

EMBEDDING ACTIVE LEARNING INTO YOUR TEACHING PRACTICE

This quick guide explores how you can embed active learning into your teaching practices to enhance student learning. It outlines some examples of how this might be done, both as short activities within a lecture, and as longer activities taking up one or more teaching sessions.

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The importance of active learning has been known for a long time, but in much of higher education in the 21st century, the lecture still rules. This quick guide makes a case for embedding active learning into your teaching practices to enhance student learning. It outlines

some examples of how this might be done, both as short activities within a lecture and as longer activities taking up one or more teaching sessions. We see active learning as an integral part of engaging students and staff in partnership (Healey et al, 2014; Healey and Healey, 2019).

HOW DO WE LEARN?

The case for active learning is based on research into how we learn. This is illustrated by Phil Race's (2005) 'Ripples on a Pond model', in which he argues that quality learning is underpinned by five key factors – motivation, needing, doing, digesting and feedback. He later added coaching and assessing as two additional factors (Race 2014) (Fig. 1).

Interestingly, when he asked participants in workshops to:

"Think of something you're good at – something you know you do well. Tell me in a few words how you became good at 'it'";

he found that four answers came up consistently – practice, doing it, trial and error, and getting it wrong at first and learning from your mistakes. Rarely did anyone say they learnt because they attended a lecture or were taught it.

EVALUATING ACTIVE LEARNING

Race suggests that the seven factors he identified may be used to evaluate active learning practices (Table 1). Not all the factors should necessarily be included in every practice. Some will be implicit rather than explicit and some will be covered elsewhere in the course. However, in some cases adding an opportunity for students to engage with the factor explicitly may enhance the quality of the learning.

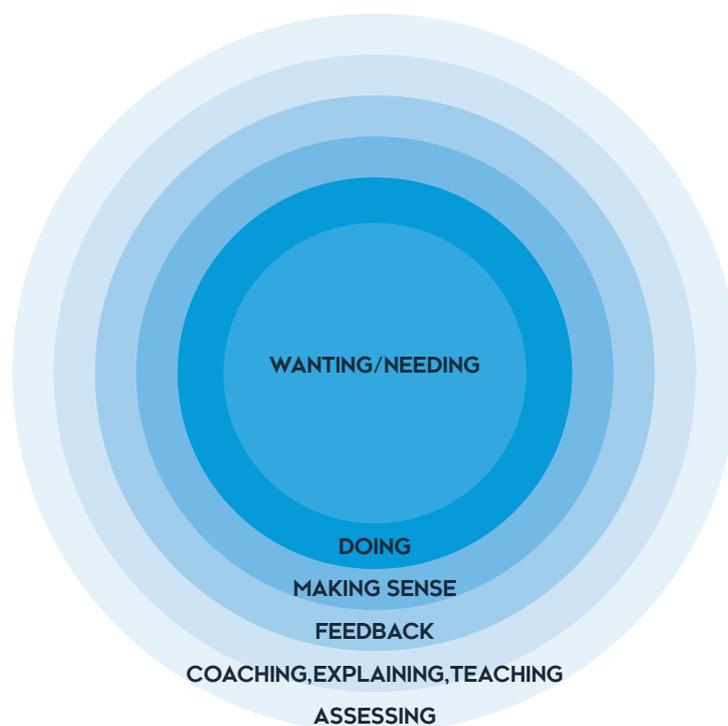


Fig. 1. Ripples on a pond model of student learning
Source: Based on Race (2014)

*It is not enough just to do,
and neither is it enough just
to think. Nor is it enough
simply to do and think.
Learning from experience
must involve linking the
doing and the thinking.*

Table 1. Evaluating active learning practices through Race's seven factors underpinning quality learning

1. Wanting to learn: How are students motivated / interested / enthused by this practice?
2. Needing to learn: Why would they put in some hard work to learn from this practice?
3. Learning by doing: What are the opportunities for students to practice / learn by mistakes?
4. Making sense of what has been learned (digesting): What are the opportunities for students to get their heads round what they have learnt?
5. Getting feedback on how learning is going: How do students obtain reactions / comments from other people (e.g. students, tutors) about what they have learnt?
6. Getting students to deepen their learning by coaching other students: Explaining things to each other.
7. Allowing students to further deepen their learning by assessing their own learning, and assessing others' learning: Making informed judgements.

