplinarity as identified in the literature. Your first step will be to choose specific interdisciplinary skills you want your students to master in your course.

Depending on your choice, the table on page 17 points you towards relevant Interdisciplinary Learning Activities (ILAs) that align with your focus. You can find the ILAs later on in this handbook. Your next step is to choose ILAs that are designed to help develop the skills that underpin these characteristics.

The collection of ILAs is not exhaustive. Our intention is to furnish an initial series of inspiring learning activities that cover the most important aspects of interdisciplinary thinking. The ILAs in this handbook have been trialled and tested by university teachers just like you. You can be confident that they will help both you and your students. The Institute for Interdisciplinary Studies (IIS) views this handbook as a work in progress and we would appreciate your ideas and feedback on putting these ideas into practice. We hope that the incorporation of these ILAs into your courses will contribute to creating a successful, challenging and engaging interdisciplinary learning experience.

References

Unravelling interdisciplinary thinking

This chapter aims to unravel the construct ‘interdisciplinary thinking’ with the purpose of making it tangible for educational settings. A construct is an intangible, underlying psychological concept that is impossible to measure directly. You do not see ‘interdisciplinary thinking’, for instance, when you observe a forensic case team. Rather, ‘interdisciplinary thinking’ may be measured by observing manifestations of it, or more specifically, manifestations that you believe are related to ‘interdisciplinary thinking’. For example, the team may exhibit signs of a shared professional language or display a smooth and effective collaboration style.

As stated earlier ‘interdisciplinary thinking’ may be perceived as a complex cognitive competency. A competency is ‘a combination of complex cognitive and higher order skills, highly integrated knowledge structures, interpersonal and social skills, and attitudes and values’ (Van Merriënboer & Kirschner, 2013). Operationalising ‘interdisciplinary thinking’ thus requires the ability to identify essential skills, knowledge structures and attitudinal aspects of ‘interdisciplinary thinking’.

That was achieved by means of a two-step process at the University of Amsterdam (UvA). First, a literature search was performed identifying important skills for interdisciplinary thinking and working. Second, a series of workshops with teachers from the UvA involved in interdisciplinary studies were held in which this set of skills was validated and complemented with relevant descriptions.

The skill component receives the most attention in this chapter as it is the core aspect of a competency. The reason for that is because competency development is part of a job-oriented training approach. This training approach focuses on delivering professionals who perform well in new and ever changing situations (van der Hulst & Ruijsendaal, 2012). For these professionals, it is not merely the acquisition of conceptual knowledge that is important but particularly the mastery of higher-order thinking and problem-solving skills. With those skills, these professionals can adapt quickly to new challenges with many unknowns, as is often required in the 21st century.

Skills enabling interdisciplinary thinking

In the next sections, ‘interdisciplinary thinking’ is operationalised into four essential skills: reflection, collaboration, critical thinking and dealing with uncertainty. A skill refers to the ability to execute cognitive, perceptual and/or psychomotor activities with the purpose of satisfactorily completing a particular task. Each of these compound skills is described and further unravelled in constituent skills. In this handbook, a table is presented linking these interdisciplinary skills with meaningful learning activities: the interdisciplinary learning activities.

Characteristics of skills that foster interdisciplinarity

Skills enabling interdisciplinary thinking

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Characteristics of skills that foster interdisciplinarity
Reflection

Reflection is an important part in creative processes (Spooner, 2004). Reflection is a generic term for the exploration of personal experiences and (individual or team) performance with the aim of understanding why a certain result has been achieved and understanding what underlying intentions, motives, belief systems or conceptual frameworks of oneself and others may have (subconsciously) influenced the course of actions. Reflection is closely related to self-regulation, which is the ‘active, goal-directed self-control of behaviour, motivation and cognition for academic tasks’ (Pintrich, 1995). Two constituent skills make up the ability to reflect, namely mentalisation and perspective taking.

Mentalisation is a concept originating from clinical psychology, yet highly applicable to interdisciplinary teamwork. Mentalisation refers to the ability that permits one not only to respond to another person’s behaviour, but also to the underlying mental states such as beliefs, feelings, attitudes, desires, intentions, plans, knowledge and so on (Fonagy et al., 2004; Allen et al., 2008). Mentalisation enables one to interpret other people’s mindset, thereby making their behaviour meaningful and predictable, allowing flexible and adaptive interaction (Fonagy et al., 2004). Mentalisation not only concerns others. It equally comprises the ability to understand one’s own mental states in relation to one’s own behaviour. Mentalisation is a coping skill. Everyone is capable of it, but some people are better at it than others, especially in times of stress or time pressure. Good mentalisation skills allow you to adapt flexibly to different circumstances and regulate your emotions effectively.

Perspective taking encompasses the ability to consider the world through the eyes of a practitioner from a different discipline (Nosich, 2012). Technical expertise (i.e. discipline-specific knowledge) plays a large role in perspective taking, whereas mentalisation mainly refers to so called affect regulation. For instance, perspective taking may refer to the act of role-playing, whereby one assumes an alternative disciplinary based viewpoint about a specific issue (Wyl, 1993; Balache, Hpes & Berger, 1996, all in Repko, 2008).

Repko et al. (2013) strongly advocate perspective taking for interdisciplinary work for a number of reasons:

- Perspective taking allows one to explore alternative viewpoints from different disciplines, thus exposing intersections where disciplines may be integrated.
- Perspective taking illuminates the general understanding of the problem and reduces tunnel vision, thereby reducing the possibility of important aspects being overlooked.
- Perspective taking increases understanding the significance of the disciplines involved and exposes strengths and weaknesses of those disciplines.

Collaboration

Effective interdisciplinary collaboration relies for a large part on (inter)professional communication. Professional communication entails speaking the language of discourse of different disciplines, negotiating meaning, resolving differences, developing a shared understanding and communicating cognitive advancements to a broad audience (Manathunga et al., 2006). Interdisciplinary collaboration also relies on the ability to work together in an efficient and goal-oriented way with other professionals in different roles and on different levels, in order to achieve a concrete product, result or outcome.

Several skills form the basis of collaboration. Formulating a common goal refers to the ability to achieve team consensus on a higher goal, vision, mission or value that exceeds individual stakes. This is closely related to team members viewing their quest from expanded perspectives and with broad horizons, exceeding their preferred professional discipline (Newell, 1990).

Giving and receiving feedback refers to communicating helpful information or criticism in order to improve behaviour in relation to a certain standard, professional practice or (in)formal code of conduct as established by a group with the purpose of improving professional behaviour.

Situation awareness refers to the ability to maintain a constant and clear mental picture of the situation or environment you are in, including realistic estimations of the courses of action in the near future. For interdisciplinary collaborative work, shared situation awareness is an important skill. It refers to the process by which team members develop compatible models of the team’s internal and external environment. This includes skills for arriving at a common understanding of the situation and applying appropriate strategies (Canon Bowers et al., 1997).
Role changing refers to the switching of roles within a team in order to learn about alternative perspectives on a given problem. It enhances understanding of professional roles and responsibilities, and accompanying dilemmas (Cooper et al., 2001). It also relates to agility in the hierarchical column outside the direct scope of a project team and addressing different types of stakeholders with the required language and scope.

Project management skills encompass skills related to following effective working methods to achieve project results, including planning and time management, budget and resource management, quality control methods, communication and dissemination strategies and risk analyses.

Taking up the leadership role is an essential skill for interdisciplinary collaboration. It entails the capacity to lead a team towards a successful project result and, while doing so, making use of the unique background of each project member. Secondly, it entails creating a constructive work climate that is less vulnerable to adverse effects of power distances. The team leader should facilitate speaking up by team members so unconventional or out-of-the-box ideas may also be heard. It also entails motivating team members, ensuring progression even when problem solving is hard or seems impossible at times, which is not uncommon when addressing ill-defined multifaceted problems. Finally, it entails keeping the team on track by keeping in mind the project ambition. This skill is explicitly described as taking up the leadership role, as anyone in an interdisciplinary team may perform this role depending on specific qualities and expertise (Orchard et al., 2005).

Critical thinking

Critical thinking is a complex cognitive skill indicating the ability to search, identify, understand, critically appraise, connect, and integrate theories and methods of different disciplines, and to apply the resulting cognitive advancement together with continuous evaluation, including the identification of misinformation, disinformation, prejudice and one-sided ‘monological’ argumentation (Boix Mansilla and Duraising 2007; Ivanitskaya et al., 2002; Woods, 2007). Critical thinking refers to skilful, responsible thinking that is conducive to good judgement because it is sensitive to context, relies on criteria and is self-correcting (Nosich, 2012). In the framework critical thinking is enabled by the constituent skills analysing, explicating differences and agreements, reasoning and decision making.

The ability to analyse is the ability to conceptualise a problem and being able to capture its essence in a short and concise way. Furthermore, it involves the systematic decomposition of a problem into meaningful smaller components and collecting relevant information for addressing these sub-problems, while continuously being aware of the intricate relationships between the components of the problem.

Explicating differences and agreements encompasses the articulation of theoretical assumptions and identifying where differences and agreements between various academic disciplines exist. This permits the integration of knowledge by relating concepts of different disciplines and building bridges between them (Ivanitskaya et al., 2002; Spelt, 2015). This is also referred to developing structural knowledge, achieving an understanding of higher-order relationships, and organising principles across the borders of single-perspective theories (Coldsmith & Johnson, 1990).

Reasoning refers to drawing conclusions on the basis of arguments and giving due consideration to all relevant factors with the aim of analysing truth claims across disciplines (Kelder, 1992, in Ivanitskaya et al., 2002; Nosich, 2012). Reasoning also entails weighting evidence: determining the validity of data-based generalisations or conclusions, and distinguishing between weak and strong arguments (Pascarella & Terezini, 1991, in Ivanitska, 2002).

Decision making is the ability to gather and integrate information, use sound judgement, identify alternatives, select the best solution and evaluate consequences (Canon Bowers et al., 1997). It is the skilful responsible thinking that is conducive to good judgement because it is sensitive to context, relies on criteria, and is self-correcting (Nosich, 2012).

Dealing with uncertainty

Dealing with uncertainty is the fourth skill enabling interdisciplinary thinking. It refers to an intellectual, cognitive ability of addressing the limitations of current knowledge and/or recognising that no single best answer is available, as is often the case in real life, ill-defined and multifaceted problems discussed from an interdisciplinary perspective. It is about realising that, as a professional, one is often left empty-handed and needs to have an open mind in order to deal with the intrinsically complex problems crossing the borders of various disciplines. Dealing with uncertainty however also refers to the personal skill that is related to attitudes like confidence and having intellectual courage. The latter represents the courage to remain creative and use out-of-the-box thinking even in (initially) uncooperative or less understandable circumstances, because sometimes ‘ideas [that are] considered dangerous and absurd are sometimes rationally justified’ (Paul and Elder, 2009).

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1 A precondition for participating in interdisciplinary work is a certain attitude. The attitudinal aspect is part of a competency and refers to personality characteristics that contribute to performing the task. Attitudinal aspects are to some extent dynamic in the sense that they can be acquired over (a lot of) time.
Other attitudinal aspects that Paul & Elder deem important in interdisciplinary work are fair-mindedness (‘having a respectful and open attitude and consciousness to treat all viewpoints alike’) and intellectual empathy (‘having a consciousness of the need to imaginatively put oneself in the place of other in order to genuinely understand them’). Spelt (2009) further refers to having a curious, respectful and open attitude as an important feature for working in an interdisciplinary context.

References
Interdisciplinary learning activities

The skills and sub-skills representing interdisciplinary thinking are used as a framework for characterizing the essential learning goals of several interdisciplinary learning activities. In table below this framework is depicted.

In the next chapter several ILAs are described. We start by presenting detailed information about their conceptual underpinnings, the required materials, and whether the ILA works best for a group or as an individual activity. We then describe how the activity could be implemented in practice and present teaching examples derived from several interdisciplinary fields to help visualize how a specific ILA may work out in a real classroom. At the end of each learning activity, we provide alternatives and some ‘tips & tricks’. The learning activities are broadly applicable to various situations and contexts.

There are some conditions that we believe are essential to implement an ILA in a successful way. These ‘rules of the game’ are:

1. Ensure that there is alignment between learning activities, learning outcomes and assessment criteria, as this will help make the overall learning experience more transparent and meaningful to students.
2. Assign teaching activities that are active and challenging. This can help to motivate and engage the student’s learning process. Active learning shifts the focus from the teacher and the delivery of course content, to the student and active engagement with the material. Active learning entails providing opportunities for students to meaningfully talk, read and write about, listen to and reflect on the content, ideas, issues and concerns of an academic subject.
3. Reinforce the importance of interaction among peers. The basic concept of collaborative learning is that students who are able to help each other, learn better than they would when they have to study alone.
4. Request the personal commitment of the student and the teacher to actively participate in the teaching activity. Commitment increases the amount of time students are willing to devote to learning. Their motivation is enhanced when they see themselves as capable and when they value a task and find it interesting. It is therefore useful to consider the students’ expectations, confidence and motivation. What do they already know about the topic? What practical and cognitive skills do they have?
5. Enjoy the activity and, subsequently, the experience of interdisciplinary teaching.

