Tutoring in interdisciplinary subjects

Meredith Nash
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ISBN 978-0-9872352-0-6

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Introduction

As a tutor for many years, the impetus for this guidebook comes from my realisation of the challenging nature of interdisciplinary teaching to undergraduate students at the University of Melbourne. It is no easy feat to help students to learn one new and specialised disciplinary way of thinking; learning and synthesising two or more disciplinary discourses poses an even greater test of one’s teaching abilities. Given the inherent complexity of disciplinarity, integrating the insights of a range of academic disciplines can be a hurdle for even the most motivated and bright students. Tutors confronted with interdisciplinary teaching for the first time might feel as anxious as I did in helping students to achieve this goal. Given that it is often the tutors (of any university staff) who spend the most time with undergraduate students, my own experiences and those of my peers compelled me to write the first resource guide written for small group interdisciplinary teaching.

Within these pages, you will find a range of tools and strategies to help you to become a more effective tutor in an interdisciplinary classroom. Beginning with some of the basic requirements for initiating an interdisciplinary process in your tutorials as well as techniques for troubleshooting common concerns and challenges, it is my hope that you will see this guide as a ‘tool kit’; essential information that you can consult ‘on the go’ and that will help you to feel more confident and prepared when it comes to ‘doing’ interdisciplinary teaching.

If you find yourself looking for appropriate activities to help your students in their interdisciplinary learning, throughout this guide, you will find a range of examples of learning activities, along with some helpful tips for planning your classes.

Dr. Meredith Nash
Part 1: Understanding the special characteristics of interdisciplinary learning and tutoring

Defining interdisciplinarity

There is a growing body of literature exploring interdisciplinarity in higher education (Klein, 1990). Klein and Newell (1997, p.394) suggest that while there are various motivations for interdisciplinary study, the term ‘interdisciplinary’ itself holds multiple meanings depending on whether the reference is to programs, courses, research areas, modes of teaching and learning, or administrative structures.

Conceptual categorisations of interdisciplinarity include ‘cross-disciplinary’, ‘multi-disciplinary’ and ‘trans-disciplinary’. Whereas the first three terms (listed below in Table 1) generally require little or no effort to integrate disciplinary perspectives, ‘interdisciplinary’ study and teaching involve higher order thinking that requires integration.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tr>
<td>Cross-disciplinary</td>
<td>View one discipline from the perspective of another (Davis, 1995, p.4).</td>
</tr>
<tr>
<td>Multi-disciplinary</td>
<td>Sequential presentation of topics drawn from separate disciplines (Wentworth and Davis, 2002, p.16).</td>
</tr>
<tr>
<td>Trans-disciplinary</td>
<td>Themes or issues that cross over several disciplines (Davis, 1995, p.4).</td>
</tr>
<tr>
<td>Interdisciplinary</td>
<td>‘A process of answering a question, solving a problem, or addressing a topic that is too broad or complex to be dealt with adequately by a single discipline or profession’ (Klein and Newell, 1997, p.393).</td>
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Table 1 A brief outline of conceptual categorisations of interdisciplinarity.
Interdisciplinary teaching involves helping students to understand how disciplinary perspectives are connected to one another. At the tertiary level, interdisciplinary teaching can take many forms. A common arrangement for interdisciplinary teaching is that subjects are taught by a ‘team’ of scholars. ‘Team teaching’ involves experts in various disciplines coming together to teach one topic from multiple perspectives. The content is delivered by a ‘team’ of teaching staff, the bulk of whom in Australia, US and UK are often postgraduate students who act as ‘tutors’ (Coombe and Clancy, 2002). Through team teaching, students can develop a respect for different viewpoints and this model of instruction can also engender a more self-conscious approach to both teaching and learning (Wentworth and Davis, 2002). The creation of interdisciplinary subjects is ideally aligned with Armstrong’s (1980, pp. 53-54) third and fourth levels of integration and synthesis in curricular integration (Figure 1). At these levels, knowledge from various disciplines is integrated in a ‘new, single, intellectually coherent identity’ (Armstrong, 1980, pp.53).

There is a large body of research that explores the roles and the responsibilities of tutors broadly (for example, Anderson, 2007; Atkinson and Colby, 2006). The existing literature, however, is largely drawn from the UK and focuses mainly on tutoring in medicine (for example, problem-based learning) and distance education (see Baumann et al., 2008). There is considerably less literature exploring tutoring in interdisciplinary contexts (Chalmers et al., 2003; Sunderland, 2010).

The best interdisciplinary tutors have an intellectual curiosity. They’re the kind of people who would be interesting at a dinner party. In the classroom they model intellectual humility and they know how to develop concepts into conversations with their students.

Tutor, 1st year, Science

**Figure 1** Armstrong’s (1980) levels of synthesis and integration in education.
Key principles of effective small group teaching

Small group teaching is an integral component of active, interdisciplinary learning. At most universities, the tutorial is the primary means by which undergraduate students have the opportunity to think and engage with their own and others’ learning in a format conducive to discussion and interaction.

The principles of effective interdisciplinary tutoring are the same that apply for any small group teaching. For example, Ramsden (2003) outlines three basic theories of university teaching that are important in any discussion of small group teaching approaches: (1) teaching as telling; (2) teaching as organising student activity; and (3) teaching as making learning possible.

Effective small group teaching is aligned with the view of teaching as making learning possible (Ramsden, 2003). This approach encourages tutors to draw on students’ abilities and misunderstandings and to use them as a platform for instruction (Ramsden, 2003, p.111). This theory views learning as something that the student does; knowledge is a process and not a product of learning. This approach also focuses on tutors continuously reflecting on their practice. Biggs and Tang (2007, p.29) reiterate this view by encouraging tutors to design activities that promote ‘deep’ approaches to learning meaning those that ask students to ‘reflect, hypothesise, apply...’

Small group teaching is important because of its enormous potential to engage students in a variety of forms. The diversity and flexibility associated with small group teaching, however, implicitly demands that a tutorial (in any subject, not just an interdisciplinary one!) should be a participative experience in which students are encouraged to take responsibility for their own learning, along with their tutors. This is what fundamentally differentiates the tutorial from many lectures, where the emphasis is often on presentation and exposition by the lecturer. In any subject, the tutor’s role is not to only transmit information to students but to lead them in locating, processing and synthesising information. The most skilled tutors are also effective group managers and have the ability to facilitate a tutorial without dominating while also addressing subject learning objectives and generic skills over the course of a semester.

Many tutors would agree, and indeed scholars as well (Griffiths and Partington, 1992), that small group teaching is no easy feat. Tutors need to be able to encourage students to think critically but they also should regularly craft stimulating and engaging teaching and learning activities that encourage deep approaches to learning. These teaching foci coincide with Anderson and Krathwohl’s (2001) revision of Bloom’s (1956) hierarchy of learning outcomes which characterises student learning as becoming increasingly complex following the mastery of various academic tasks (Biggs and Tang, 2007, p.76). The challenge for tutors in any subject is to develop teaching and learning activities in accordance with the higher levels in the pyramid).