UNPACKING ACTIVE LEARNING

Active learning is defined as any strategy “that involves students in doing things and thinking about the things they are doing” (Bonwell and Eison 1991, 2). But, as Paul Ramsden (2003, 113) reminds us: “student activity does not itself imply that learning will take place”. There are plenty of examples of students busily undertaking tasks but with little learning resulting. The key to effective learning is well designed active learning. Graham Gibbs (1988, 9) argues that: “It is not enough just to do, and neither is it enough just to think. Nor is it enough simply to do and think. Learning from experience must involve linking the doing and the thinking.”

According to Chickering and Gamson (1987, 3) active learning techniques underpin good undergraduate education: “Learning is not a spectator sport. Students do not learn much just sitting in classes listening to teachers, memorizing pre-packaged assignments, and spitting out answers. They must talk about what they are learning, write reflectively about it, relate it to past experiences, and apply it to their daily lives. They must make what they learn part of themselves”.

EVIDENCE OF IMPACT

There is a wealth of literature indicating the positive impact that active learning has on student outcomes. Here we will mention just two highly cited studies based on large data sets. First, in a meta-analysis of 225 studies in STEM disciplines, Freeman et al (2014) examined failure rates in active learning courses compared with those delivered by traditional lectures. They found that the mean failure rate was 12% less in the active learning courses (Fig. 2) and active learning cut course failure rates by around one-third. They also found a wide range of failure rates, with a few active learning classes having a failure rate of over 20% more than the traditional lecture classes, while a few other studies found the failure rate was up to 50% less in the active learning classes. This underlines the importance of context and learning design in evaluating practice. Simply adopting active learning is not sufficient on its own to guarantee improved student learning, though it increases the probability significantly.

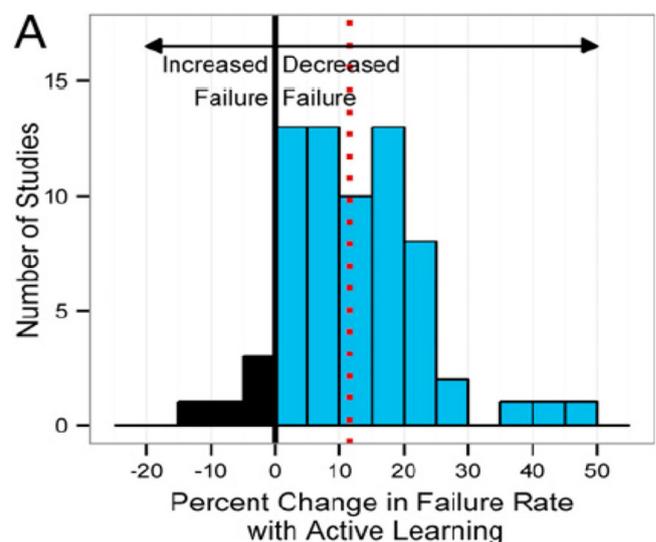
In the second study, George Kuh (2008) analysed data from the National Survey of Student Engagement. He was able to identify a set of active learning practices that have high impact, in that engagement in these practices increase rates of student retention and student engagement.

In the light of these and other findings, Dirks (cited in Waldrop, 2015) suggests that: “At this point, it is unethical to teach any other way.”

Daniel Bernstein (2018, 290) suggests that asking whether active learning works is: “A good question, but not the right one.” Active learning can take many different forms, hence it is more important to ask, which forms of active learning benefit what kinds of student learning, when delivered by whom to which students, and under what circumstances. So as Bernstein goes on to argue “it is time for researchers in the scholarship of teaching and learning to go beyond asking whether active learning “works” and address instead of a set of deeper questions about it” (p.290).

Learning is not a spectator sport. Students do not learn much just sitting in classes listening to teachers, memorizing pre-packaged assignments, and spitting out answers.

Fig. 2. Difference in failure rate in active learning courses V lectures in STEM



Source: Freeman et al (2014)

ATTENTION SPANS

One of the key arguments behind the need to incorporate short activities within lectures is the limited attention span that students have. One study studied students in over 90 lectures given by 12 different lecturers and found that attention span could be held for 10-18 minutes. However, the attention span became only 3 to 4 minutes by the end of the lecture (Johnstone and Percival, 1976). The research behind the attention span literature was usefully summarised by Donald Bligh (1972). He refers to an attention span of around 20 minutes. Later studies cite shorter periods of 10-15 minutes. However, citing averages ignores the variability and there is evidence that attention spans vary widely between individuals and between teachers and according to the interest in the topic (Bradbury 2016). Nevertheless, recognition of the danger of over-simplifying the impact of attention spans does not reduce the desirability to introduce a variety of activities to break up lectures. They do not guarantee enhanced student learning, but do increase its probability.