The following figure shows an overview of the ILAs, clustered according to the various sub-skills. It is impossible to practise all the sub-skills of interdisciplinarity at the same time in one assignment. However, each activity fosters at least two of the sub-skills.
A closer look at interdisciplinary texts

Characteristics: Perspective taking, giving and receiving feedback, reasoning

Duration: 90 minutes (excluding homework)

Teaching context: Seminar & homework assignment

Resource(s): ‘Targeted Assessment Rubric: An Empirically Grounded Rubric for Interdisciplinary Writing’ (Boix Mansilla et al., 2009)

Brief description: The students write an essay about a common topic that has been thoroughly studied by at least two academics. Afterwards, they judge each other’s essays and provide them with feedback.

Goal: Students write an interdisciplinary essay and judge each other’s work.

Setup

First seminar (1 of 2)

➔ Explain the goal of the writing assignment and state that the essay should contain around 1000 words. The assignment ideally takes place over the course of two seminars with a two-week gap between them.

➔ Give an introduction about a common topic that has been thoroughly studied by at least two well-known academics from different disciplines.

➔ Have students formulate a leading question regarding this topic and then attempt to answer this question in an essay in which they try to integrate the insights from the two academics.

➔ Introduce the guidelines the students will use when peer reviewing each other’s essays during the second seminar. The peer review provides a way to evaluate the quality of interdisciplinary work and could involve the following criteria (Boix Mansilla et al., 2009):

  - **Purposefulness:** The degree to which students are able to provide clarity in their academic text about the aims and audience of their interdisciplinary writing.
  - **Disciplinary grounding:** The students’ ability to select, understand and use empirical literature from multiple disciplines to inform their work.
  - **Integration:** How perspectives come across in the chosen literature, how well the students can identify connections across disciplines and how well they can synthesize these points into a coherent whole.
  - **Critical awareness or meta-cognition:** The students’ capacity to take a meta-disciplinary perspective on their interdisciplinary work and to reflect upon the craft of weaving disciplines together.

Second seminar (2 of 2)

➔ Have the students bring their essays to class. Divide the students into pairs and ask them to exchange papers. Have the students give written or oral feedback using the assessment form as a guiding tool. Subsequently, have them discuss their personal experiences of completing the assignment as a group.
Interdisciplinary writing on alienation

A short introduction is given about the different perspectives that Marx, Weber, Durkheim and Simmel used when describing alienation in modern society (e.g. Calhoun’s (2012) ‘Classical and Contemporary Sociological Theory Readers’ provides a good overview of this debate).

The students are then asked to write a 1000-word essay that combines the perspectives addressed in the literature on alienation. In their essays, the students may elaborate on the fact that the concerns of the four academics about modern society are what bind them together despite the differences in their assumptions, their ideas about the cause, their ideas about the scale to which alienation represents itself and their ideas about the possible consequences. Note that the disciplinary grounding of these social scientists might be difficult to identify in this example.

At the second seminar, the students exchange peer reviews of their essays, then discuss their experiences of writing the essay and the direction it could have taken. This discussion could include suggestions regarding how to have best tackled the topic.

Boix Mansilla et al. (2009) developed a useful assessment form to evaluate the quality of an interdisciplinary text. The assessment provides four main criteria for judging an interdisciplinary text? (i.e. purposefulness, disciplinary grounding, integration, and critical awareness or metacognition.) The authors suggest evaluating each of these dimensions by determining which level of interdisciplinary understanding is reached (i.e. naïve, novice, apprentice or master).

For further details, please refer to the appendix.

Alternatives and Tips & Tricks

➔ Make the assignment easier by giving a few examples of good interdisciplinary texts to use during the first seminar.
➔ Students could read the article by Boix Mansilla et al. (2009) to get background information on the criteria.
➔ To increase the challenge of interdisciplinary writing, ask the students to elaborate on the information in their essays that is derived from a third discipline.
➔ To add a further challenge (for a particularly advanced group), say that the essay could be based on the work of two or more academics who studied various topics and ask the students to integrate these diverse topics into a unified whole.
➔ Add a third seminar during which the students rewrite their essays in the light of the feedback they received from their peers during the second seminar.
➔ See the data management table form for another example of this learning activity.

References

- The framework of this ILA is derived from curricular design within the Association for Integrative Studies.
- The example of this ILA was developed by teachers of Interdisciplinary Social Sciences (ASW) at the University of Amsterdam.
Beyond interdisciplinary horizons

**Characteristics**  
Mentalisation, analysis

**Duration**  
150 minutes (60-minute seminar; 90-minute lecture)

**Teaching context**  
Seminar and a lecture (and possibly a homework assignment)

**Resource(s)**  
A lecturer from a specific disciplinary background

**Brief description**  
Groups of students prepare and conduct an interview with a lecturer. The interview should include prepared sets of critical questions and comments that incorporate (inter)disciplinary knowledge that will match the field of expertise of the lecturer but also challenge him/her to look beyond his/her own discipline for alternative explanations.

**Goal**  
The students learn more about the perspective of the lecturer and consequences for his research.

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**Setup**

- This activity is meant for courses that combine seminars and lectures in a single sitting. At the start of the seminar, inform the students that they will be holding an interview with the lecturer who is to give the forthcoming lecture. Provide information about the lecturer with regard to his/her disciplinary background and the main topic(s) he/she will be covering.

- Divide the students into groups of 3 to 4. Ask the groups to brainstorm and draft one critical question or comment to be put to the lecturer. Questions should be accompanied by a short description that provides information regarding insights from other disciplines in relation to the question. This information should be sufficient to allow the lecturer to refute/discuss the question in relation to his/her own discipline.

- At the end of this seminar, ask the students to discuss the questions as a group, and then to democratically select a set of best questions. Depending on the number of valid questions/comments that emerge from this seminar, you might give a homework assignment to some of the groups in order to realize a sufficient number of questions for the interview.

- After the seminar, the students attend the lecture. The lecturer gives his/her (disciplinary) lecture, and then the interview can start. You or one of the students assumes the role of moderator for this interview to ensure that things run smoothly.

- Divide the students into the former groups and ask them to evaluate the answers. Let them analyse the perspective of the lecturer and the consequences for his research.
The act of suicide – a social, cognitive psychological or biological phenomenon?

A lecturer with a background in classical sociological theory may focus during his/her lecture on Durkheim’s theory (1897, ‘Le suicide, Étude de Sociologie’), namely that the event of suicide should be seen not as a personal act, but as a social phenomenon. That is, the stronger the social ties are within a community, the less likely it is that a person will commit suicide.

Students may base their critical questions and comments on a synthesis of the following insights from diverse disciplines that address the topic of suicide. Examples of perspectives derived from different disciplines are given below.

Cognitive psychology

Suicide may be explained on the basis of the ‘Escape theory of suicide’ (Baumeister, 1997), in which suicidal behaviour is perceived as a rationally motivated behaviour. On the basis of this theory, suicide is explained in terms of an ultimate attempt to escape from aversive self-awareness. The theory stresses that awareness of one’s own shortcomings results in a state of cognitive destruction that in turn produces irrationality and a lack of inhibition. The act of suicide can then be viewed as a process of escape from aversive self-awareness.

An example of a critical question posed by the students could be as follows: How could Durkheim’s research have been altered in order to account for intrinsic personal characteristics of individuals who commit suicide, regardless of which community they belong to and what the degree of social cohesion may be?

Genetics and epidemiology

In this field, students may find scientific claims that the psychosocial factors of suicide are highly overrated. Voracek and Loibl (2007) performed a systematic review of twin studies and found that genetic factors make a significant contribution to explaining different types of suicidal behaviour. Moreover, according to some epidemiological studies, suicidal behaviour is largely independent of the inheritance of psychiatric disorders that could underlie aversive cognitive behaviours.

An example of a critical comment made by the students could be: Research in which the social structures of a society are studied in combination with the available genetic information from individuals of the population of that same society, may result in a more profound understanding of the determinants of the act of suicide than the degree of social cohesion alone.

Medicine

Some medical studies underpin the importance of studying suicidal behaviour in relation to specific groups in society where the risk factor is substantially higher, such as suicide among youth (Gould et al., 2003) or suicidal behaviour among schizophrenic patients (Hawton et al., 2005). This once again brings up the idea that certain cognitive types increase the risk of suicidal behaviour.

Examples of critical questions by students could be as follows: To what extent does Durkheim’s theory still hold? Would the lecturer consider Durkheim’s theory a universal one or does it apply only within specific social conditions? Does the lecturer consider the additional knowledge by the students as complementary or contradictory to Durkheim’s theory on suicide?
Alternatives and Tips & Tricks

➔ If the students have limited experience of interdisciplinary thinking, it may be sufficient to use questions from an individual discipline (other than the lecturer’s discipline) as opposed to asking for questions that integrate multiple disciplines.

➔ If the lecturer is not familiar with interdisciplinary students and/or interdisciplinary studies, an alternative could be to ask students to prepare the questions during the previous seminar and then send the questions to the lecturer before he/she gives the lecture. The lecturer could then initiate a discussion with the students after the lecture, on the basis of the questions submitted by the students.

➔ If the course has a series of guest lecturers, this ILA could become a standard part of each lecture. In this way, interdisciplinary thinking is practised over the course of a subject by both the students and the (disciplinary) teachers. Also, each seminar could be assigned to a specific lecturer, thus obviating the unfortunate situation of having too many questions for the lecturer to answer during a single seminar.

➔ It is essential to inform the lecturer of the activity to allow him/her time to reflect on the limitations of or alternative explanations for their own discipline’s ability to approach difficult subjects (e.g. explaining the underpinnings of suicide).

References

- The framework of this ILA is derived from curricular design within the Institute for Interdisciplinary Studies.
Breakin

Characteristics Perspective taking, mentalisation, situation awareness
Duration 45–90 minutes
Teaching context Seminar
Resource(s) –
Brief description Students are instructed to provide a rationale on the basis of a given ‘worldview’ and are then challenged to react to ‘breaking news’ (an alternative worldview/major shortcoming of the given worldview). This requires them to reconsider this perspective and its related knowledge framework by employing mediated collaborative communication and encouraging students to keep an open and agile mind.

Goal For students to improve their ability to deal with new information that goes beyond a given worldview and can be considered a counterweight to the restrictions of mono-disciplinary thinking. This leads to the synthesis and sharing of integrated visions on possible new knowledge frameworks.

Setup

➔ Inform the students of the basic principles (e.g. a set of assumptions) that follow from a specific knowledge framework (not necessarily academic) – a worldview. This information can be transmitted through a possibly academic article that is read by the students or via a short lecture given by the educator.
➔ The students then incorporate the provided information and take it as their worldview during this exercise.
➔ Then, the ‘breaking news’ is presented, for example by means of a video clip or an article. Afterwards, the following questions could be used to start a group discussion:
   • How does this breaking news complement/contrast with their new worldview?
   • Which assumptions within the worldview have to be reconsidered?
   • Is it possible to incorporate the implications of the breaking news into the worldview (i.e. by changing current assumptions or by adding new assumptions to the knowledge framework)?
➔ End the discussion by reflecting on the quality of the students’ communication skills and attitudes during the exercise:
   • Were the students thinking and reasoning on the basis of the given worldview or did they drift back into their own worldview?
   • To what extent were the students able to listen and build on previous comments?
   • How successful were the students at incorporating the implications of the breaking news into the worldview?
   • To what extent was consensus reached on a possible new knowledge framework and how did this process take shape?
Human behaviour: The impact of nature vs. nurture

Karl Marx’s worldview
Students are presented with (elements of) the worldview of Karl Marx (1818–83). Marx was a philosopher, an economist, a historian and a journalist, but is best remembered as a revolutionary socialist. He believed that the nature of human beings was largely determined by the political and economic characteristics of the social system that was prominent during his time. He is perhaps best known for his perspective on how economic power relations resulted in a ruling class of capitalists who owned all productive property, and an oppressed class of labourers who could do not much more than sell their labour. His revolutionary ideas on how the labouring classes would eventually liberate themselves from their social position is an illustration of his belief that individuals could evolve in a different way if a specific social system were abolished, thus reinforcing the belief that human behaviour is a product of the circumstances and past experiences (i.e. nurture) of the individual. Sources: Buskes, 2009; www.wikipedia.org

Charles Darwin: breaking news
Charles Darwin (1809–82) was educated in the tradition of natural theology, a philosophy that tried to unite religious ideas with scientific discoveries, but his discovery regarding the origin of species would largely affect the assumptions of this knowledge framework and that of others (like that of Marx). Darwin discovered that the evolution of species is driven by natural selection and that our common struggle for survival is largely genetically programmed. This discovery highlighted the controversial idea that human beings evolved from animals and that all organisms are the product of environmental pressures and subsequent (random) adaptations. This discovery also placed a big question mark over the extent to which human beings have a free will and/or consciously perform their actions. Sources: Buskes, 2009; www.wikipedia.org

Reconsidering the old worldview
An implication of Darwin’s theory for the given worldview was the belief that the talents and dispositions of individuals are primarily determined not by class and/or social structures but by our biological characteristics. By incorporating the breaking news into the worldview of Marx, students may come up with reconsiderations that relate to the field of socio-biology (of which Edward O. Wilson was the father), which studies the biological mechanisms behind human behaviour that emerged from Darwin’s discoveries as an initially controversial interdisciplinary discipline.