Figure 2 This pyramid describes how student learning becomes increasingly complex (Anderson and Krathwohl, 2001).
Challenges of interdisciplinarity for tutors

You may already be currently practising some of the principles noted in the previous section in your tutorials. Interdisciplinary tutoring, however, adds layers of complexity to the key principles for effective small group teaching. This complexity comes into play in several ways:

1) **Interdisciplinary subjects generally need to cater to students from a wide variety of disciplinary backgrounds.** Depending on their disciplinary background, some students will enter interdisciplinary subjects without ever setting foot in a discussion-based tutorial environment. Some interdisciplinary tutors have highlighted that their students from engineering or science backgrounds, for example, often express anxiety about interdisciplinary tutorials because discussion and debate are modes of learning more traditionally associated with arts, humanities and social sciences. Science and commerce students, on the other hand, often encounter laboratory/practical tutorials more regularly in their disciplinary studies (Fry, Ketteridge and Marshall, 2009) in order to prepare them for the requirements of professional life. Problem-based learning is a common mode of learning in medical education in addition to clinical teaching (Maudsley, 1999). Be mindful of the many forms of ‘tutorial’ in existence across the disciplines. Interdisciplinary teaching and learning activities should acknowledge the various pedagogical styles that comprise your students’ disciplinary backgrounds.

2) **Interdisciplinary subjects necessitate that you will need to design new methods or adjust existing methods for small group teaching to help students to learn to synthesise multiple perspectives.** In some subjects, interdisciplinarity is so essential to the academic value of the subject as a whole, teaching and learning activities need to explicitly involve students in examining the value of interdisciplinarity in a particular environment. For example, in An Ecological History of Humanity, where students combine the insights of microbiology, history, archaeology, zoology and sociology, it is critical that teaching and learning activities help students to understand how these different disciplinary perspectives combine to create ecological history. Have a look at the interdisciplinary tutor’s tool kit (Part 2) for ideas!

3) **Interdisciplinary subjects often require broad subject knowledge.** Chances are that you have a strong affiliation with one particular discipline and possess a disciplinary terminal degree. Inevitably, you will have to contend with topics in your subject that fall outside of your area of expertise (see Golding 2009b, p. 10). It is a good idea to ask the subject coordinator what level of detail/breadth of knowledge you are expected to have so that you can prepare accordingly.

As per the principles of effective small group teaching, in an interdisciplinary subject, you do not necessarily have to be a multi-disciplinary ‘expert’, but teaching in an interdisciplinary subject does raise the need for some discussion of disciplinary content and knowledge as well as skilled facilitation. Interdisciplinary tutoring, however, presents obvious challenges given the range of disciplines that you and your students will engage with over the course of a semester. Subject-matter ‘expertise’ is not a skill that can be learned overnight or even in one semester. Try to channel your teaching efforts into areas that will directly benefit student learning such as the development of group facilitation and communication skills as well as a range of strategies that you can draw upon to stimulate and motivate students’ learning.

A good [interdisciplinary] tutor is someone who is able to cope in a situation where they are unclear of the material and even the methodologies behind them but still be able to prompt students in discussions.

Tutor, 1st year, Commerce
To summarise, in an interdisciplinary tutorial the teaching foci should be:

* Developing critical thinking skills.
* Employing multiple perspectives.
* Discussing disciplinary content as appropriate.
* Helping students to relate information to larger conceptual frameworks that reflect the reality of living in a world filled with complex problems with no ‘easy’ solutions.

Challenges of interdisciplinarity for students

Your students may be finding it challenging learn in an interdisciplinary environment just as you might be feeling the weight of teaching in one. It is generally agreed that in any area of study, students’ self-awareness is essential for deep learning to occur. For students, becoming a self-aware learner is demanding. Drawing on data from the UK, Bradbeer (1999, p.382) has identified three key barriers to interdisciplinary learning for students including:

1) Problems working across disciplines.
2) Problems working within disciplines.
3) Synthesising different disciplines.

It has been argued that before students can learn to move beyond disciplinary settings, they must first acquire the skills to learn in disciplinary settings (Bradbeer, 1999, p.393). This point has clear implications for first-year students, for example, who have had little experience learning one disciplinary perspective before they begin their interdisciplinary learning (see Part 3: FAQs for practical strategies for managing this issue).

Bradbeer (1999) similarly has suggested that one way that students can overcome the hurdles listed above is linked to self-awareness. Interdisciplinary learning is not just a matter of your students developing a set of generic skills; it is a way of knowing, or epistemology (Klein, 1990, pp. 212-14). Students (and you as the tutor) ‘must have or develop sophisticated conceptions about the nature of knowledge, knowledge claims and truth’ (Golding, 2009a, p.1). Overcoming some of the challenges to interdisciplinary learning means that your students gradually need to see that no disciplinary viewpoint is inherently “true”.

Lecturers and tutors need to understand that students might be completely new to this field, and therefore they need to give you plenty of support and direction.

Student, 2nd year, Science
Strategies for managing the challenges of interdisciplinarity

1) Know your group

Most tutors use the first tutorial of a semester to find out who their students are and to give students an opportunity to meet one another. In an interdisciplinary subject, it is especially important for you to find out your students’ disciplinary backgrounds beforehand or in the first class so that you can get a sense of their background knowledge and experience straight away. Also, take note of any student that has special needs that may impact upon their learning over the semester.

**Tip:** Record any pertinent information about your students so that you always have it on hand. This information will be useful when you are designing learning activities and ensuring that they are interdisciplinary.

2) Utilise the diversity in your tutorial.

Try not to see the diverse disciplinary backgrounds of your students as a burden. Purposefully mixing the students in your class (in pairs or small groups) so that students from different disciplinary backgrounds can support one another in their learning (e.g. peer tutoring) can provide a rich experience for your students. Stress to your students the advantages that will develop from this mode of learning. Your students will gain experience in learning to accommodate each other’s beliefs and disciplinary cultures especially considering that they will often be working in multidisciplinary teams when they enter the workforce (especially in the sciences/engineering). Class discussions or debates will also be significantly enhanced when students with different viewpoints contribute.

3) Make maximum use of your students’ existing knowledge.

Students who are encountering interdisciplinary learning, especially at the first-year level, are often anxious about doing interdisciplinary subjects. Students want to make connections between their existing knowledge and their new knowledge, not only because it facilitates their new learning but also because it is more comfortable to draw from what they already know.

In order to address this issue, you can help build opportunities for reflection on what students know and engage them in activities that build on this knowledge in line with some of the tenets for active, interdisciplinary learning.

**Example:** Concept mapping can help your students to see how seemingly unrelated perspectives fit together. For example, in an interdisciplinary engineering subject, students draw on physics, chemistry and calculus skills to create a concept map that highlights the variables affecting the structural safety of a bridge.

4) Ground your tutorials in real-life situations to make interdisciplinary learning meaningful.