SHORT ACTIVITIES THAT CAN BE INTEGRATED INTO A TEACHING SESSION

There are many active learning techniques that can be used to break up lectures, engage students, and enhance learning. Keven Yea (2019) outlines 280 such activities. In Table 2 we identify the key characteristics of ten commonly used techniques.

Table 2. Activities to engage students in learning within a session

1	BRAINSTORMING	Everyone thinks of as many different ideas as possible. All ideas are accepted and recorded without comment. The ideas are evaluated after a set time period or when the inspiration ends. Different brainstorming techniques may be appropriate in different HE contexts (Al-Samarraie and Hurmuzan, 2018).
2	CASE STUDIES	A story or scenario is presented to the group that outlines a real life, authentic, or contextualized situation. Groups assess and evaluate the case study or work together on questions (Cox, 2009).
3	CRITICAL INCIDENTS	These are brief written or spoken depictions of remembered events. These can be used during class to bring out those 'aha' moments that had a real impact on their learning; or can be used about difficult concepts. Ask the students to write a description (where and when it occurred), think about what was involved (e.g. a topic or problem) and then unpack why it was so memorable. Can be used to enhance teaching and students' critical reflection and learning (Preskill, 1996).
4	EXIT TICKET	At the end of a lecture ask students to write their answers to these two questions: a) "What is the most significant thing you learned in this session?" and b) "What remains unclear or confusing?". The students hand the answers in on the way out. The lecturer responds to the issues raised at the beginning of the following session (Marzano, 2012). The 'minute paper' is a similar technique (Stead, 2005). For large classes consider collecting the answers electronically.
5	LINE-UP	When a topic has a spectrum of possible answers or viewpoints, ask students to place themselves along a line in response to a statement and discuss their views with their neighbours. Invite a few people at the ends and in the middle of the line to justify their position – "Why are you standing there?". The best statements are ambiguous and allow participants to interpret the terms in the statement differently. It depends on what you mean by ...
6	JIGSAW	Allocate students into groups of 4-6 (ideally the same number in each group). Divide your content (e.g. concept, framework, or topic) into the same number as you have group members. Each student has to become the 'expert' on one topic. Have experts in the area meet together first, so they become more expert, then return to their group, where each one is now an expert. Each then has to teach the rest of the group about their topic, and answer questions about it. The principle behind the technique is that we learn more by teaching it https://www.youtube.com/watch?v=euhtXUgBEts .
7	MIND MAPS	A topic is written on the board or on a flip chart. Mind maps can be used for individual or group activities to help with problem solving, brainstorming, and memory. The class / group suggests and organizes ideas and information, presenting them visually, often in clusters. The map usually focuses on one central word or idea and use branches to depict the importance of ideas (Kinchin, 2014; Rajapriya and Kumar, 2017).
8	QUICK QUIZ	During a class have a quick quiz on the material just covered. This could also take the form of a problem-solving exercise (or practice exam questions) and groups or individuals can compete for speed and accuracy (Cook and Babon, 2017). Polling or voting software can be used to administer multiple-choice tests. An extension is to set students an assignment to design their own multiple-choice questions (MCQ) on different topics as they have to know a topic well to set a good MCQ (Nguyen et al, 2020).
9	ROUND	Every person takes a turn to make a statement. Useful topics include: <ul style="list-style-type: none"> • One thing I need to know about ... • Something I learned today ... • One important point (about the topic) ... Can also be used to share brainstorming activities or group discussions. Keep going until no new answers are shared. Allow participants to 'pass' if necessary.
10	THINK-PAIR-SHARE (TPS)	Each person considers the topic / question and writes down some ideas / answers. Then join with one other for discussion. This provides a good basis for wider discussion and answers tend to be much more forthcoming in a plenary when they share their thoughts, perhaps in a round. There is evidence that use of TPS enhances critical thinking (Kaddoura, 2013).

Source: This table draws on a longer list of active learning techniques originally compiled by Rachel Spronken-Smith (University of Otago) in 2011 (personal communication).

LONGER ACTIVITIES THAT TAKE ONE OR MORE TEACHING SESSIONS

In this section we present four case study examples – the inverse or flipped classroom; inquiry-based learning; learning through debate; and learning through a World Café format – to illustrate a range of longer learning activities.