Alternatives and Tips & Tricks
➔ Please note that the initial worldview presented to the students is hard to maintain over the course of addressing the three questions stated above.
➔ It is also possible to confront the students with the three questions separately; this will allow you more easily to structure the discussion as a moderator.
➔ You may decide to have a group of students act as the (neutral) moderator during the discussion.
➔ Depending on the overall purpose of the course in which this method is applied, the breaking news may be invented or real. For example, referring to a real discovery within a specific research discipline that fundamentally changed previous assumptions within that field (e.g. the relative influence of epigenetics in biology) may be relevant, in particular to acquaint the students with former beliefs within a specific research discipline.

References
- The framework of this ILA is derived from curricular design within the Institute for Interdisciplinary Studies.
**Characteristics**
Project management skills, decision making, dealing with uncertainty

**Duration**
90 minutes

**Teaching context**
Seminar

**Resource(s)**
Poster-sized paper (i.e. flip chart) and coloured marker pens

**Brief description**
Many contemporary problems are complex in the sense that they involve different agents acting at different levels; these agents are interconnected and their actions are interdependent. At first, the students are divided into groups and each group focuses on understanding one agent or level of a specific system. In the second part of this activity, the students combine their knowledge and identify the relationships between the different agents or levels.

**Goal**
For students to be able to identify different agents and the feedback loops that exist between these agents, through collaborative analysis, as a method to better understand complex systems.

---

**Setup**

- Introduce a complex problem or topic that involves different agents at different levels where these agents and their subsequent actions are interconnected.
- Divide the students into groups of 3 or 4 students. The number of groups depends on the number of levels or agents that are identified within the particular system. If possible, divide the groups according to disciplinary backgrounds, so that the integration illustrates interdisciplinarity.
- Have every group create a visualization of the processes that takes place at their level of analysis on the provided poster-sized paper.
- After 15 minutes, collect the posters and present them at the front of the room to help identify the relationships between the different processes.
- Have each group present their poster and discuss how the processes occurring at each level influence processes on other levels.
- Have a group discussion about the interconnections between each level. Ask one student to take notes on the combined pieces of paper with the visualized processes and linkages, to create a working model of the complex system.
### Multilevel systems

A number of systems can be described as multilevel systems.

Examples are:

<table>
<thead>
<tr>
<th>Corporations</th>
<th>Corporations are made up of departments, which in turn are made up of divisions that consist of individual human beings. In addition, corporations operate in a wider industrial network (of services, goods and waste) and this network operates in the economy as a whole. Note: not all ‘levels’ are clear-cut in this example; for example, the industrial network and the complete economy operate on the same scale and are typically both within the domain of macroeconomics.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slime moulds</td>
<td>Slime moulds have an internal biochemistry that maintains their cellular integrity, they are microorganisms at the cellular scale, and they are self-organized units at the multicellular (collective) scale. Slime moulds operate, as collectives, in an ecology of foodstuff and danger.</td>
</tr>
<tr>
<td>Brains</td>
<td>Studies take place at molecular, cellular, circuit (groups of cells), systems (functional groups of circuits), whole-brain and embodied levels (embodied means that the brain is seen as operating in the context of a body and environment).</td>
</tr>
</tbody>
</table>

### Alternatives and Tips & Tricks

To understand the interplay of different levels in multilevel systems, scientists commonly intervene at one level and look at the outcome at another level. For example, a neuroscientist may block cellular receptors in a rodent and look at the behavioural outcome. Have the students think of experiments that could intervene at one of the identified levels. What kind of outcome do they expect to see at another level after the intervention at a different level? What can this teach them about the workings of the system as a whole?

### References

- The framework of this ILA is derived from curricular design within the Institute for Interdisciplinary Studies.
Creating your portfolio

Characteristics: Mentalisation, situation awareness
Duration: Variable
Teaching context: Seminars
Resource(s): –
Brief description: This ILA involves a reflection assignment. By working on this assignment over a series of seminars, students learn to reflect on their own interdisciplinary learning.
Goal: The students create awareness of the limitations of disciplinary perspectives and methodologies.

Setup

➔ Introduce the reflection assignment at the start of a course that has an explicit interdisciplinary focus.
➔ Remind students of the importance of the reflection assignment halfway through the course by discussing the following questions with them:
  ▪ How do they feel about their interdisciplinary learning thus far in the course?
  ▪ What skills have they developed to reflect on the pros and cons of the disciplines covered in the course?
  ▪ To what extent have their initial ideas on the utility and value of interdisciplinary research changed?
➔ NB: Make sure you write down the most noteworthy reflective comments that are made during this discussion, as these could be useful for future adjustments to the course.
➔ In the seminar before the students are due to hand in their completed reflection assignment (i.e. portfolio), schedule time for a final reflection on the same questions that were mentioned in the previous step. While marking the assignments, recall some of the previous conclusions (recorded at the halfway mark) and verify to what extent these thoughts still hold.
➔ Divide the students into groups of three at the start of the last seminar. The students hand their portfolio to the others. They ask the student questions about his or her interdisciplinary development.
Assignment: Reflection on interdisciplinarity

Since interdisciplinarity is also an attitude, we believe it is helpful for students to reflect on their development towards becoming interdisciplinary academics. To activate this reflection process, a reflection form that addresses your own interdisciplinary learning has been developed.

Assignment instructions:
Answer the following questions three times: once at the beginning of the course, once halfway through the course and once at the end of this course. You should also reflect on your previous answers, as this will help you to track how your thoughts about your own interdisciplinary learning may have changed over time.

Reflective questions on interdisciplinary learning

Reflection on personal characteristics

1. What things (interests, knowledge, skills, personal characteristics, etc.) do you think one needs in order to succeed as an interdisciplinary academic?

2. Which of these things do you already possess, and which do you need to acquire or develop?

3. Can you describe where are you in the process of ‘becoming interdisciplinary’? Please describe the difficulties you’ve encountered and the successes you’ve had thus far. Would you like to see things go differently in your learning process?

Reflection on content

4. Which disciplines and/or subjects do you find the most interesting? Do some disciplines dominate your interests? If so, please explain why.

5. How do your preferences for specific disciplines affect your perception of the advantages and shortcomings of interdisciplinary research and your own interdisciplinary learning process?

6. What insights do you have regarding when combining and integrating several disciplines for research is useful and when it is not?

Alternatives and Tips & Tricks

➔ There are several possible types of reflection assignments, other than a reflection form, such as:

- Having students write an essay on their own interdisciplinary learning.
- Organizing reflection meetings between students and teachers.
- Encouraging students to prepare a discussion about their own interdisciplinary learning experience.

➔ Completed reflection assignments can be a useful tool to use during a personal conversation between student and teacher.

References

- The framework of this ILA is derived from curricular design within the Institute for Interdisciplinary Studies & Interdisciplinary Social Sciences (ASW).
### Setup

- Tell the students about this assignment in advance of the seminar. They will need at least one week to prepare for it.
- Instruct them to prepare a talk lasting no more than 2 minutes, in which they clearly convey what their most recent individual academic project was about. The students have to explain the impact of their project on the environment. The rest of the group should not be familiar (or as familiar) with the topic of this project.
- The presentation should not include slides or other multimedia, but should focus on public speaking and clear communication. Encourage students to practice with others in unrelated courses or with their parents to identify ‘sticking points’, where additional explanation is needed to elucidate their point.
- At the beginning of the seminar, repeat the important elements of public speaking (e.g. speaking dynamics, rhythm, use of metaphor/example, importance of repetition, etc.). Also inform the students that they will be expected to provide feedback on their peers’ presentations.
- Organize the order of presentations and start the pitches. Time them carefully – don’t be lenient. The time constraint is what forces the students to stay focused and be succinct.
- Between pitches, have students in the audience provide feedback to the student on his/her public speaking skills and the content: What was clear? What was not clear? Why were things unclear? Did the speaker manage to engage the public and capture their interest in the topic discussed?

### Elevator pitch

**Characteristics**
Reasoning, situation awareness, dealing with uncertainty

**Duration**
45 minutes

**Teaching context**
Seminar

**Resource(s)**
—

**Brief description**
In elevator pitches, students try to ‘sell their story’ within the timespan of an average elevator ride. They have just two minutes to clearly convey their interests, strengths and accomplishments to a public that is unfamiliar with the topic.

**Goal**
This activity helps students to improve their public speaking skills and gives them a chance to zero-in on their topic, collect their thoughts on it, and then learn to explain its significance clearly and succinctly, in order to clearly and effectively explain their vision.
Pitching your bachelor’s thesis

In a course with Master’s students from different disciplinary backgrounds, students were asked to prepare an elevator pitch about their mono-disciplinary Bachelor thesis. They were asked to look at their discipline through the eyes of an expert in an unassociated discipline and to clearly and concisely explain the focus of their research, the assumptions made, and the strengths and weaknesses of their thesis.

Alternatives and Tips & Tricks

➔ First-year students may not have a disciplinary project to talk about. If they don’t, you could have them talk about a secondary-school project, or focus their pitches more on their personality and what they are planning to learn from a course or their chosen curriculum.

➔ As a twist, you could repeat this assignment in the last seminar of the course. There, you could have the students focus their pitches on what they have learnt during the course and how their (disciplinary) skills contributed to it.

➔ Videotaping the pitches can be useful for giving the students insight into their presentation skills. Videotaping can also help illustrate what the students have learnt during the course.

➔ You can recommend the students to practice their pitch in front of an audience that is unfamiliar with the topic. It could be even more interesting to arrange an audience for the students that is really not familiar with the topic (e.g. contacts from another research department).

References

- The framework of this ILA is derived from curricular design within the Institute for Interdisciplinary Studies.
Interdisciplinary debate

**Characteristics**
Perspective taking, giving and receiving feedback, reasoning

**Duration**
60–90 minutes

**Teaching context**
Seminar and homework assignment

**Resource(s)**
2 academic articles

**Brief description**
Students debate over a position on a topic that is looked at differently from different disciplines or perspectives. Prior to the debate, the students are provided with two articles that represent different viewpoints. The students use these articles as starting points to build their rhetoric to be presented in the debate. The debate is held during the seminar and the quality of the debate is judged by a jury of students.

**Goal**
Students debate a common topic from a different perspective. They receive feedback from a jury of students.

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**Setup**

➔ Introduce a statement based on the literature that the students have read in preparation for this seminar.

➔ Form two groups of 4–9 students and one group of 5 students. One group is in favour of the statement, the second group is against it and the third group forms the jury.

➔ Give the groups time to prepare for the debate by sharing their views on the provided literature (which should have been read prior to the seminar). The debating groups should try to find as many arguments for their position as possible and should try to anticipate the possible counter-arguments.

➔ Instruct the jury to pay particular attention to the rhetorical structure of the arguments presented by the debating groups. The jury should attempt to categorize the types of arguments (methodological, theoretical) within each text to anticipate those to be used by the debating groups. The jury should also prepare an introduction to the debate to summarize the positions of both articles. Following the debate, the jury analyses the nature of the conflicting insights and provide a rationale for their choice of the winner.

➔ A possible timeline of the debate is:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction (jury)</td>
<td>3</td>
</tr>
<tr>
<td>Argument group 1</td>
<td>4</td>
</tr>
<tr>
<td>Argument group 2</td>
<td>4</td>
</tr>
<tr>
<td>Discussion</td>
<td>20</td>
</tr>
<tr>
<td>Conclusion (jury)</td>
<td>5</td>
</tr>
</tbody>
</table>
Human and animal cognition

Questions about differences between human and animal cognition are hotly debated in various academic fields. Some academics focus on cognitive similarities and state that the cognitive abilities of animals and humans can be placed on a continuum. Other academics suggest that there is a qualitative break between the cognitive functions and abilities of animals and humans and take the differences in neural structures as a point of departure.

To prepare for their seminar, students read two texts on human and animal cognition. One text stresses the continuity between human and animal cognition and pleads for a bottom-up approach (De Waal, 2010). The other focuses on the discontinuity in cognitive abilities (Premack, 2007). During the class, the students debated the following statement, ‘Humans are unique in their cognitive abilities’. The group was divided into three. One group was in favour of the statement and used the text that stresses discontinuity to finalize their arguments and prepare for the debate. Another group was against the statement and used the other article to do the same. The jury used both texts to analyse the source of the differences between the statements and found a way to categorize the different arguments that would probably be brought up during the debate.

The chairman of the (group-appointed) jury introduced and led the debate, while other members of the jury took notes and categorized the arguments. After the debate, the jury withdrew in order to summarize the most important arguments and analyse the nature of conflicting insights. In this case, the differences were at a number of levels: the chosen approach to look at the problem (bottom up vs. top down), the types of examples used to support the claims (examples of complex cognitive tasks vs. simple cognitive tasks) and the methodology proposed to investigate the topic (focus on cognitive behaviour and abilities vs. focus on neural basis of cognition) were used as points of contention by both groups. The jury eventually evaluated the debate based on the quality of the logic presented in the arguments, and provided this rationale for their choice of a winner.