Students who are feeling ambivalent about interdisciplinary learning will be thinking, “Why do I need to learn this?” or “How does it apply to my life?” It is important to remember that most students spend the majority of their university learning time in disciplinary contexts. Your role in an interdisciplinary subject is to help students to extend a more specific set of disciplinary skills and apply them to a range of problems and contexts as in the example in the box above.

One easy method of making learning meaningful for students is by anchoring tutorial material in ‘real-life’ situations or problems (for example, using contemporary swine flu outbreaks in Australia to discuss disease
epidemics in the 14th century). This does not mean that the content of the tutorial must follow actual situations entirely. The level of ‘realism’ that you draw into your class will depend on the level of the students, the content of the subject, and your skill as a facilitator. Role play, for instance, is an excellent way of drawing together the events, personalities or problems of everyday life with interdisciplinary content.

Example: Students in An Ecological History of Humanity explore the question of whether humans would be better off living as hunter gatherers through a role play. Students are asked to pretend that they are appearing as guests on a contemporary talk show to debate the issue. The tutor asks students to create roles for themselves and notes that they should consider disease, social, political and other environmental factors in their actions/responses.

5) Structure interdisciplinary learning.

If your normal practice in a disciplinary-based tutorial is to have an open group discussion without much pre-planning, interdisciplinary tutorials often require more structure in order to be effective. Think about how you can utilise activities that provide high-level thinking but that also include problem-solving, opportunity for critical reflection and discussion, creativity and the exploration of a range of topics from multiple perspectives. Interdisciplinary subjects necessitate giving students greater scope to participate in a range of activities that allow them to apply their knowledge and to make connections between disciplinary perspectives.

Tip: You might try a debate one week, a role play the next and a freewriting activity the following week all coupled with corresponding activities online (blogs, wikis, etc.) to allow students to consolidate multiple perspectives in different ways and in a variety of forms.

Considering the diversity of your students, ask yourself:

• What do I want to achieve in the tutorial?
• What learning activities are going to be most appropriate to meet the needs of my students and the learning outcomes of the subject?

Do not hesitate to involve your students in this process. You can ask your students what they want to achieve at the beginning of a tutorial and you can incorporate their suggestions as they emerge during the session.

Remember, it is especially important in an interdisciplinary tutorial to leave aside time at the beginning of the tutorial to explain to students how the session fits in to the overall structure of the subject with links to the previous week(s) and also to conclude the tutorial with a re-cap of the session, making links to the next session. Often you will need to help students to make links where they might not see them themselves (especially early in the semester or in first-year).

Example of an introduction: “Last week we were studying the physical effects of alcohol in pregnancy. This week we will use that knowledge to examine the question of who should bear responsibility for the prevention of foetal alcohol syndrome. Pregnant women? Doctors? Governments?”
Part 2: The interdisciplinary tutor’s toolkit

Structuring interdisciplinary learning

What is a learning activity?

- Learning activities are student-centred, structured activities or experiences that facilitate the acquisition of knowledge or competencies specified by the curriculum (Exley and Dennick, 2004).

Learning activities in an interdisciplinary tutorial are the most effective when they are:

✓ Interdisciplinary
✓ Reflective

Satisfying the above conditions should provide a roadmap for the development of your students' integrative thinking skills, one of the goals of interdisciplinary studies. Activities that invite your students to compare, contrast and critique disciplinary perspectives are essential in provoking your students to see shades of gray where previously they might only have seen black or white (see Lattuca, Voight and Fath, 2004).

Here are a few questions for you to consider when selecting a learning activity:

1. How will the learning activity fit in with previous and subsequent learning activities? Will the students be able to see the connections between them?
2. Will the learning activity allow students to practice applying their skills in specific areas of content?
3. Will the activity help students to convert abstract content from various disciplinary perspectives into more concrete examples?
4. Does the activity require students to be active and to interact with one another in a meaningful way?
5. How might the size of the tutorial room, number of students, session time, and availability of resources or equipment impact the feasibility of the activity?

Try to choose tutorials activities that:

1) Allow your students to practice interdisciplinary thinking.

Put yourself in your students’ shoes. Interdisciplinary learning can be daunting for students who are unfamiliar with it. Allowing students to exercise their budding interdisciplinary skills in preparatory exercises each week in the relative safety of tutorials can increase their confidence and lessen anxiety before they engage in the more risky undertaking of submitting assessed work.

Examples: concept mapping, peer tutoring, document analysis/case studies, debate

2) Prepare your students for interdisciplinary collaboration.

In developing integrative thinking skills, one goal is that your students will be able to communicate with other people from disciplines other than their own, an important graduate attribute. Regular interaction with peers in tutorials is essential for your students to become adept in purposeful, interdisciplinary relations at university and beyond.

Examples: small group work, role play, peer tutoring

I think [interdisciplinary] tutorials need to be thorough and clearly presented with opportunities for students to ask questions and engage fully in the coursework.

Student, Arts, 3rd year
3) Challenge your students to reflect on their learning at every opportunity.

Build in opportunities for reflection throughout the semester. Students should be able to trace how their learning and development as an interdisciplinary thinker has changed over the course of a semester.

**Examples:** self-assessment tasks, reflective learning journals

**Collaborative learning strategies**

Collaborative learning is one of the foundational strategies for small group teaching in any subject and they are essential in interdisciplinary learning. Changing the format of discussions and activities will keep your students interested while still encouraging them to work together. Whole-class discussions can be difficult to manage and inhibit the participation of certain students. Dividing students into smaller groups may help them achieve the learning objectives more effectively.

**Strategy A: Collaborative/Team learning**

**Definition:** Pairs, small groups or ‘teams’ of students work together.

This strategy can take many different forms:

- **Buzz groups:** Two or three students discuss an issue for a set time limit and then share ideas with the larger group.
- **Fishbowl:** Small group of students discuss an issue while larger group observes and analyses followed by group discussion and feedback and then reversal of roles.
- **Snowballing:** Pairs of students discuss issue and then join another pair, eventually becoming a large group.

**Teaching tips:**

1) Whatever form your small group work takes, discussing students’ impressions/ideas is essential. There are several ways that this can be managed:

   - Ask each group to report back the most important point from their discussion.
   - Ask each group/pair to list responses on a sheet or paper or on a whiteboard.
   - Provide each group with an overhead transparency to list one or two important discussion points. Groups can show overhead individually to large group with one or two minutes of verbal clarification. If time is short, tutor can cut up overheads into four sections, distributing one section to each group. Tutors can then collect sections and show them all at once or in blocks to the entire class.
   - Ask students to nominate a spokesperson to report back to larger group or a ‘scribe’ to list down discussion points on sheet of paper or overhead.

2) Avoid putting groups/or individual students on the spot unless they have been given sufficient warning before undertaking the task that they will need to report back to the group.

3) Encourage students to rearrange the furniture in the room to enhance group work.

4) Consider any students with special needs and accommodate them appropriately by making reasonable adjustments to collaborative activities.

**Advantages:** Good method for getting all students engaged; encourages teamwork; students can test out their ideas with peers safely before they ‘risk’ contributing to larger group; can lead to critical thinking and evaluation of concepts and relationships; builds communication skills
Challenges: You might need to manage more dominant/confident students so that all students have a space to express their views; can be less useful without sufficient time for consolidation/review; requires that you observe and actively participate/facilitate groups in order to keep students on track; possibility not all students will participate equally.


Interdisciplinary example: Students from science and humanities disciplinary backgrounds work in small groups during the tutorial to brainstorm the creation of an imagined public health campaign for a major research assignment. The campaign is supposed to be aimed at teaching their peers at university about AIDS, drawing on scientific, social, ethical and cultural aspects of the disease. In the tutorial, one student in each group serves as the ‘scribe’ and the tutor asks each small group to present their ideas for their campaign to the rest of the tutorial for feedback.

Strategy B: Debate

Definition: Involves students in constructing reasoned oral arguments in response to a proposition provided by you. Students use inductive and deductive reasoning skills and they also must use evidence to defend a position.

Teaching tips:

1) It is often more effective if you assign students to a ‘side’ randomly or ask students to prepare to argue for both sides before the debate to minimise time lost in class on the day and to force students to engage with a position that they might not necessarily agree with. If you let students choose their side, depending on the topic, you could have everyone in the room arguing for the same position!

2) Students should be asked to prepare a half page of notes on their position the week before the debate to familiarise them with the topic and to help them to feel more secure and motivated to participate. From your perspective, students have less of an excuse for non-participation if they have been prompted the week before and have notes in front of them. To encourage reflection on the material, you can also ask students to summarise the arguments that were presented following the debate.

3) To encourage participation (especially in larger tutorial groups), you might like to structure the debate formally where each ‘team’ elects a spokesperson to deliver an opening argument and then teams take turns to deliver counter points with the provision that everyone in the class must speak at least once and no student/team speaks twice in a row. For formal debates, be mindful that all students will not know the ‘rules’ of debating as it might not have been part of their high school curriculum. Smaller tutorial groups might not necessitate a formal structure.

4) Keep time throughout the debate so that everyone gets a chance to talk (for example, each person is given one minute to make a point before moving on to a counter argument).

5) Depending on the level and ability of the group, you might ask a student or a group of students to moderate the debate. Note: The student ‘moderator’ should be prompted prior to the debate so that they know what to do in this role. They will most likely need your instruction and assistance to manage the debate effectively.

Advantages: Develops analytic skills; improves ability to recognise complexity across a range of issues and disciplines; develops communication skills.

Challenges: Requires pre-planning by you and students; may require that you give students some training in how to carry out debate; can be challenging for students who are anxious about speaking in a group.
**Interdisciplinary example:** In a subject about climate change, students debate this proposition: “Australia’s future energy needs can only be met by investing in nuclear energy”. The tutor prompts students to draw on social, political, economic, legal and scientific arguments relating to climate change. Students are instructed to prepare to argue for either side in the preceding week. On the day of the debate, the tutor divides students in two groups to argue each position. Students submit a short summary of the key arguments they presented following the debate.

**Strategy C: Case study**

**Definition:** An in-depth examination of a real-life situation or scenario to illustrate subject content.

**Teaching tips:**

1) Case study should fit with themes of the tutorial or subject more broadly. It should be clear to students what key concepts are relevant for their learning upon engaging in this activity and allows them to draw on multiple perspectives.

2) Before the tutorial, ask students to do any pre-reading or preparation. Think about the various ways in which students will interpret the case study and be prepared to answer their questions. It might be helpful for them (and for you) to prepare a clear set of instructions along with a printed copy of the case study so that they have know how to approach the task. Giving them questions to prompt their thinking is especially helpful for students who have not encountered this type of learning activity before.

3) This activity works best when students are placed in groups of two or three. Students should be positioned to learn from each other and not necessarily asked to complete the task on their own.

4) During the tutorial, circulate around the room to monitor the progress of each group, asking or answering questions as appropriate.

5) Allow time after the activity for a summary of points/ideas/key concepts raised by groups using a whiteboard or in a whole class discussion. Help students to draw together perspectives as appropriate.

**Advantages:** Associates theoretical/abstract concepts with practical/concrete examples; stimulates critical thinking; improves problem-solving skills; excellent for peer interaction and learning.

**Challenges:** Developing a good case study can be difficult and time-consuming; the case should be sufficiently complex and not based around ‘facts’ that students merely memorise and recite; can be problematic if students are not sufficiently prepared.

**Interdisciplinary example:** Students explore the ethical questions surrounding individual freedom versus the protection of society in the face of disease through a case study of Mary Mallon, an asymptomatic carrier of typhoid widely known as “Typhoid Mary”. The tutor prompts students to think about social and scientific factors together in determining whether Typhoid Mary was an irresponsible vector of disease or a victim and if there are modern equivalents to this case (for example, HIV).
Strategy D: Document/item/object analysis

Definition: Conceptual clarification using relevant historical or contemporary documents or objects (for example, newspaper articles, photographs, cartoons, letters, diaries, government documents, speeches, interview transcripts, artefacts).

Teaching tips:
1) This strategy can be used in conjunction with any of the collaborative learning techniques listed earlier. You can provide each pair or small group of students with a relevant document or item and ask them to process it according to learning objectives for tutorial.
2) You might like to give each group a different (but otherwise related) document or item for analysis and then ask groups to swap documents/items once or twice during the tutorial so that groups can analyse different objects.
3) Ensure that students are clear which concepts/disciplinary perspectives are meant to be clarified/integrated during this activity.
4) In order to consolidate learning, this exercise should be followed by group discussion to link documents/items to interdisciplinary content/concepts.

Advantages: Allows students to relate appropriate primary source documents to material being studied; provides a more engaging way of introducing new material; raises awareness of multiple meanings associated with documents or items.

Challenges: Students might not easily see disciplinary relationships between concepts and documents/items; can be time consuming for your to find appropriate items for study.

Interdisciplinary example: Students consider if gender stereotyping is intrinsically human and if so, whether it has a Palaeolithic basis. In tutorials, students read the transcript of a debate between two Harvard University evolutionary psychologists about gender differences in aptitudes for science. Students then use these competing arguments to consider the nature of humanness and the idea of nature vs. nurture in small groups.

Strategy E: Role play

Definition: A dramatic activity in which students assume the roles of others. Can be later analysed and interpreted in line with learning objectives.

Teaching tips:
1) The scenario for role play should be conceived by you prior to the tutorial. Scenarios that work best are those that are either controversial or involve conflicting emotions/positions and have clear ‘roles’ associated with them. Scenarios that draw upon topics/environments that are immediately familiar to students tend to generate the most enthusiasm.
2) Students need to be briefed prior to commencement of the activity (e.g. learning objectives, contextualising). Decide whether everyone in the group is going to be given a role or if a small number of students will do the role play while others observe.
3) Role plays work best when students are given a topic/scenario. Allow 5-10 minutes to allocate students roles or, depending on the group, students can allocate themselves roles. It is often difficult for students to sustain a role play beyond 10-20 minutes so prepare to spend the remaining class time discussing and evaluating the role play or reversing roles.
4) If you have a large group, it is worthwhile making sure that the actual running time is shorter so that all students have a chance to participate.