Alternatives and Tips & Tricks

➔ An additional task that could be proposed to the students is to have both groups present an experiment or methodology with which to find a solution to the statement. In the above example, this would have meant having to present a method to assess whether humans are unique in their cognitive capabilities. After both presentations, the jury would react to and discuss the proposals.

➔ To complicate matters further (for particularly advanced groups), in their conclusion the jury could also introduce a third (disciplinary) perspective to the matter.

References

- The framework of this ILA is derived from curricular design within the Institute for Interdisciplinary Studies.
Formulating a hypothesis

**Setup**

- Organize your students into pairs or trios in which each student’s major/previous discipline differs from that/those of the other student/students. Designate one of the students in each group as the ‘expert’ on the basis of his/her disciplinary background.

- Ask each student to formulate a hypothesis that is relevant to the disciplinary specialty of the expert. This hypothesis ideally draws on the disciplinary knowledge of the non-expert.

- After this has been done, within each group each hypothesis is handed over to the student who is specialized in the discipline being addressed. Ask the expert to evaluate the quality of the hypothesis and, if needed, to revise it in such way that it better corresponds to the respective research discipline.

- The exercise is finalized by a brief discussion among the groups: which elements of the hypotheses could be improved, and why?

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**Characteristics**

- Perspective taking, project management skills, analysis, explicating differences and agreements

**Duration**

- 45 minutes

**Teaching context**

- Seminar

**Resource(s)**

- 

**Brief description**

- Students formulate hypotheses derived from a research discipline that is not their own. The hypotheses are then discussed and improved through peer review.

**Goal**

- This activity illustrates how relevant insights from other disciplines can be unified with the student’s own goals and ambitions.
Example of the activity in action

Hypothesizing on social inequality

In this example, the research topic that is introduced is ‘Understanding social inequality’.

Social inequality is a phenomenon that has been studied in almost every social discipline and thus many different approaches, concepts and methodologies have been developed better to understand this phenomenon. Although the exercise is for students to come up with hypotheses that could be derived from disciplines that are not their own, below are some examples of how hypotheses regarding the nature of social inequality may be formulated, depending on the discipline taken as a starting point.

Students who are ‘experts’ in political science may come up with the following hypotheses:

- Social inequality is to a large extent the result of power inequality.
- The nature of political systems is closely related to the magnitude of social inequality.

Students who are ‘experts’ in social science may come up with the following hypotheses:

- The meritocratic ideal doesn’t provide sufficient safeguards to prevent social inequality in a society.
- Economic capital is – irrespective of the behaviour of other variables such as talent, cultural capital and social capital – one of the major determinants of social inequality.

Students who are ‘experts’ in cultural anthropology may come up with the following hypothesis:

- What social inequality means and how it is problematized is narrowed by a dominant westernized point of view (in many societies social inequality is more incorporated into the societal structure, and horizontally organized traditional societies face a complete different reality of social inequality – e.g. caste systems).

Alternatives and Tips & Tricks

➔ To ensure that the students can come up with hypotheses that are sufficiently to the point (step 2), it may be helpful to introduce a specific research topic for which a wide range of scientific disciplines are relevant. You can also tailor the topic introduced to the make-up of your group of students.

➔ Guided by the student expert, the groups could sketch a way in which the hypothesis could be investigated scientifically.

➔ You could finalize the activity with a group discussion in order to reveal some of the revisions that were suggested: which elements of the hypothesis could be improved (e.g. presence of unknown scientific jargon or assumptions, whether any available knowledge that was overlooked, etc.)?

➔ You could also choose to finalize the activity by collecting and presenting hypotheses derived from some current research articles on the same research topic and then comparing them with those generated by the students.

➔ Although this ILA is intended for (under)graduate students who have a specialization in a discipline, it is also possible to conduct this exercise with undergraduate interdisciplinary students. However, if this is the case, it is highly recommended to work with the formulation of a research question instead of a hypothesis, since the design of a hypothesis involves more analytical steps that demand greater familiarity with a discipline’s specific methodology.

References

- The framework of this ILA is derived from curricular design within the Institute for Interdisciplinary Studies.
Managing data

Characteristics: Analysis, explicating differences and agreements
Duration: Minimum of two weeks
Teaching context: Homework assignment
Resource(s): Data management tables (digital versions)
Brief description: Students are taught how to collect and categorize information from different disciplinary perspectives. They form groups of four students, in which they individually analyse different articles on a specific topic. They then report their findings in a shared document and discuss the problems they encountered collectively.

Goal: For students to use the data management table to identify differences (and the causes of these differences) between disciplinary perspectives.

Setup

➔ Divide the students into groups of 3 or 4 students. Each group has to think of a topic that is studied within different disciplines.
➔ Introduce and explain the data management table (DMT) (see below).
➔ Ask the students to search for articles on their topic from several disciplinary perspectives (derived from academic sources).
➔ Each student reads and analyses at least one relevant article and then writes down the findings and posts them in a shared document (e.g. Google docs, Dropbox).
➔ After a set deadline, the group meets outside class to discuss their findings and their questions. They also write down differences and the overlap they have identified between the theories, concepts and assumptions.
➔ The students now share their document with their teacher, who provides them with feedback.
### Managing data on alcohol and aggression

The following data management table could be provided to the students:

<table>
<thead>
<tr>
<th>Discipline / sub-discipline</th>
<th>Theories</th>
<th>Concepts</th>
<th>Assumptions</th>
<th>Insights into topic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Psychology:</strong> understanding behaviour and mental processes by researching and establishing both general principles and specific cases.</td>
<td>Subculture of violence theory: groups that accept violence as a means of conflict resolution.</td>
<td>Violence: 11 (physical) violence items from the Conflict Tactics Scale: throwing, pushing, grabbing, shoving, slapping, kicking, biting, hitting, beating-up, choking, burning, forcing-sex, threatening with knife or gun, stabbing, and/or shooting.</td>
<td>Higher rate found among F-M-IPV may be due to underreporting of violence data across gender or because in clinical samples men are more violent.</td>
<td>Support for the subculture of violence theory: Black subjects reported significantly higher FMIPV (not MFIPV) than White subjects when controlled for factors such as socioeconomic background, drinking, and history of victimization.</td>
</tr>
<tr>
<td><strong>Epidemiology:</strong> the study of patterns of health and illness and associated factors at the population level. This is useful for identifying risk factors (for disease), determining optimal treatment approaches for clinical practice and for preventive measures.</td>
<td>Social structure theory: socioeconomic factors that characterize the lives of specific groups.</td>
<td>Alcohol problem measures: survey with 29 alcohol-related problems from 14 specific problem areas.</td>
<td>Higher rate found among F-M-IPV may be due to underreporting of violence data across gender or because in clinical samples men are more violent.</td>
<td>Coding alcohol consumption (methodological) more than 3 drinks a day is considered as heavy drinking – ignores gender, weight, and time-course of consumption (over the course of an evening or within 5 minutes).</td>
</tr>
</tbody>
</table>

*Tip: Look up (through other sources) what the found disciplines include.*

**Example of the activity in action**

**Interdisciplinary Learning Activities**

Within the broad topic of alcohol and aggression, students may explore why alcoholics are often more abusive towards family members than towards others. Combining the two articles and analysing the differences might lead to the following observations.

The first article reviews several theories that try to explain alcohol-related intimate partner violence among white, black and Hispanic partners. Alcohol consumption apparently goes hand-in-hand with increases in aggressive behaviour towards partners, but there is a catch: it is unclear whether alcohol should be considered the cause of aggression. Expectations, individual and relationship history, and environmental factors might need to be present for the violent behaviour to arise. In the second article there is talk of social stimuli or instigation that precedes the violence, and about variants in brain receptors that somehow modulate the level of aggressiveness expressed.

At first glance, in these cases the different insights seem to provide pieces of the puzzle that you are trying to solve. But conflicts could lurk below the surface, such as:

- Do both articles adhere to the same concept of violence?
- Does this match your preconceived definition of violence?
- What level of alcohol consumption are both articles talking about?
- How does that compare to the ‘alcoholics’ you want to study?
- Do the articles privilege the social correlates of violence over the neural correlates or vice versa?
- Animal studies vs. studies with humans

The first article does not even consider the level of analysis of brain biochemistry to be relevant to the behaviour they want to study, whereas the second article notes that the social circumstances may modulate aggressive arousal in the brain, but that this modulation differs in biochemically different brains, without mentioning individual or social history.

Animal studies vs. studies with humans

The second article focuses on experiments with mice, whereas the first addresses human subjects. Are the insights from animal studies really relevant for understanding human behaviour? In what ways are they limited?
Alternatives and Tips & Tricks

➔ Reading relevant review articles first will help you to recognize the main theories. Online information about the author can also be helpful for this step.

➔ Epistemological assumptions are more hidden, and it can help to browse through an introductory course book from the sub-discipline.

➔ The mini-guide Critical Thinking (Paul & Elder, 2009) provides handy tools for a critical analysis of texts.

➔ If students are not accustomed to critically analysing texts, you can use one article as an example. Every student should read this article and hand in a completed DMT as a homework assignment. During the next seminar you can discuss the students’ findings, answer questions and address any problems they encountered.

➔ Another way to make the assignment slightly easier is to pair students within the smaller groups in order to let two students read the same article and do the assignment together.

➔ Encourage students to ask experts in the field about the concepts, theories and assumptions they encounter.

➔ Using a wiki may be useful for this learning activity, because students eventually have to share their information. Through online software such as www.wikispaces.com, both teachers and students can create shared documents to work on jointly.

➔ You can ask the students to use different colours for their individual contributions in the DMT. You can use your own colour to comment on the students and their findings.

References

- The framework of this ILA is derived from curricular design within the Association for Integrative Studies.
- The example of this ILA was developed by teachers of Interdisciplinary Social Sciences (ASW) at the University of Amsterdam.
Movies & matter

Characteristics
Formulating a common goal, project management skills, explicating differences and agreements

Duration
A minimum of three weeks

Teaching context
Homework assignment

Resource(s)
A camera for each group of 4–5 students; literature from various disciplines

Brief description
Small groups of students are asked to make a short film (4–5 minutes long) about three scientific concepts that are studied in three different academic disciplines. The students design a story board in which both the concepts as well as their connections and interconnections are explained. The films are evaluated on their disciplinary and interdisciplinary values and for their degree of creativity and clarity.

Goal
Small groups of students make connections between interdisciplinary concepts visible and understandable to a broader public through the use of film.

Setup
➔ Divide the students into groups of 4 or 5.
➔ Give the students a hand-out with a pool of concepts, grouped into three columns according to the discipline in which the concepts are used. Each group of students picks three concepts (one from each column) based on their own interests.
➔ The concepts should have been addressed in previous classes. However, the students are expected to learn more about them by consulting scientific literature.
➔ The students now make a film script for a film lasting 2–5 minutes. The script must centre on the three concepts: it should be clear what they are and how they are interrelated. The students should make use of and refer to literature and researchers that have played an important role in the general understanding of these concepts. They also have to pay attention to missing links and what is still unknown.
➔ Students are free to produce their films how they want, but are encouraged not to simply copy & paste video material from the internet.
➔ Students upload their films onto a shared channel and the films are evaluated and graded by a multidisciplinary team of teachers.
Example of the activity in action

Natural & social science based matter

The following list of concepts can be used if this learning activity is related to natural science based courses:

<table>
<thead>
<tr>
<th>Physics</th>
<th>Biology</th>
<th>Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cosmic microwave background</td>
<td>Mitogen activated protein (MAP) kinase pathway</td>
<td>Proteins</td>
</tr>
<tr>
<td>Deuterium</td>
<td>Cell membrane and the intake of substrates</td>
<td>Water</td>
</tr>
<tr>
<td>Entropy</td>
<td>Human anatomy</td>
<td>Conformation</td>
</tr>
<tr>
<td>Galaxy</td>
<td>Golgi apparatus</td>
<td>Periodical system</td>
</tr>
</tbody>
</table>

Good examples of a film based on the concepts of the galaxy, human anatomy and proteins can be found here: http://www.youtube.com/watch?v=laDWBt8mgSw

(This film is in Dutch and was made by four first-year Beta-gamma students Maarten van der Sande, Maria Stuut, Patrick Vlaar, Vikki de Jong.)

The following list of concepts can be used if this learning activity is related to social science based courses:

<table>
<thead>
<tr>
<th>Sociology</th>
<th>Economy</th>
<th>Political science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functionalism</td>
<td>Barter economy</td>
<td>Nationalism</td>
</tr>
<tr>
<td>Civilization theory</td>
<td>Theory of comparative advantage</td>
<td>Clash of civilizations</td>
</tr>
<tr>
<td>Social cohesion</td>
<td>Theory of the invisible hand</td>
<td>Liberalism</td>
</tr>
<tr>
<td>Tragedy of the commons</td>
<td>Scarcity</td>
<td>Good governance/rule of law</td>
</tr>
</tbody>
</table>

Alternatives and Tips & Tricks

➔ Giving feedback on the film script can help to improve the quality of the final product. Regular feedback sessions will ensure that the end product is of a minimum quality.

➔ The films can be shown to a broader audience to finalize a course, and ‘Oscars’ could be awarded to the three best films.

➔ This learning activity has been used successfully in a first-year course titled ‘From the Big Bang to Life’, in which students had to use and combine in their film scripts concepts used in physics, biology and chemistry (see also the first example in the section above).

➔ Examples of the short films can be found here: http://www.youtube.com/user/oerknalleven?feature=watch

References

- The framework of this ILA is derived from curricular design within the Institute for Interdisciplinary Studies.
Panel discussion

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Perspective taking, explicating differences and agreements, reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>120 minutes</td>
</tr>
<tr>
<td>Teaching context</td>
<td>Lecture &amp; homework assignment</td>
</tr>
<tr>
<td>Resource(s)</td>
<td>Two researchers from different disciplinary backgrounds</td>
</tr>
<tr>
<td>Brief description</td>
<td>Students are asked to take the lead in preparing and conducting two interviews with (mono-disciplinary) researchers. They are to ask the interviewees the same set of questions aimed at elucidating the views of the researchers on a common topic. Through the process of the interview and a subsequent analysis thereof, the students evaluate the (expected) differences in the approach of the two experts and thus provide a reflection on the disciplines they represent.</td>
</tr>
<tr>
<td>Goal</td>
<td>Students gain an understanding of how the knowledge frameworks of (mono-disciplinary) researchers differ and complement each other as a counterweight to the limitations of a mono-disciplinary approach.</td>
</tr>
</tbody>
</table>

Setup

➔ When telling the students about the assignment, mention that it requires them to develop a set of questions on a topic that are thought-provoking yet general enough that they can be debated by researchers from different academic fields. Make sure you briefly introduce the topic at stake.

➔ Mention that the two participating researchers are from different disciplinary backgrounds and that they will be present in the upcoming lecture. Also inform the students about the disciplinary background of each researcher.

➔ During the lecture, the first half of the first session (20 minutes) should begin with the students asking the first researcher the series of questions. Make sure you designate a small group of students to act as ‘scribes’ who are responsible for making notes on how the questions are interpreted and what kind of information is provided.

➔ During the second part of the first session (again 20 minutes), the second researcher should be asked the same set of questions. The same group of students act as the scribes.

➔ After the break, invite the two researchers to start a discussion that is led by the students. The starting point of this discussion should be the extent to which the two researchers interpreted the set of questions differently as a result of their different disciplinary backgrounds. The group that acted as scribes provide the main input for this discussion, but everyone can participate.

➔ The final goal of this discussion is to explore the complementary (non-conflicting) elements of knowledge derived from the disciplinary fields as well as the contrasting elements between each knowledge framework.
Panel discussion on energy

In a course that involves exploring current issues on sustainability, a broad topic like ‘Energy’ can be addressed in several ways.

The following two types of researchers could be chosen to participate in the interview and subsequent panel discussion prepared by the students:

- A researcher with a background in political science, specializing in the geopolitics of natural resources.
- A researcher with a background in chemistry, specializing in sustainable energy technologies.

Questions that students might come up with are:

- Do you consider energy a scarce resource?
- If so, who or what makes it a scarce resource?
- Do you consider the quantity of energy available for human use a current problem? If so, what are the possible and viable solutions to that problem?
- What characteristics of energy determine our relationship to it?
- What are the most challenging developments in your field with regard to the energy problem?
- What are the most promising methodologies for research on the energy problem?

Alternatives and Tips & Tricks

➔ You could decide to not have the second researcher present while the first one is answering the questions, or vice versa. Although knowing the answers of the first/second researcher may allow differing knowledge frameworks to be understood sooner in the panel discussion, if one of the researchers does not know how the other researcher has dealt with the questions, it might make it easier for the students to stimulate the panel discussion between them.

➔ Depending on the availability of the researchers, you may want to organize several panel discussions on similar or other topics during the course.

➔ It is important to select two researchers who are open-minded enough to consider alternative approaches to the topic to be discussed.

References

- The framework of this ILA is derived from curricular design within the Institute for Interdisciplinary Studies.
Peers & prejudice

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Mentalisation, explicating differences and agreements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>45 minutes</td>
</tr>
<tr>
<td>Teaching context</td>
<td>Seminar</td>
</tr>
<tr>
<td>Resource(s)</td>
<td>Whiteboard</td>
</tr>
<tr>
<td>Brief description</td>
<td>Students form small groups based on a real or fictitious characteristic of each group. They make prejudices of the other and their own group. Afterwards they commonly discuss the prejudices.</td>
</tr>
<tr>
<td>Goal</td>
<td>By explicitly stating stereotypes and labelling others, students learn to discuss and explore the rationale behind these stereotypes.</td>
</tr>
</tbody>
</table>

**Setup**

- Divide the class into small groups of approximately 5 students based on a real or fictitious characteristic of each group.
- Get the groups to come up with at least one prejudice about the other groups and one prejudice they think the other groups will have about them.
- Write down the prejudices on the whiteboard and initiate a discussion. Does the class, as a whole, agree on the prejudices? To what extent is there a semblance of truth in the prejudices suggested? Was it more difficult to come up with prejudices about the other groups or about their own group?
- Ask them if they might also benefit from the characteristics that are expressed in the prejudices. If so, how? Write those benefits on the whiteboard and discuss the findings with the group.
Labelling biologists, philosophers and anthropologists

Groups of students could be labelled on the basis of their research disciplines and the related scientific practice (perspectives, assumptions, methods). In the following example, three groups of students are labelled as ‘philosophers’, ‘biologists’ and ‘anthropologists’.

Examples of prejudices that the students might come up with:

- Philosophers too often construct theories without sufficient reliance on empirical data; this tradition results in knowledge that is difficult to contradict.
- Biologists apply an approach that is often too reductionist. Their studies don’t tell us much about the complexity of the real world.
- Anthropologists don’t do real science. Participatory research, for example, is highly subjective. Also, the role of the researcher is too influential as results could be interpreted completely differently by another researcher.

Possible benefits (e.g. positive interpretations) of the previous prejudices may be:

- The reflective thinking that philosophers often apply may result in innovative explanations of the world that might be true but that cannot (or cannot yet) be proven by empirical data.
- By studying smaller elements of a natural system more thoroughly, highly specialized knowledge is obtained through biological methodologies that may turn out to be relevant knowledge for real-world application in the future.
- Anthropologists are usually skilled in acknowledging the subjectivity of their own presence. Since anthropologist often spend a relatively long time on their fieldwork, participatory research becomes more valuable as the human subjects of study get more used to the presence of the researcher.

Alternatives and Tips & Tricks

➔ Make sure that there is enough knowledge within the groups about the labels that are imposed.
➔ An alternative is to use non-scientific labelling, for instance in the case of a societal problem that involves different stakeholders. An example is the restructuring of a neighbourhood, where house owners, the city council, shop owners and real estate agents all have different needs (and possible prejudices).

References

- The framework of this ILA is derived from curricular design within the Institute for Interdisciplinary Sciences & Interdisciplinary Social Sciences (ASW).
Scenario analysis

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Decision making, situation awareness, dealing with uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>4–12 weeks</td>
</tr>
<tr>
<td>Teaching context</td>
<td>Seminar &amp; homework assignment</td>
</tr>
<tr>
<td>Resource(s)</td>
<td>Instruction on scenario method</td>
</tr>
<tr>
<td>Brief description</td>
<td>Students are challenged to explore the future by means of a scenario analysis. For a specific theme they sketch a possible future in which they combine known facts with current and future trends and uncertainties.</td>
</tr>
<tr>
<td>Goal</td>
<td>For students to learn to analyse, integrate and present trends and facts that interact in complex ways, and to implement an attitude of open-mindedness towards unconventional ideas and out-of-the-box thinking.</td>
</tr>
</tbody>
</table>

Setup

➔ Divide the students into groups of 3–5 students. Within their group, they decide on a topic for which they want to explore the future.

Step 1: Brainstorming about the future

➔ The first task is to think creatively about possible futures for the chosen topic. At this stage, anything is possible: there are no boundaries and the students are encouraged to think outside the box. Various methods can be used to achieve this (see Alternatives).

Step 2: Analysing trends

➔ The next step is to analyse and structure the ideas generated in step 1. In this step, students search for academic and non-academic literature to support the trends. These trends should reflect a wide variety of information and include different domains, such as the political, the socio-economical, the cultural, the ecological and the technical domain.

Step 3: Formulating the driving forces of the future

➔ On the basis of the gathered information, the students decide which two of the driving forces are the ones that will have a great impact on the future of their chosen topic, but of which the outcomes are still uncertain and hard to predict.

Step 4: Drawing a scenario framework

➔ The driving forces form the axes of a scenario framework and in this way, four possible futures are mapped. The axes are continuums and the ends of each axis represent the most extreme outcomes. The students pick one scenario for further analysis. They may choose a best-case or a worst-case scenario.

Step 5: Developing a storyline through back-casting

➔ In the final stage, students take their scenario as a starting point from which they work back towards the present, identifying steps that need to be taken and anticipating things that need to happen. Once they have developed a coherent timeline, they present their scenario through storytelling. A story enables the students to present the complex interplay of causal relationships.
Scenarios of the future of agriculture

In the ‘Sustainable Dynamics’ course, a group of four first-year students in Future Planet Studies decided to explore the future of agriculture. In their first brainstorm session about possible future trends within this theme, they thought of genetically modified products, food conflicts and wars as a result of a worldwide food crisis, the exchange of knowledge on extensive land use, changing norms and values concerning food, urban farming and, lastly, the end of hunger.

By analysing these ideas and trends, they found that there was uncertainty about methods of land use: trends were pointing in the direction of both more intensive and more extensive land use. The pattern of globalization concerning food was also an important but uncertain factor.

The students formulated technology and innovation as the driving forces behind the development of type of land use, and economic ethics as the key driving force behind the development towards either more globalization or more protectionism.

Their scenario framework looked like this:

![Diagram of the scenario framework]

The desirable future of extensive land use and international cooperation was chosen for further analysis. Through retrospective research, the students found that a transition in thinking about land use, diet and international aid was needed to meet the conditions of this scenario. Although less desirable, the awareness and readiness for action would be triggered by a worldwide food crisis as a result of overexploitation and market competition.

Alternatives and Tips & Tricks

- There are several ways to stimulate creative thinking. The Walt Disney method given in this handbook (page 80) is an example. Another way is to ask students to write an essay as a homework assignment in the form of a diary of a student in the year 2060. The essay should cover one day in the life of this student and should be about their chosen topic. Below is an extract from the essay written by one of the students in the group that focused on agriculture:

  It’s 7 o’clock and I didn’t sleep at all tonight, thanks to the genetically modified glow in the dark fish that I got as a present. Unfortunately, I have to get up now since we’re going on an excursion to the Museum for Agriculture. It’s the only place in the Netherlands where they still apply intensive agricultural land use. It’s become part of our cultural heritage since intensive land use led to severe soil degradation and food insecurity. I’ve heard we’re even allowed to taste some product, which is exciting, since I’ve never tasted ‘authentic vegetables’ or ‘traditional meat’. They say it tastes better, but obviously in-vitro meat is much more nutritious and healthy.

- A story or film script is a way to present a future scenario to academic or non-academic audiences. The following points of interest for storytelling will make the future reality more plausible and imaginable: think of a catchy name; make use of metaphors; pay attention to details; integrate both current ‘certain’ and possible future trends.

- As can be read from the setup, this learning activity involves several exercises within one method (the scenario analysis). The success of this ambitious ILA is largely dependent on the level of the students’ motivation and the timing of this activity within the course. This demands adequate and realistic planning regarding when which exercise will be done by the students and how feedback on these exercises will be organized.

- This learning activity should be well planned, since it involves many different elements that are elaborated upon over time.

References

- The framework of this ILA is derived from curricular design within the Institute for Interdisciplinary Studies².

² Based on the scenario method for higher education, as developed by the department of educational research & development from the HvA, it is further developed and adapted for IIS by Jacintha Scheerder MSc. Furthermore it is updated through annual circular design by Lucas Rutting MSc, Joris Buis MSc and Mieke de Roo MSc.
Shuffling teams

Setup

➔ Introduce the problem.
➔ Divide the students into groups of 3–5 students. Each group focuses on a single disciplinary background.
➔ Within each group, questions should be generated about how the problem posed could be interpreted and answered from a specific disciplinary perspective.
➔ Have the original teams disperse and assign students to work with students from other groups, thus creating interdisciplinary teams.
➔ Within each team, the case is discussed again. The students should then try to come up with an integrated solution by evaluating and comparing the different disciplinary answers.

Characteristics

Formulating a common goal, explicating differences and agreements

Duration

45–60 minutes

Teaching context

Seminar

Resource(s)

–

Brief description

Students are divided into teams and asked to come up with a solution to a complex problem. They first work in disciplinary teams, but later they change teams by forming interdisciplinary teams. In their interdisciplinary teams, they formulate an integrated perspective on the problem.

Goal

Students learn to think about a question from different perspectives and find an interdisciplinary solution.
Peaceful versus belligerent societies

In an ‘Evolutionary Thinking’ course, students are challenged to think about explanations for the existence of both peaceful and belligerent societies. Four teams are formed and each team reads a different article on peaceful and belligerent societies. One team learns about an anthropological perspective on the evolution of human aggression; another team focuses on population genetics from the perspective of theoretical biology; the third team reads a text in which a behavioural biologist perspective leads to the conclusion that ‘humans crave violence just like sex’; and the fourth team discusses a sociological text on the nature of peaceful or nonviolent societies.