**Advantages:** Encourages collaborative learning; enhances interdisciplinary communication skills; allows students to apply their knowledge to ‘real-life’ situations; students see this as a fun and engaging way to creatively problem-solve and interpret the behaviours of others.

**Challenges:** Students may be hesitant to participate (make sure to have a contingency plan if this is the case); you will need strategies in place to manage the activity if students get off track.

**VARIATIONS**

Van Ments (1989) has outlined a number of variations that you might like to experiment with:

- **Role reversal:** Students swap roles (for example, a doctor becomes a patient).
- **Role rotation:** Roles are rotated throughout the group so everyone has a chance to see the problem/issue from a different point of view (this is important in interdisciplinary tutorials).
- **Replay:** The facilitator (either you or a student) asks to students to ‘rewind’ and act out a scenario again in order to discuss a particular moment in the role play.
- **Fast-forward:** If time is running short, you can ask the group to ‘fast-forward’ to a later scene or situation in the role play.

**Interdisciplinary example:** Students participate in two role plays in practical sessions. In the first role play, two tutors (acting as environmental activist and company CEO) demonstrate less effective communication skills. Students use checklists to identify communication skills they observe and then provide feedback as a group. In the second role play, students work together in groups of three, with each student taking on a different role: e.g. environmental activist, company CEO or observer. The tutor provides each group with a brief case description. Students draw on the case in their role play. Those who are acting receive feedback from the student observers and then shift roles accordingly.
**Metacognitive strategies**

Metacognitive strategies encourage students to reflect upon how they learn and the pathways that lead them to knowledge about a certain topic. Metacognitive learning activities present students with creative ways of understanding relationships between concepts and can be particularly useful in helping students to organise their learning.

**Strategy A: Concept mapping**

**Definition:** A method for students to understand complex themes/topics/ by mapping/diagramming concepts and sub-concepts. This method could be used for mapping a scientific process or for mapping out key themes associated with a particular topic or historical time period, etc. Concepts are represented in circles or squares and connected with straight lines and associated words or phrases to describe the relationship.

**Teaching tips:**

1) Students need to be given examples of how to concept map if they have not already. You should model how to create a concept map in class before asking students to do so on their own.

2) If students are doing the activity for the first time, you might approach this activity in one of two ways: (a) ask students to prepare a concept map independently and then ask students to swap concept maps with a peer and compare maps (an additional bonus of peer learning/peer review); (b) ask students to prepare concept maps in pairs and then ask students to swap maps with another student pair to compare. If the tutorial room is equipped with multiple whiteboards, it can also be useful for student pairs to draw concept maps on whiteboards for all members of the group to observe and analyse.

3) You might use this exercise as an opportunity to see gaps in knowledge or to correct any misunderstandings with students as a group. Allow sufficient time for reporting and processing of concept maps.

**Advantages:** Helps to clarify relationships between topics; allows for more nuanced understanding of complex concepts/ideas; allows students to reflect on their own thinking/learning process and those of their peers.

**Challenges:** May take several sessions for students to understand how to organise concepts.

General example:

Figure 3 An example of a concept map showing its key features (see Novak and Canas, 2008).

Interdisciplinary example:

A tutor asked her students to create a concept map about young people and alcohol use that incorporates cultural, biomedical and social perspectives. This is what one group of students came up with:
Strategy B: Concept mapping with paper-based resources

Definition: Concept mapping with paper-based resources such as multi-hued post-its, note cards, labels, scrap paper (anything you have on hand!)

Teaching tips:
1) Groups of two or three students are given a note card or post-it with an idea, concept, process, definition, name, date, etc. Students are given instructions in how to process the item listed on the card.
2) You can ask students to categorise a series of cards depending on the subject or give students two envelopes of different cards that students can use to match or relate concepts.
3) Paper resources are especially useful for helping students to understand the various steps in a process/links between disciplinary perspectives.
4) Post-it notes are flexible; students can write on the notes, rearrange their ideas easily within a small group, and then stick the notes onto another surface to show to the larger group.

Advantages: Students begin talking to each other immediately in this mode; they can use the notes as evidence for their reasoning; can lead to critical thinking and evaluation; fun!

Challenges: Requires that you do some pre-planning; students need to be familiar with concept mapping in order to perform this task independently or in groups.

Interdisciplinary example: In preparation for the submission of a reflective essay at the end of semester in a Gender Studies subject, students are asked to construct concept maps using post-it notes that show the links between the major topics in the subject and that demonstrate an understanding of the various social, political, economic, and biomedical structures that shape humans as gendered individuals. Students are divided in groups of three and are instructed to use one note per concept in their maps. Each group constructs their map on a designated area of the wall in the room. Each small group circulates around room along with tutor, providing other groups with oral feedback. Groups are then given time to incorporate feedback into their maps.

Reflective strategies

Strategy A: Free writing

Definition: Students write about personal experiences/anecdotes in context of concepts and themes of tutorial or subject (graded or ungraded, depending on subject) within a prescribed time frame.

Teaching tips:
1) Discussion is essential (either in small groups or as a class) for technique to be effective. Students should reflect on their writing and associated themes/topics as a group.
2) The process works more effectively if students are given topics or questions as this may lessen the chance that students will see the activity as ‘busywork’ especially if it is ungraded.
3) Feedback from you is useful for students. Feedback does not have to be extensive (especially if it is a very short piece of writing), but students will get more out of the exercise if they have feedback.
4) Using a variety of approaches/prompts for freewriting will keep students interested.

Advantages: Promotes critical thinking; facilitates structured reflection on course content (important in interdisciplinary subjects!); encourages students to develop their own opinions; develops expressive abilities.
Challenges: Can be perceived as onerous for students; student may not take it seriously if it is not graded; requires a time commitment.

Interdisciplinary example: Tutor asks students to critically reflect on the meaning of “inequality” for the first 2 minutes of class. For the next 5 minutes, students compose a paragraph discussing how the definition of “inequality” changes when viewed through various lenses (economic, health, political, and social). Students share their reflections with the group.

Strategy B: Self-assessment

Definition: Students monitor and make judgements about their own learning. Can be used in conjunction with peer review.

Students can self-assess in a variety of ways.

- Students can freewrite a brief reflective statement following the completion of an assessment or in-class activity acknowledging the aspects of the assignment that they found easy or challenging and how they think that they could improve for future assessments.

- Using a draft of an assessment, you give students the marking rubric and/or marking criteria which you will use to assess their work at a later date. This alerts students to those aspects of their draft assignment they should assess. Students can compare self-assessment with peer reviews (for example) and improve their work based on these evaluations.