Within each team, the following questions are discussed:

- What explanation for the existence of peaceful and belligerent societies is given?
- To what extent is the given explanation an evolutionary explanation and can it be linked to a ‘VSR’ algorithm?
  - $V =$ what varies, and of which characteristic is this a variation?
  - $S =$ what kind of circumstance (natural, social, sexual, cultural, mixed) causes the selection of that characteristic?
  - $R =$ how is this variation reproduced to next generations?

After 15 minutes of discussion, the teams disperse and re-form into new teams comprised of one student from each of the previous teams, thus ensuring different disciplinary perspectives. During the second 15-minute discussion, each student presents the reasoning of his/her previous (disciplinary) group. The group then synthesizes new points regarding the existence of peaceful and belligerent societies.

Within each team, the following questions could be discussed:

- What explains the existence of peaceful and belligerent societies?
- Which explanations are more convincing than others?
- Which explanations are complementary?
- Which explanations are opposing?

Alternatives and Tips & Tricks

- If the level of the disciplinary expertise of the students is sufficiently high, it may not be necessary to provide a complex problem. Instead, after having identified the students’ variety of disciplinary backgrounds, have them generate as a group a complex problem for which they, again as a group, would like to find an integrated (interdisciplinary) solution.

- If you don’t wish to finish this ILA with a group discussion comprising mini-presentations of integrative solutions by each interdisciplinary team, you could have the students return to their original (disciplinary) teams so that they can inform their former group of the outcomes of the discussion.

References

- The framework of this ILA is derived from curricular design within the Institute for Interdisciplinary Studies.
Walt Disney strategy

Characteristics
Formulating a common goal, project management skills, dealing with uncertainty

Duration
90 minutes

Teaching context
Seminar

Resource(s)
3 imagined or real rooms, flip-overs, marker pens

Brief description
The strategy that Walt Disney used to make films is also applicable in other fields. Different rooms or spaces are created for different purposes. Creative ideas are generated in the dream room. Ideas are specified and become concrete in the reality room. And in the sweatbox, ideas are presented and analysed critically on feasibility.

Goal
Students are stimulated to have an open attitude so that they come up with new and unconventional ideas. The students are then challenged to translate their ideas into structured and concrete plans.

Setup
➔ Present the students with a case, a problem or a research question. Then divide the class into smaller groups of 6 or 7 students.
➔ Direct the students to the dream room (this may be an actual room or just a part of the classroom). In the dream room, ideas are created. Students write down every idea on a Post-it note, which they then stick on a large piece of paper. Everything is possible – there are no boundaries – and only positive feedback is allowed.
➔ After the dream room, direct the students to the reality room, where they pick one or more ideas to further elaborate upon. The central question here is: “How does it work?” Or: “How do we make it work?” Encourage the students to remain positive about the possibilities but also to be precise and as concrete as possible.
➔ The next room is the sweatbox. In this room, students pitch their idea to the rest of the group (see also ILA 6). The group gives feedback on the idea, guided by the question “Is this possible?”
How to solve low levels of work motivation?

In a course on labour & organization, students from various backgrounds (psychology, sociology and business studies) were challenged to think creatively about a research design that would enable them to solve a real-life problem. A medium-sized international company based in Amsterdam was struggling with low levels of motivation amongst its employees. The main question that should be investigated with their research design was: ‘What causes the low levels of motivation among employees?’

In the dream room, students came up with many ideas, based on their knowledge from different fields and different perspectives on the focus of the problem. Some examples of ideas were: ask the employees to keep a diary about their experiences at work; perform a discourse analysis on their work emails; start working undercover and observe what’s going on; ask them to do something completely different for two days and evaluate the changes; use focus groups; switch jobs among the employees and reverse power relations as an experiment; take them on a trip; and do personality tests.

In the reality room, the students took a closer look at their ideas and found that although most of the ideas were not realistic, they touched upon important aspects of work motivation. The lack of motivation could have something to do with personality, power relations, type of work, type of organization, and/or the reward system. In order to keep all options open, they chose an explorative approach. Employees from different levels within the organization were asked to keep a journal for one week and to write about their experiences at work. They were given the freedom in the structure and length of their reflections, but were asked to address the highlights and low points of each day.

After they had presented this idea to the rest of the group in the sweatbox, the group was given feedback by their peers on how to approach the employees, ensure anonymity, and present the results to the organization. The group also suggested that the research would need a second phase in order to answer the research question.
CALQ discussion

Setup

➔ At the last meeting of the course, ask the students to return to and focus on one of the lectures they have had during the course. Then divide the students into groups of 10 and get them to discuss each of the lectures, with the person who specifically focussed on this topic chairing the discussion.

➔ To structure the group session, ask the students to make a ‘CALQ’ analysis of the message of the specific lecture and the accompanying literature as a whole.

A CALQ consists of:

Core message: Write down a sentence/couple of sentences from the literature that comes closest to the lecturer’s core message.

Argument: Summarize the lecturer’s point of view on the central topic. Try not to repeat the PowerPoint slides, but rather try to explain the lecturer’s line of reasoning: how did he/she construct the evidence that led to his/her conclusion?

Link: Indicate how this topic relates to other subjects during this course. The ‘batons’ may be used as a first starting point.

Question: Prepare three questions or statements about this topic that you believe might be good questions for the exam. One of the questions needs to be aimed at a topic that is unclear to you (or that you expect to be unclear to others).

➔ During the working group every single person presents and chairs his/her topic for 10 minutes. As they are an interdisciplinary group of people, expect them not only to present their CALQs but also to ask well-aimed questions so that they also get a conversation going with input from other students and thus other disciplinary backgrounds.

➔ After everyone has presented his/her CALQ, the students will have discussed all the material for the exam. This is a communal learning process in which students explain the core of the subject matter in understandable terms.

➔ Chairing role: Every student acts as chairperson for 10 minutes. In these 10 minutes, they present their CALQ analysis. It is the chairperson’s responsibility to ensure that 1) everybody pays attention and takes part in the discussion, 2) following his/her CALQ analysis, all relevant issues get discussed and 3) this all happens in 10 minutes. Note that the final questions or statements are an important element of the CALQ analysis. They serve to create a fruitful discussion.

Characteristics
Perspective taking, taking up the leadership role, analysis

Duration
2 hours (and each student should spend a week preparing for the activity)

Teaching context
Tutorial & home assignment

Resource(s)
–

Brief description
Each student studies one lecture from the lecture series plus the accompanying literature. In groups of 10 students, in which everyone has studied a different content, they discuss the entire lecture series plus the literature. This pushes the students to look at the core of the lectures, to search for links and to explain to each other things that are unclear. It also allows them to practise steering discussions.

Goal
Students gain an understanding of the different knowledge frameworks of the lectures and learn to lead a discussion of these perspectives in interdisciplinary teams.
Food production

In a course on food production, students from different backgrounds discussed various questions from the lecture series. All the questions had an interdisciplinary component:

- How can we guarantee sufficient food to feed the entire population of the world in the coming decades?
- Which resources are available for this?
- Do we have enough land to grow food or do we need to develop alternative substrates to meet the demand?
- Do we have enough water to grow crops?
- What production system would be the most effective to feed the world’s population?
- What means do we have to improve the nutritious value and quality of our food (‘upgrading’)?
- Do we have to stick to traditional breeding methods to fortify our crops or should we commercially develop genetically modified organisms (GMOs) to enhance the quantity and/or the quality our food production?
- What opportunities and risks are related to the genetic manipulation of crops?
- Each student made a CALQ analysis of one lecture and lively discussions followed.

Alternatives and Tips & Tricks

- To be able to discuss all of the topics, each student should read and study not only the topic that has been assigned to him/her, but also the other lectures and articles.
- Ensure that the students do not blindly trust what their fellow students present as their CALQ, but critically reflect upon their input.
- Give feedback to the student who has the chairing role.

References

- The framework of this ILA is derived from the programme Future Planet Studies curricular design within the Institute for Interdisciplinary Studies.
## Setup

- Students develop a campaign based on a thorough analysis of or a solution to a problem. They can choose from several options and work on solutions to an issue in various ways. For example, they could:
  - Develop a media or lobbying campaign with regard to a specific issue.
  - Write a strategic policy recommendation for an EU Committee or another national or international organization.
  - Submit a tender to an important national or international scientific institution (e.g. NWO).
  - Write a critical group essay or research report on an issue.
- Other ideas can be put to the lecturer. If deemed adequate, they may also be accepted as end products to be worked on. Any end product that is delivered is assessed on the incorporated level of scientific insights that the students gained during the course.

## Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Perspective taking, role changing, situation awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>4 weeks (around 80 hours in total)</td>
</tr>
<tr>
<td>Teaching context</td>
<td>Tutorials &amp; home assignment</td>
</tr>
<tr>
<td>Resource(s)</td>
<td>–</td>
</tr>
<tr>
<td>Brief description</td>
<td>Developing a campaign based on a thorough analysis of or a solution to a problem.</td>
</tr>
<tr>
<td>Goal</td>
<td>Students develop an interdisciplinary way of thinking and learn how to integrate knowledge and expertise from different disciplines in order to arrive at balanced insights.</td>
</tr>
</tbody>
</table>
Outline of the assignment work:

**Week 1**
- Organize two lectures on a specific topic.
- Divide the students into groups of 3 or 4 students.
- Let the students chose a (broad) theme on which they would like to work during the assignment.
  - What subject needs to get more (public) attention?

**Week 2**
- Have a tutorial meeting with the student groups and let them define or make a rough sketch of what they want to put forward/bring to attention and why.
  - Analyse the situation at stake.
  - Formulate a problem statement.
  - Define the possible remedy/solution/improvement.
- This step may be regarded as the introduction to the subject matter including a scientific hypothesis.
- Let the students decide on the main aim of their campaign.
  - Should it be raising awareness, is it meant to be inspiring, compelling or activating, or is the intention to change existing behavioural patterns?
  - What campaign form is most suitable to bring their ideas out in the open and reach their target group?
Let the students explain their choice.

- Consider this as the methodological part of the assignment (which must be included in the final report).
- The group members make a selection and read relevant literature about the chosen topic. They need to include at least six academic articles.
- Based on the core concepts (i.e. leading ideas) with regard to the chosen theme, the group writes a theoretical text that forms the basis for their campaign strategy. Make sure this text is scientifically correct and coherent, as well as inspiring, compelling, activating or whatever goal they have formulated at the start.
- The theoretical discussion including a detailed list of scientific references is a compulsory part of the final product. Make sure the final product reflects an interdisciplinary view on the chosen theme/topic.
- Let the students spend the rest of week 2 on the further development of their preliminary ideas. As there are only two weeks left, it is highly recommended to start with the campaign as soon as possible.

**Week 3**
- During week 3, the students work on the final product of the assignment.
- If necessary, the students can consult the lecturer via email or make an appointment.

**Week 4**
- The draft is presented to the supervising lecturer. After approval (or after reworking it on the basis of the feedback given), the students can start preparing for the presentations.
The future of food

In the first week, an introductory lecture was given to explain the assignment and to feed the students some ideas about possible pathways towards solving the world food issue, for example starting a media campaign, lobbying or writing a strategic policy recommendation.

In the subsequent meetings, their imagination was triggered by stakeholders from the field, who not only presented various examples to inspire the students as regards the assignment, but also enhanced their creativity.

One of the stakeholders was the Royal Tropical Institute (KIT). Its representative talked about challenges in food production systems. Agriculture is fundamental to promote sustainable economic development and the key for KIT is the perspective of the smallholder/small-scale farmer.

The goal of KIT is to assist smallholders/small-scale farmers to improve their livelihoods through entrepreneurship/access to markets, and food security.

Value chain development is a key concept in strategies to reduce rural poverty in developing countries. The basic idea is that value chains offer farmers (and indeed all chain actors) the opportunity to acquire new knowledge from actors elsewhere in the chain.

Another stakeholder that participated in the discussion was a representative of the Youth Food Movement (YFM), which is committed to promoting a fairer and healthier food system. Through events such as eat-ins, debates, the Food Film Festival and the YFM Academy, the movement endeavours to make people aware of the food choices they make.

In consultation with the lecturer, the students subsequently picked a theme to work on, decided on the form of the end product, formed a group together with other students and started working on the assignment.

One of the groups from the Future of Food project designed the ‘WeCan’tWaste Challenge’: for one weekend participants had to live from food that otherwise would have been wasted. The students wanted to contribute towards a renewed appreciation for our food and stimulate behavioural change. They had articles placed in different newspaper and organized an online campaign.

Alternatives and Tips & Tricks

➔ Bonus: those students who stand out for their constructive and scientifically sound input and feedback during the final symposium are awarded extra points for this assessment element.

➔ The deadline for the group work is after the presentations, in order to give the students an opportunity to consider the feedback they received during the presentation of their draft versions prior to turning in the final version.

References

- The framework of this ILA is derived from curricular design within the Institute for Interdisciplinary Studies.
Designing a research question

Characteristics
Formulating a common goal, project management skills, decision making

Duration
2 hours

Teaching context
Tutorial

Resource(s)
Paper for the mind map and paper for the research question

Brief description
Students from different disciplinary backgrounds have to come up with a research question and sub-questions on a shared topic of interest.