Teaching tips:

1) Students will need some training in how to assess their own work. Try to introduce students to the marking criteria and guide students in the process of making judgements.

2) It is useful to provide students with handouts detailing marking criteria as well as a handout providing a ready-made structure for conducting a self-assessment.

3) It is worthwhile to encourage students to undertake self-assessment at regular intervals while completing an assignment, as well as after it is finished in order to receive the full benefits of the activity.

4) Students should not be encouraged to give themselves a grade or mark in a self-assessment. It is more useful for students who are not yet familiar with academic judgment (especially at the first-year level) to write constructive comments to themselves about their work.

Advantages: Motivates students to take responsibility for their own learning; encourages students to reflect on their work independently or in a group; develops skills in critical evaluation; can improve the quality of student work.

Challenges: Requires careful planning by you; students might think that you are passing off you marking responsibilities; students might feel ill-equipped to assess their own work without prior training.

Interdisciplinary example: This self-assessment form (below) has been used in An Ecological History of Humanity in relation to a short online writing assignment (wiki) in which students are asked to draw on three or more disciplinary perspectives in their response. Students use the self-assessment form to improve their work before submitting a final draft for marking. Columns can be added to reflect the needs of your students/subject.
STUDENT SELF-ASSESSMENT: EXAMPLE

Using the marking criteria below (and explained in detail in your tutorial handbook), assess your performance on your wiki response. Don’t worry about giving yourself a ‘mark’ or ‘grade’; this activity is designed to help you to think about how you can improve your work.

How have you performed in each category below? In the comments section, list your strengths and weaknesses in light of the marking criteria. How can you improve your final draft?

<table>
<thead>
<tr>
<th>Marking criteria</th>
<th>Student comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Intensity of engagement and commitment (50%)</td>
<td></td>
</tr>
<tr>
<td>B. Citation (30%)</td>
<td></td>
</tr>
<tr>
<td>C. Synthesis of multiple disciplines (20%)</td>
<td></td>
</tr>
</tbody>
</table>

Enter your marking criteria and weighting (%) here

This is the space where students comment on their work in response to the criterion listed at left.
Questioning

**Definition:** Use of a range of questions to raise students’ awareness of concepts and their interconnections. Aim to ask questions that target higher-level thinking and encourage deep learning.

Probing questions

Exley and Dennick (2004, p.45) identify five types of probing questions:

1. **Prompting:** Question contains clues if student does not know the answer.
2. **Justifying:** Asks student to explain answer choice.
3. **Clarifying:** Asks student to elaborate/clarify meaning.
4. **Extending:** Asks student to apply existing knowledge to new or different situation.
5. **Redirecting:** Ask same question to a variety of students.

Interdisciplinary example:

<table>
<thead>
<tr>
<th>Cognitive level</th>
<th>Types of questions</th>
<th>Examples</th>
</tr>
</thead>
</table>
| EVALUATION      | Questions that involve making judgements on the basis of standards, rules or that ask students to weigh up strengths and weaknesses associated with evidence | Judge, defend, evaluate, justify  
*Evaluate the extent to which reproductive health illustrates the interdependence of social practices, social conditions and biology.* |
| SYNTHESIS       | Questions aimed at creation of new ideas, concepts or plans | Create, speculate, design, plan  
*Create a concept map linking together the reasons why cholera broke out in Zimbabwe in 2009.* |
| ANALYSIS        | Questions aimed at analysing assumptions or evidence    | What are the assumptions? What is the evidence?  
*What does the Haiti earthquake tell us about the intersections between history, environment, political systems and human health?* |
| APPLICATION     | Questions aimed at applying knowledge in new ways       | How would you? What would you do in this situation?  
*How would you write an ecological history of electricity?* |
| COMPREHENSION   | Questions aimed at explaining existing knowledge         | Compare, contrast, explain  
*Compare and contrast the arguments about climate change from the perspectives of an economist and a climate scientist.* |
| KNOWLEDGE       | Questions aimed at recalling factual knowledge          | Define, describe, list  
*Describe why humans became shorter during the Industrial Revolution.* |

Table 2 Questioning at various cognitive levels (Adapted from Exley and Dennick, 2004, p.44)
Virtual/online strategies

Most interdisciplinary subjects integrate some measure of online teaching into their curriculum through a centrally supported student learning management system or other virtual resources. Consider using a variety of media forms to support and apply a range of learning strategies in your tutorials.

Strategy A: Wikis

Definition: Web sites that can be collaboratively created and edited by students. The name is derived from the Hawaiian phrase ‘wiki-wiki’, meaning ‘quick’ (Parker and Chao, 2007, p.57).

Sources:
• You own university hosted wikis
• MediaWiki: www.mediawiki.org
• Wikispaces: www.wikispaces.com

Teaching tips:
1) Wikis can enhance collaborative, interdisciplinary learning activities already taking place in a tutorial. Tutors, however, should try to manage these spaces by providing students with clear expectations and requirements associated with wiki tasks.

2) It is essential that wiki content is integrated into face-to-face content and that you are responsive to student queries and contributions. By making the wiki a regular part of tutorial conversations, students will see their contributions as worthwhile and valued.

3) To encourage participation online, it is useful to build assessment into wiki contributions or to attach wiki contributions to tutorial participation marks.

4) Wikis are a flexible medium. Encourage students to use images, table, graphs or other media rich content to enhance their contributions.

Advantages: Potential for including students who are less comfortable participating in face-to-face settings or for those students who speak languages other than English; encourages active and reflective learning; opportunity for peer teaching and evaluation; wikis are very easy to use; enhances computer literacy skills.

Challenges: Can be onerous for you to manage in addition to classroom responsibilities; can present access issues for students without regular access to computers/internet; can be challenging for students not used to learning online.

VARIATIONS

How can you integrate wikis into your tutorials?

• Developing research projects: Students can create individual or group wikis to develop ideas surrounding a major research project or other collaborative exercise. You and your students can provide feedback directly on the wiki.

• Summarising/condensing required readings: Students contribute ‘notes’ either formally or informally to create a running stream of class notes over the semester.

• Mind-mapping/Concept mapping: Students can use wikis to collaboratively mind map or brainstorm subject content in addition to tutorial concept mapping activities.
• Lab notes: Students can keep individual lab note wikis which can then be used in peer review/peer tutoring or self-assessment activities.

• Reflective writing: Freewriting activities can occur on the wiki where students either have individual wikis where they keep a ‘journal’ or as a collaborative writing space.

• Collaborative reference space: Wikis can be used to create a collaborative glossary/encyclopaedia/instruction manual/handbook. Wikis can also be used to create collaborative bibliographies or reference lists.

**Interdisciplinary example:** Students prepare for a ‘team’ research project by creating a collaborative bibliography of source material engaging with at least three disciplinary perspectives on the tutorial wiki. The team wikis are assessed for quality and relevance by the tutor and fellow classmates. The tutor uses this assessment as a platform for further small group work in class about interdisciplinary modes of inquiry in economics.

**Strategy B: Blogs**

**Definition:** Short for ‘web log’, blogs are flexible spaces that accommodate a range of content from text to images in the form of a ‘post’. They automatically post content in reverse chronological order and create archives of old posts so that they are easy to navigate. Blogs can also be kept private and used like a personal journal.

**Sources**

- Your own university hosted options
- Blogger: [www.blogger.com](http://www.blogger.com)
- WordPress: [www.wordpress.com](http://www.wordpress.com)
- Edublogs: [www.edublogs.com](http://www.edublogs.com)

**Teaching tips:**

1) Monitoring blogs can be time consuming if you have a large number of students and multiple tutorials. Really Simple Syndication (RSS) allows you to subscribe to information and access the latest posts from students’ blogs in one place. Have a look here for more info: [http://www.whatisrss.com/](http://www.whatisrss.com/)

2) Consider developing weekly summaries of what your students are writing in their blogs and discuss them in class. In this way, students are able to recognise that their contributions are valued OR build in learning activities in tutorials that require students to present outcomes from their blogs.

3) You can use blogs in conjunction with social bookmarking. Students can tag their own blog posts and the posts of others. Students might also like to incorporate content from Youtube, Flickr and Slideshare in their blogs.

4) Students must be instructed in acceptable standards of behaviour in an electronic environment. Find out your University’s policy on ‘netiquette’ and give your students clear examples of unacceptable behaviour and associated consequences.

5) While blogs are generally very easy to use, it is still essential to provide students with proper training in using them. Students often need guidance in relation to writing style, tone and formality as students might perceive blogging as an informal activity. If they are expected to comment on each other’s posts, explain to them how they are supposed to intellectually engage with one another using this tool.
Advantages: Facilitates collaborative and individual reflection and discussion; good for formative assessment purposes; ability to link to other content expands the possibilities of the tool; Blogroll tool allows users to link to other blogs of relevance (see http://blogrolling.com/); enhances computer literacy skills; enhances communication skills.

Challenges: Not possible to use for collective/collaborative editing; can be time-consuming for you to monitor individual blogs and comments; students need some training in order to undertake activities.

VARIATIONS:

How can you integrate blogs into your tutorials?

• Publish individual or collective writing: Students can follow up tutorial discussions on individual blogs and comment on each other writing.

• Class notes: Students can use blogs to prepare tutorial discussion notes or to pose questions to each other than can be answered using ‘comments’ tool or in class.

• Discuss group assignments: Students can liaise with one another for group work through the blog.

• Peer review: Using the ‘comments’ tool, students can provide constructive feedback for one another.


Interdisciplinary example: In a subject about globalisation, students demonstrate their understanding of globalisation (via lecture and tutorial content and their own encounters with globalisation) in a personal blog over five weeks of semester. Tutor encourages students to include other media rich content as appropriate (video clips, images). Students are also required to engage intellectually with the blogs of their peers by providing useful comments. Tutor provides ongoing feedback and uses blogs as a platform for interdisciplinary discussion in tutorials.

Strategy C: Social bookmarking

Definition: Allows online storage and management of bookmarks/resources/websites that can be accessed anytime and tagged by key words. Students can share saved bookmarks with each other and also access other relevant bookmarks on the basis of collective tags, other students’ recommendations, or popularity (bookmarks can be ranked).

Sources

• Del.icio.us (popular public social bookmarking site): www.delicious.com
• Digg (popular social bookmarking site): www.digg.com
• Connotea (bookmarking for researchers, clinicians and scientists): www.connotea.org
• CiteULike (bookmark academic papers): www.citeulike.org

Teaching tips:

1) The ability to link to current events and connect those issues to multiple disciplinary perspectives and theoretical concepts being discussed can help students to solidify information in addition to textbooks and reading packs. Social bookmarking, however, needs to undertaken with the total amount of
students’ weekly readings/assessments in mind or it is possible to overwhelm them with too much information.

2) Students might be unfamiliar with social bookmarking. It will be necessary to outline how to establish a social bookmarking account or log in to a collective tutorial account. Have a range of links available at the start that you can share with students as a model for your expectations.

3) Unsure of which social bookmarking site to implement in your tutorial? Experiment with a few different sites yourself before settling on one (for a review of a range of sites see Hammond, Hannay, Lund and Scott, 2005).

4) Instead of asking students to create individual accounts, you can create an account for the tutorial using a common user name and password, divide the tutorial into small groups, and then assign each group different weeks or topics throughout the semester. Students in each group are then responsible for uploading links to the tutorial account.

Advantages: Encourages collaborative resource sharing; enhances computer literacy skills; provides students with ‘real life’ examples of the topics being discussed in tutorials; creation of learning communities where students are responsible for providing directing tutorial content and directing ensuing discussions.

Challenges: Tagging/key words can be confusing for students; possibility of information overload; requires extra time and planning for you to manage effectively; students will need training in using the tool.

VARIATIONS

How can you integrate social bookmarking in your tutorials?

Research projects: Students can collect and share resources; particularly effective for group work. Students working on a similar topic can create directories of relevant links/resources.

Enhancing research skills: In addition to using the tool to collect resources, students might be directed to practice their research skills by asking students to:

• Find resources that summarise a topic.
• Find resources that compare or contrast multiple disciplinary perspectives (this would also be useful in preparation for an in-class debate).
• Answer questions which require the examination of various resources from different disciplines which they then have to bookmark.
• Determine whether sources are reliable and credible.


Interdisciplinary example: Students are asked to build a collection of links (‘bookmarks’) online that are relevant to their major research essay and also represented a range of disciplinary perspectives. Students collectively create a list of tags in class in small groups and then together in the tutorial. Students assign subject-related keywords (‘tags’) to each bookmark following tutorial. Students evaluate the quality of each resource they bookmark and annotate each bookmark accordingly. They also share their bookmarks with one another. Students and the tutor assess the annotated bookmarks, providing feedback about the quality of the resources bookmarked.
Part 3: Frequently Asked Questions (FAQs)

Expertise

Do I have to be an ‘expert’ in every area that my students encounter in an interdisciplinary subject?

A: It is assumed theoretically that tutors do not have to be ‘content experts’ in order to teach in interdisciplinary subjects. Ideally, interdisciplinary tutors are supposed to facilitate a process of self-directed learning (Wilkerson, 1991). In practice, however, students who have little or no experience with this type of learning will inherently rely more heavily on you for clarification and will need to discuss content. This is especially true for first-year students. With this group, tutors often find it challenging to function effectively in a classroom without being in a position to convey some knowledge.

Beware: Falling in to the pressure to be the ‘expert’ can lead you towards a more directive, content-focussed approach to allay 1) students’ anxieties about self-directed learning and 2) their own discomfort with not being able to know everything in an interdisciplinary subject.