Goal
Students are challenged to understand and work with peers from other disciplines and improve their research skills by becoming acquainted with research approaches in different disciplines.

Setup

➔ **Brainstorm.** Finding a shared topic of interest. Ask the students to individually note issues that are important and meaningful to them. Divide the students into groups of four. Then ask the students to jointly explore overlapping topics.

A brainstorm is an activating method that generates many ideas about a particular issue or topic. This brainstorming session is intended to stimulate out-of-the-box thinking and break through fixed mind-sets.

➔ **Mind map.** Let the groups jointly choose an issue. Ask them to individually note words, questions, disciplines, technics, methods and theories associated with the chosen issue. Then ask the students to make connections. When everybody has finished his/her mind map, get the group to discuss the differences and similarities.

A mind map is an activating method that makes you distinguish between main and side issues, record information quickly, analyse information, hold information and see connections. The way you organize your thoughts reflects the functioning of your brain and is therefore more practical than, for example, making linear notes.

➔ **Designing a research question.** After the discussion, ask the groups to formulate a main research question and four sub-questions derived from the various disciplines that will help them to answer the main question.

Disciplines typically focus on one aspect of a (complex) problem. To do so, they often operate on the basis of their own disciplinary perspective, including their own theories, language and methods. To produce an overall understanding, insights from multiple disciplines are required. This interdisciplinary learning activity helps to produce this overall understanding.

➔ **Discussion of the research questions among the groups and feedback.**
Disciplinary perspectives on a complex problem

The financial crisis is a multifaceted problem. Over the past five years, academics from different disciplines have tried to explain what caused the global economic recession. The disciplinary explanations shed light on only a part of the problem. Combined, they may offer a more comprehensive explanation.

Different perspectives on the causes of the financial crisis

- **Economist**
  - What factors of the current financial system elicit risky behaviour of bankers and consumers of financial products?

- **Psychologist**
  - What are the weaknesses of the current financial system?

- **Political Scientist**
  - To what extent can national governments prevent a global economic recession?

- **Sociologist**
  - Which cultural norms and/or societal factors contribute to the expression of greedy behaviour?

Alternatives and Tips & Tricks

- Introduce the students to Socratic questioning. The pedagogy of Socratic questions is open-ended, focusing on broad, general ideas rather than specific, factual information. The questioning technique emphasizes a level of questioning and thinking where there is no single right answer. It generally starts with an open-ended question proposed by one student. The participants have to listen actively in order to respond effectively to what others have contributed. Participants must demonstrate respect for different ideas, thoughts and values, and must not interrupt each other.

References

Team charters

**Characteristics**
Giving and receiving feedback, mentalisation, taking up the leadership role

**Duration**
During a project

**Teaching context**
Seminar

**Resource(s)**
-

**Brief description**
Every student fills in a scheme at the start of the course. In this scheme the characteristics that influence group work are listed. The students use this scheme in order to make agreements on the way they will be cooperating. Once a week, the students evaluate their progress using their filled-in schemes.

**Goal**
The students communicate their strong and weak points. They use these to give each other feedback during the course, in order to maintain an optimal group environment.

**Setup**

→ At the start of the course, the students are divided into groups for a project. Once the students are divided, they fill in their strong and weak points in the scheme.
  - At the top left, the students start with ‘my success’. What did they need to gain success?
  - At the top right, the students write down ‘what do the others need to know about me?’. Here the students write down their weak points.
  - At the bottom left, the students write down what they need. What helps them to successfully finish the project?
  - At the bottom right, the students write down ‘what do I add?’. This is where they write down their strong points.

→ The groups make agreements for the coming weeks, using these filled-in schemes. The team charters and the agreements are documented and preserved by a group member, who is appointed as process leader. He or she makes sure that the documents are available at every meeting. Moreover, the process leader intervenes as soon as the group members do not cooperate properly during the project.

→ Once a week the students evaluate their progress. They use the schemes for evaluating their contribution and make appointments for the coming week.
### Examples of filled-in schemes

<table>
<thead>
<tr>
<th>My success</th>
<th>What do others need to know about me</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humour</td>
<td>I am critical</td>
</tr>
<tr>
<td>Hard working co-workers</td>
<td>Sometimes I am too bossy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What do I need</th>
<th>What do I add</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical co-workers</td>
<td>Leadership</td>
</tr>
<tr>
<td>Contradiction</td>
<td>Deadlines</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>My success</th>
<th>What do others need to know about me</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humour</td>
<td>Sometimes I finished my work too late</td>
</tr>
<tr>
<td>Compliments about my work</td>
<td>I am a little bit lazy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What do I need</th>
<th>What do I add</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deadlines</td>
<td>Knowledge of the German, Dutch and English language</td>
</tr>
<tr>
<td>Feedback</td>
<td>Knowledge of Windows, Excel and SPSS</td>
</tr>
<tr>
<td></td>
<td>A team player</td>
</tr>
</tbody>
</table>

### Alternatives and Tips & Tricks

- Add the team charter to the portfolio of activity 5.
- Students show their strong and weak points. This might be difficult for some students. Give your own filled-in scheme as an example to comfort the students. Show the usefulness of this scheme to you.
- Monitor the atmosphere while walking around. It is important to lead the conversation when the atmosphere in a group starts to become unpleasant.

### References

- The framework of this ILA is derived from the pressure cooker programme within the Institute for Interdisciplinary Studies.
Business model canvas

Characteristics
- Taking up the leadership role, decision making, analysis

Duration
- 90 minutes

Teaching context
- Seminar

Resource(s)
- Scheme from www.businessmodelhub.com
- Post-its

Brief description
- The students fill in the business model in project groups. They analyse the mechanism of the organisation. They try to discover the strong and weak point of the organisation.

Goal
- The students learn to analyse an organisation and use this information to formulate recommendations.

Setup
- At the start of the course, the students are divided into groups. Every group assigns its own leader. This leader acts as moderator.
- Every group receives the business model on A3 paper. The company is either of their own choice, self-developed, or appointed to them by the instructor.
- The students start with the customer segment and write down the company’s clients on post-its. Every customer has its own colour post it. These colours are used in the rest of the model, in case an activity or a definition relates to a customer.
- The model is completed when all customers are known.
- The students analyse the strong and weak points of the organisation, after the entire business model is completed. Every post-it receives an A+ or A-.
- Next, the students think about how the organisation could be improved. Solutions to the weak points are formulated.
- Every group shares their insights with the class by means of a presentation.
Example of the activity in action

**Food for a poor neighbourhood**

The students have to develop a project for locals in a poor neighbourhood. Five students want to use a piece of land where they can educate the (unemployed) locals about agriculture. These locals could then produce vegetables and sell them to the people in their neighbourhood. The vegetables are low-priced because of the poverty in this area. The common goal is to produce locally made, cheap and healthy food. The students use the model to analyse the strong and weak points of their project and then use this information to make improvements.

<table>
<thead>
<tr>
<th>Key Partners</th>
<th>Key Activities</th>
<th>Value Propositions</th>
<th>Customer Relationships</th>
<th>Customer Segments</th>
</tr>
</thead>
<tbody>
<tr>
<td>The local primary school</td>
<td>Education of the volunteers</td>
<td>Delivery of cheap, healthy, locally grown vegetables</td>
<td>Local community +</td>
<td>Poor locals +</td>
</tr>
<tr>
<td>The local community centre</td>
<td>Production +</td>
<td></td>
<td></td>
<td>People who eat unhealthy -</td>
</tr>
<tr>
<td>The local government</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key Resources</th>
<th></th>
<th>Customer Relationships</th>
<th>Customer Segments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volunteers</td>
<td>A large piece of land +</td>
<td>Local community +</td>
<td>Poor locals +</td>
</tr>
<tr>
<td></td>
<td>Tools for agriculture +</td>
<td></td>
<td>People who eat unhealthy -</td>
</tr>
<tr>
<td></td>
<td>Seeds +</td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Key Resources</th>
<th></th>
<th>Customer Relationships</th>
<th>Customer Segments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Local community +</td>
<td>Poor locals +</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>People who eat unhealthy -</td>
</tr>
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<td></td>
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</tbody>
</table>

**Channels**

- The local primary school +
- The community centre +
- Word of mouth +
- Social media +

**Cost structure**

- Production -

**Revenue streams**

- A bag with vegetables +

---

**Alternatives and Tips & Tricks**

- Use this lesson as the start of a project.
- Add the disciplines of customers to the post-its in order to gain insight into the different interests.
- Find filled-in schemes on the internet as inspiration.

**References**

Setup

➔ Show the case to the students at the start of the seminar. Discuss the case together. Analyse the issues between the different actors. Next, discuss their motives and desires.
➔ Divide the class into groups of three or four students each.
➔ Introduce the model visually.
   ▪ Observation: I have seen/notice this.
   ▪ Effects: This is the effect on me.
   ▪ Pause: Give the other person the opportunity to react.
   ▪ Suggestion: How can the other person improve?
➔ Discuss the different steps with the students. Let them practice as follows: Two students practise the conversation, while the third student observes and eventually gives his or her feedback.
➔ Introduce a new case and let the students change their roles.
➔ Evaluate the course.

Characteristics

Giving and receiving feedback, mentalisation, role changing

Duration

60 minutes

Teaching context

Seminar

Resource(s)

-

Brief description

The students give each other feedback on a fictional case. They use a model that prevents them from being judgemental. They can use this model in real life as well.

Goal

The students learn to give feedback without judgement.
Example of the activity in action

Examples of a case:

A group of interdisciplinary students have to make a film about how elderly care in the Netherlands should be organised. Their backgrounds are economics, history and biology. During the project, the focus shifts towards a more economic point of view. The other two students are disappointed and want to quit the project. They have another two weeks before the deadline.

Two students have to write a paper together. The first student is responsible for all computations and the second student is responsible for writing the paper himself. However, his writing skills are not very good and he is not willing to improve himself. The deadline approaches.

A student has handed in an individual writing assignment. At the halfway stage, the student did not receive much feedback, apart from ‘being right on track’. His final mark turned out to be a 6.3. The student is disappointed, as he could not find great differences between his papers and papers of other students. The teacher did not take the student’s argumentation seriously. The bachelor coordinator forces the student to resolve his issues with the teacher himself.

Alternatives and Tips & Tricks

➔ Let the student use the OEPS model for the portfolio of activity 5.
➔ Let students hand in their own cases before the start of the seminar. Let the students use their own cases during the seminar.

References

- The framework of this ILA is derived from curricular design within the Institute for Interdisciplinary Studies.
A professional’s view

Setup

➔ Prepare an interdisciplinary case. This can be a fictional as well as an empirical case. It has to contain actors of different disciplines, who might have different solutions to the problem.

➔ Discuss the case in class. Analyse the issues together with the students. Write down the different actors on the blackboard.

➔ Divide the students into groups, so that every group has the same amount of students as the number of actors from the case. First, the students write down the insight in their actor’s role, including possible motives.

➔ Next, the students try to find a solution to the problem together. One student assumes leadership. There is an assignment attached to the case: every discipline from the case has to be resembled in the solution.

➔ The students present their solutions to the class. They have to focus on which part of the solution relates to which discipline.

Characteristics

Taking up the leadership role, role changing, mentalisation

Duration

90 minutes

Teaching context

Seminar

Resource(s)

-

Brief description

The students are appointed a role from a real or fictitious case. They try to compromise for a common goal.

Goal

The students learn to analyse the motives of different stakeholders in a project and how to react to these motives. One student is responsible for leading the discussion.
Examples of a case

After the destruction of several old houses, a piece of land has become available. This piece of land is located close to the city centre. The local council wants to assign a proper destination for this piece of land. One of its demands is that it contributes to the local economy. Moreover, it has to be accessible for the locals. The local council has invited a team of interdisciplinary experts for inspiration. First, they have invited the chairman of the shopkeepers’ association. They would like to attract more people to the city centre. On the other hand, it has made appointments with an architect. An environmental group has invited itself to the meeting. They are not happy about the lack of nature in the city. The headmaster of a local primary school has been invited as well.

- The local council does not want to spend too much money, but they do not have to scrimp and save either. This council also leads the discussion.
- The chairman of the shopkeepers’ association wants to expand the shopping centre. It has to attract more people to the city.
- The architect wants to use this project to become famous.
- The environmental group wants to use this space to experience nature.
- The school headmaster would like to create a place that enhances the development of children.

Alternatives and Tips & Tricks

➔ Use this lesson to start a project.
➔ Give the students secret motives attached to their role. These motives run parallel to the motives of some other role. The students are not allowed to directly reveal their motives, but they do have to try to incorporate these motives in the final solution.
➔ Let one student be the leader of the group, in addition to his role as an actor. He is responsible for the atmosphere in the group.

References

- The framework of this ILA is derived from curricular design within the Institute for Interdisciplinary Studies.
The interdisciplinarity shuttle

Characteristics
Mentalisation, formulating a common goal, project management skills, explicating differences and agreements, decision making

Duration
50 minutes

Teaching context
Seminar or Workshop

Resource(s)
Instruction

Brief description
A spaceship to a planet quite similar to earth will leave in 40 minutes. It harbours plenty of life and is even inhabited by an intelligent civilisation. One research team from earth will be the first to make contact. The students can be part of this team and win seats on the ship if they come up with the best interdisciplinary research proposal.

Goal
For students to get to know one another’s disciplines, the corresponding strengths and weaknesses, and integrate these disciplines in a collaborative and interdisciplinary manner.

Setup
- Divide the students into groups of 4. Tell them that in 40 minutes, a spaceship called the ‘Interdisciplinarity shuttle’ will depart for Kepler 62e. Kepler 62e is a planet that is quite similar to earth: it is full of life and harbours and intelligent civilisation. Humanity would love to make contact with this intelligent species and learn everything about them. Yet, the planet is hard to access and it is impossible to communicate with earth once the shuttle has landed. The capacity on the spaceship is limited; there is only room for one interdisciplinary research group. The group that comes up with the best interdisciplinary research proposal will be rewarded with an opportunity to conduct their research and be the first to study this alien civilisation.

Step 1: Choose a research topic [5 min.]
- Each team has to pick a suitable research topic. Tell them that they have to make sure the topic is something all team members can work on, given their fields of expertise, and that their topic should be concise and narrowed down. Let them answer the following questions:
  - What makes the topic appropriate to interdisciplinary inquiry?
  - Why is this topic relevant?
  - Is the topic focused enough?

Step 2: Make a mind map [5 min.]
- The participants now individually have to make a mind map. First they have to determine what they can contribute to the research, given their background, knowledge and skills, and write down what relevant theories, concepts and assumptions they can bring to the table. They also have to write down their weaknesses: what capabilities do they lack, considering the type of research? What is their blind spot?

Step 3: Find common ground [8 min.]
- Now the group has to work together, in order to answer the following questions:
  - Which disciplines can address the research topic?
  - How can the topic be approached from different disciplines?
  - How can you work cooperatively on the same research topic?
  - What are the dominant perspectives of the disciplines?
  - How can you bring the individual mind maps together?

114 Interdisciplinary Learning Activities
Step 4: Formulate a research question [5 min.]

➔ Now each team can formulate a research question, based on their research topic and the answers to the questions answered in step 3. Instruct them that the research question has to be precise, realistically researchable and has to make use of the skill set of all team members.

Step 5: Make a draft of the methodology [8 min.]

➔ Each team has to make a rough draft of the methodology they want to deploy. They can choose to conduct several disciplinary experiments or use an integrated method. They do not have to go into detail.

Step 6: Make a draft of the methodology [5 min]

➔ Finally, a two-minute pitch has to be prepared. This pitch has to contain the research question, a justification for the methodology and clearly state how this approach is interdisciplinary.

Evaluation:

➔ The pitch should be evaluated based on creativity, usefulness and the level of interdisciplinarity:
  o Creativity: Is the research question and approach original and/or interesting?
  o Usefulness: Is an answer to the research question beneficial to science and/or society?
  o Interdisciplinarity: Does the research need an interdisciplinary approach? Does the team make use of the strengths of the disciplines of all its members?

After voting, you can tell everyone that there is one last seat available - the winning group can choose one member from another team to join their mission to Kepler 62e. Now the winning team is complete and can claim its reward!

References

- The framework of this ILA is derived from curricular design within the Institute for Interdisciplinary Studies.
Appendix


Targeted Assessment Rubric for Interdisciplinary Writing

Category 1: Purposefulness

<table>
<thead>
<tr>
<th>Guiding question</th>
<th>Naïve</th>
<th>Novice</th>
<th>Apprentice</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1. Does the student’s framing of the problem invite an integrative approach?</td>
<td>The paper does not contain a discernible purpose or the purpose is unclear.</td>
<td>The student clearly states a purpose that calls for an integrative approach. However, the student offers no clear rationale or justification for taking this approach.</td>
<td>The student clearly states a purpose that calls for an integrative approach and provides a clear rationale or justification for taking this approach.</td>
<td>The student clearly states a purpose that calls for an integrative approach.</td>
</tr>
<tr>
<td>1.2. Does the student use any academic genre effectively to communicate with his or her intended audience?</td>
<td>An academic genre is discernible but multiple violations of the genre (e.g., organization, tone, referencing, vocabulary) limit the student’s ability to communicate with the intended audience. Or The writing is not fluid. It requires multiple readings.</td>
<td>An academic genre is clear and generally adhered to. The student is obviously aware of the intended audience, which often represents more than one discipline. The paper reads fluidly. No innovation within the genre is visible or if there is any attempt at innovation it is not effective. The paper may include minor errors in tone, mechanics, and referencing.</td>
<td>An academic genre is clear and consistently adhered to. The student is obviously aware of the intended audience, which often represents more than one discipline. Any innovation within the genre is effective and deliberate.</td>
<td>The student shows little to no awareness of the methods, habits of mind, and validation criteria by which knowledge is constructed and verified in the disciplines. Opinions and information summaries are presented as matters of fact.</td>
</tr>
</tbody>
</table>

Category 2: Disciplinary Grounding

<table>
<thead>
<tr>
<th>Guiding question</th>
<th>Naïve</th>
<th>Novice</th>
<th>Apprentice</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1. Does the student use disciplinary knowledge accurately and effectively (e.g., concepts, theories, perspectives, findings, examples)?</td>
<td>A disciplinary knowledge base is not discernible in the sense that the ideas and information included do not stem from any particular disciplinary tradition. Misconceptions and folk beliefs abound. In some cases, jargon is used with little evidence of understanding. And/or the student misuses sources in a major way — e.g., non-credible sources, misunderstanding the meaning of source(s), relying too heavily on one source.</td>
<td>The student uses disciplinary concepts, theories, perspectives, findings, or examples in simplistic, general, or mechanical ways — as in the ‘textbook’ version of a discipline. Key claims are sometimes not supported, or concrete disciplinary examples are disconnected from key claims. Some misconceptions and unwarranted use of jargon may be present. Sources are used pro forma.</td>
<td>Concepts and theories are used effectively in accordance to their disciplinary origins, in ways adopted by disciplinary experts. Theories and generalizations are consistently supported with examples or findings from the disciplines involved. Conversely, concrete cases and examples are interpreted with disciplinary concepts and theories. Relevant and credible sources are used intelligently to advance the argument of the piece, though the paper may have too many unnecessary sources, or key sources may be missing.</td>
<td>In addition to the qualities outlined at Level 3, a well organized network of concepts, theories, perspectives, findings, and examples within one or more of the selected disciplines is clearly visible. Some insightful new examples, interpretations, or responses within the selected disciplines may be present.</td>
</tr>
<tr>
<td>2.2. Does the student use disciplinary methods accurately and effectively (e.g., experimental design, philosophical argumentation, textual analysis)?</td>
<td>The student shows little to no awareness of the methods, habits of mind, and validation criteria by which knowledge is constructed and verified in the disciplines. Opinions and information summaries are presented as matters of fact.</td>
<td>The student shows awareness of or uses disciplinary methods and modes of thinking (e.g., ways to select evidence or construct causal accounts), and validation criteria to construct knowledge in one or more of the selected disciplines. He or she does so effectively, exhibiting language that describes the constructed nature of disciplinary knowledge (e.g., the provisional nature of insights, the limits of generalizations, the multiplicity of interpretations).</td>
<td>The student accurately employs methods, habits of mind, and validation criteria to construct knowledge in one or more of the selected disciplines. He or she does so effectively, exhibiting language that describes the constructed nature of disciplinary knowledge (e.g., the provisional nature of insights, the limits of generalizations, the multiplicity of interpretations).</td>
<td>The student accurately employs methods, habits of mind, and validation criteria to construct knowledge in one or more of the selected disciplines. He or she does so effectively, exhibiting language that describes the constructed nature of disciplinary knowledge (e.g., the provisional nature of insights, the limits of generalizations, the multiplicity of interpretations).</td>
</tr>
<tr>
<td>Guiding question</td>
<td>Naive</td>
<td>Novice</td>
<td>Apprentice</td>
<td>Master</td>
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</tr>
<tr>
<td>3.1. Does the student include selected disciplinary perspectives or insights from two or more disciplinary traditions (presented in the course or from elsewhere) that are relevant to the purpose of the paper?</td>
<td>The paper shows no evidence that disciplinary perspectives are used to address the paper’s purpose. Multiple perspectives or points of view may be considered but these do not represent disciplinary views and/or are not clearly related to the paper’s purpose.</td>
<td>The paper includes two or more relevant disciplinary perspectives or fields but the connections between the included disciplinary insights and the purpose of the work are superficial or unclear. Crucial disciplinary perspectives may be missing.</td>
<td>The paper includes two or more relevant disciplines or fields. Selected disciplinary insights are clearly connected to the purpose of the work. Disciplinary perspectives that are tangential to the purpose may be present, or relevant perspectives missed.</td>
<td>The paper includes two or more relevant disciplines or fields. Selected disciplinary insights are clearly connected to the purpose of the work. No unrelated disciplinary insights appear and no crucial perspectives are missing. If the paper includes some tangential perspectives which are, however, original it should be considered Level 4 for this criterion.</td>
</tr>
<tr>
<td>3.2. Is there an integrative device or strategy (e.g., a model, metaphor, analogy)?</td>
<td>The student may explore the topic in a holistic way but connections are unclear and there is no obvious sense of integration.</td>
<td>The student may explore the topic in a holistic way, making valid connections across disciplinary or field perspectives; however, insights from different perspectives are not integrated coherently or effectively. In some cases, disciplinary concepts, theories, perspectives, findings, or examples are placed side by side; connections and analogies are made but no overall coherent integration is discernible.</td>
<td>An integrative device (e.g., a complex causal explanation) clearly brings disciplinary insights together in a generally coherent and effective way.</td>
<td>A novel, imaginative, or well-articulated integrative device (e.g., a leading metaphor, a complex causal explanation) is used to bring disciplinary insights together in a coherent and effective way.</td>
</tr>
<tr>
<td>3.3. Is there a sense of balance in the overall composition of the piece with regard to how the student brings disciplinary perspectives or insights together to advance the purpose of the piece?</td>
<td>The paper shows an imbalance in the way particular disciplinary perspectives are presented in light of the purpose of the work (e.g., giving equal weight to each disciplinary perspective studied irrespective of its substantive relevance to the problem at hand).</td>
<td>The student attempts to balance disciplinary perspectives but builds this on artificial or algorithmic grounds rather than substantive ones (e.g., giving disproportionate weight for no obvious reason). Disciplinary insights in the paper are generally balanced on substantive grounds in light of the purpose of the work. However, one or more aspects of the argument may be weakly addressed.</td>
<td>Disciplinary insights are delicately balanced to maximize the effectiveness of the paper in light of the purpose of the work. The integration is elegant and coherent and there are no distractions in the building of the argument.</td>
<td></td>
</tr>
<tr>
<td>3.4. Do the conclusions drawn by the student indicate that understanding has been advanced by the integration of disciplinary views?</td>
<td>The student attempts to make connections across different perspectives but these are unrelated to the apparent purpose of the paper.</td>
<td>Minor efforts at integration are present. Or a language of integration is present but is used mechanistically to yield minimal advancement toward the intended purpose.</td>
<td>The student makes a valid integration of disciplinary insights to generate understandings linked to the purpose of the paper. However, some obvious opportunities to advance the purpose of the paper are overlooked or undeveloped.</td>
<td>The student takes full advantage of the opportunities presented by the integration of disciplinary insights to advance his or her intended purpose both effectively and efficiently. The integration may result in novel or unexpected insights.</td>
</tr>
</tbody>
</table>
## Category 4: Critical Awareness

<table>
<thead>
<tr>
<th>Guiding question</th>
<th>Naive</th>
<th>Novice</th>
<th>Apprentice</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1. Does the student show awareness of the limitations and benefits of the contributing disciplines or how the disciplines intertwine?</td>
<td>There is no awareness of which disciplines are being used but there is no or only brief discussion of the limitations and/or benefits of the disciplinary contributions. There may be some misconceptions about how the disciplines are being used.</td>
<td>The benefits and/or limitations of the differing contributing disciplines or fields are sufficiently and clearly discussed. Some of the points made may be general or obvious.</td>
<td>The benefits and/or limitations of the differing contributing disciplines or fields are discussed clearly, insightfully, and in relationship to one another (e.g., students not only describe individual contributions but highlight how views complement, balance, add empirical grounding or put into question insights from other disciplines included in the work).</td>
<td></td>
</tr>
<tr>
<td>4.2. Does the student exhibit self-reflection?</td>
<td>The student does not consider the strengths and limitations of his or her own paper. Ideas are presented at face value without scepticism or reflection.</td>
<td>Comments on the strengths and limitations of the paper and its integrative approach seem mechanical, superficial, or in passing. Ideas are mostly presented at face value without scepticism or reflection.</td>
<td>There is sufficient comment on the strengths and/or limitations of the paper and its integrative approach, although the points made may be general or obvious.</td>
<td>There is consistent awareness of the strengths and limitations of the paper and its integrative approach. A tentative tone is adopted and alternative integrative approaches may be considered.</td>
</tr>
</tbody>
</table>
Colophon

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