Strategies:

- Try to focus on encouraging your students to think independently and to learn collaboratively using the techniques listed in Part 2 of this guidebook.
- Prepare your students early on in the semester for the responsibilities associated with interdisciplinary learning.
- Consider ways that you can improve your teaching and facilitation skills. It is very difficult to be an ‘expert’ in all areas in an interdisciplinary subject, and students can benefit greatly from a skilled tutor who is not necessarily an interdisciplinary ‘expert’.
First-year students

I'm teaching a first-year interdisciplinary subject for the first time. What can I expect?

A: Ask any experienced interdisciplinary tutor and they will tell you that it is a constant challenge to discourage first-year students from relying on tutors for the ‘right’ answers. You need to remember that the majority of your students will be coming from a setting in which high school teachers are seen as ‘experts’ with the ‘answers’. Chances are they will not have had much experience learning independently. After spending an entire semester employing interdisciplinary teaching techniques, it is entirely possible that you might still be regularly asked by students what exactly they are supposed to know and what facts (not concepts) they should be learning. This does not mean that you are a poor teacher. It means that becoming an interdisciplinary thinker takes time and the best thing that you can do for your students is to lay the groundwork for their integrative thinking.

Strategies:

✓ Most universities provide a range of support services for first-year students to help them to make the move to university. Feel free to ask their advice.

✓ Take the time to reiterate the role of interdisciplinary studies to your first-year students. Discuss their anxieties about knowing the ‘right’ answers and, with your guidance, encourage them to come up with collective strategies for their learning. Help them to feel in control.

✓ Give your students every opportunity to practice reflection and collaboration in the tutorial with many opportunities for feedback from you and their peers.
**Linking concepts**

How can I help students to make links between topics?

**A:** This is a common concern for interdisciplinary tutors. Firstly, try to avoid making the links between concepts *for* the students but rather think of ways that you can help them to make the links *themselves.*

If you are continually putting the information together for your students, this can lead them to rely on you too heavily and not think for themselves. Remember that students (especially in first year) may have difficulty trying to identify key concepts and making links between them because they often have not been taught to do this before they reach university.

**Strategies**

- Become aware of students’ ideas and understandings relating to the topic under consideration as well as their likely conceptual pathways for that topic in order to anticipate any misconceptions (know your students!).
- Carefully plan learning activities using metacognitive strategies such as concept maps. These can help students to feel in control of the subject content and allow them to make links and address their own learning pathways.
- Regularly use focus questions to make clear to students key ideas relevant to specific learning activities – follow up with a summary and re-cap of the tutorial to consolidate the learning for that session and to encourage students to regularly make connections between earlier and subsequent themes or topics.
**Critically reflective thinking**

**How can I ensure that my students’ reflective thinking is also critical thinking?**

**A:** According to Brookfield (1997), critical thinking involves helping students to recognise and research the assumptions that underpin their thoughts and actions. While it is a good idea to prompt students to continually reflect on what they think or know by using 'I' both in class and in their writing, the challenging (but essential!) task is to help them to consider how they have reached a particular point of view. Students cannot become critically reflective on their own. They need their tutor and their peers to act as ‘critical mirrors’ to help them to see their ideas in new ways (Brookfield, 1997, p. 19).

**Strategies**

- Engage students in critical debate. Give them an opportunity to learn from each other and challenge their own ideas.
- If you want your students to become critically reflective, scaffold the process. Check your assumptions and practices as a tutor in front of your class and review them from different perspectives.
- Use questioning techniques skilfully. Ask questions aimed at different levels of Bloom’s (1956) learning hierarchy (see Part 2 for examples). Using questions aimed at different levels of the hierarchy will motivate students to think in different ways.
Planning interdisciplinary tutorials

How should I plan an interdisciplinary tutorial?

A: It’s not always easy to anticipate what activities will engage your students or whether the activities you have chosen will go down like a lead balloon! Be flexible! Come to class prepared with a few activities in case some activities work less well than anticipated.

Your choice of activities and learning experiences will rely upon a few factors:

- Size of the room
- Size of the group
- Equipment/resources available to you
- The time you have available to devote to planning
- The preparedness of your group

Before class:

✓ Ask yourself: What do I want to achieve? How will I make this happen? What are my learning objectives? How can I make the tutorial sufficiently interdisciplinary and reflective?

✓ Make a list of learning activities/experiences that will best achieve your learning objectives. Next to each activity, write down what YOU will be doing and what your STUDENTS will be doing throughout the activity. Are your students listening to you? Are they working collaboratively? What will you do when your students work in small groups? How will you facilitate their learning?

✓ If it helps you to plan, consider noting down how long you anticipate each activity will take so that you can monitor progress effectively during class. In doing so, however, remember to remain flexible. If certain activities take more or less time than expected, that is fine.

✓ Write some preparatory notes so that you feel confident when you arrive to class.

✓ Think about any ‘worst-case’ scenarios and how you can fix them quickly and on the spot.

After class:

✓ Consider how the tutorial progressed – would you do anything differently in subsequent tutorials? How might you revise learning activities?

✓ Ask your students for feedback – consider implementing a ‘one minute essay’ (described in Toolkit) to see what they enjoyed about the tutorial and where they see room for improvement.
Example: Interdisciplinary tutorial plan

Subject: An Ecological History of Humanity (University of Melbourne)

Tutorial session objectives for students:

1. Define epidemiological transition.
2. Explain (visually and orally) the links between disease, life expectancy and fertility control immediately following Black Death (14th century) through late 19th century.

<table>
<thead>
<tr>
<th>Timing</th>
<th>What the tutor does</th>
<th>What the student does</th>
<th>Learning focus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>Think about what you and your students will be doing approx. every 10-15 minutes in the class.</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Are you circulating around the room? Giving instructions and guidance? Asking questions?</td>
<td>Are your students working in groups? Independently? Are they listening to you? Are they writing?</td>
<td>What is the purpose of the activity you have chosen? What should the students get out of it?</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:15-10:30am</td>
<td>Tutor asks students to recap previous session which focussed on the social and economic effects of war.</td>
<td>Students are discussing in pairs and then as a group.</td>
<td>These activities allow students to consolidate info learned in previous session with other students and apply to current lesson.</td>
</tr>
<tr>
<td>10:30-10:40am</td>
<td>Tutor asks students to brainstorm reasons why fertility was high post-plague to the 19th century</td>
<td>Students are discussing in groups of 3-4</td>
<td></td>
</tr>
<tr>
<td>10:40-10:55am</td>
<td>Tutor reconvenes class to review results of group work. Students unpack concepts on the white board and create a timeline of key factors/events in history of contraception.</td>
<td>Students thinking, discussing, writing on board.</td>
<td>Students place concepts into historical and biological context. This activity allows students to establish a visual and verbal connection with the material.</td>
</tr>
<tr>
<td>10:55-11:00am</td>
<td>Tutor asks questions to monitor student learning and re-caps main points, links to topic for next class.</td>
<td>Students are listening and reflecting on main points of session.</td>
<td>Students consolidate material and prepare for next tutorial.</td>
</tr>
</tbody>
</table>
References and further reading