1. THE INVERSE OR FLIPPED CLASSROOM

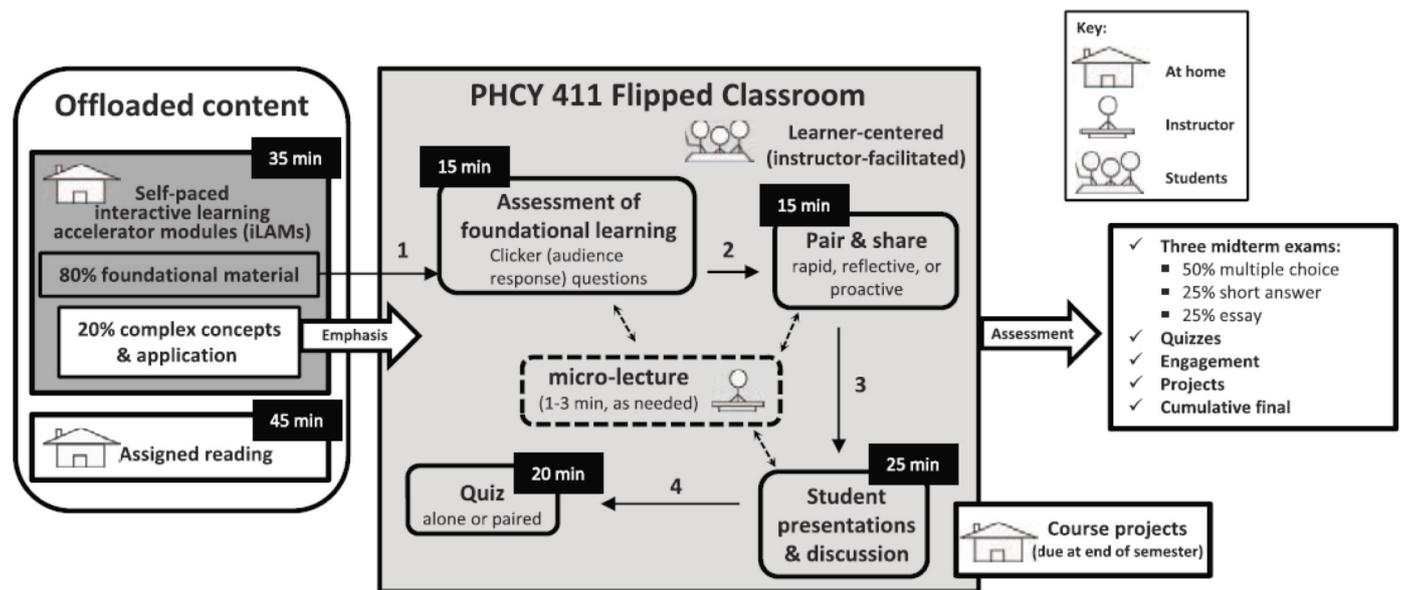
An increasingly popular way in which active learning is becoming embedded in courses is through the development of inverse or flipped classrooms. In this approach, students obtain the material traditionally covered in lectures prior to the class through, for example, readings and videos or through open educational resources. They can then spend the time in class (whether face-to-face or online) in discussion, problem

solving and other experiential activities. Ideally the students then undertake some follow-up activities. Student evaluations of teaching show that students generally rated the instructor significantly higher in a flipped classroom setting compared to a lecture format (Samuel 2019). The key to the flipped classroom experience is the linkage between the out-of-class and in-class activities (Karanicolas et al, 2015).

When a flipped approach was adopted in a first-year course in a health professions school at the University of North Carolina (Fig. 3), it resulted in improved attendance and learning, with 85% (n=126) of students favouring the flipped learning experience over the traditional lecture format (McLaughlin et al, 2014).

For another example of the application of a flipped classroom see [Scale Up](#) at Nottingham Trent University.

Fig. 3 Flipped classroom format for a first-year pharmaceuticals course



Source: McLaughlin et al (2014).

2. INQUIRY-BASED LEARNING

We are using the term inquiry-based learning (IBL) here as a generic term in which students learn through various forms of inquiry, including problem based learning, team based learning, research based learning, challenge based learning, community based learning, and case based learning. The main components of IBL are illustrated in Fig. 4. The focus of the activity may be on one or two of these components (e.g. identifying a research question or collecting and analysing information), but we argue that students should be taken right

through the process at least once a year and not leave it until the final year project or dissertation. IBL may be used as an alternative to attending a lecture(s), for students to learn about existing knowledge which is new to them. It may also be used for students to undertake research, where they are creating new knowledge for society (Levy and Petrucci, 2012). There is evidence that a well-designed IBL course may have beneficial impacts on student learning.

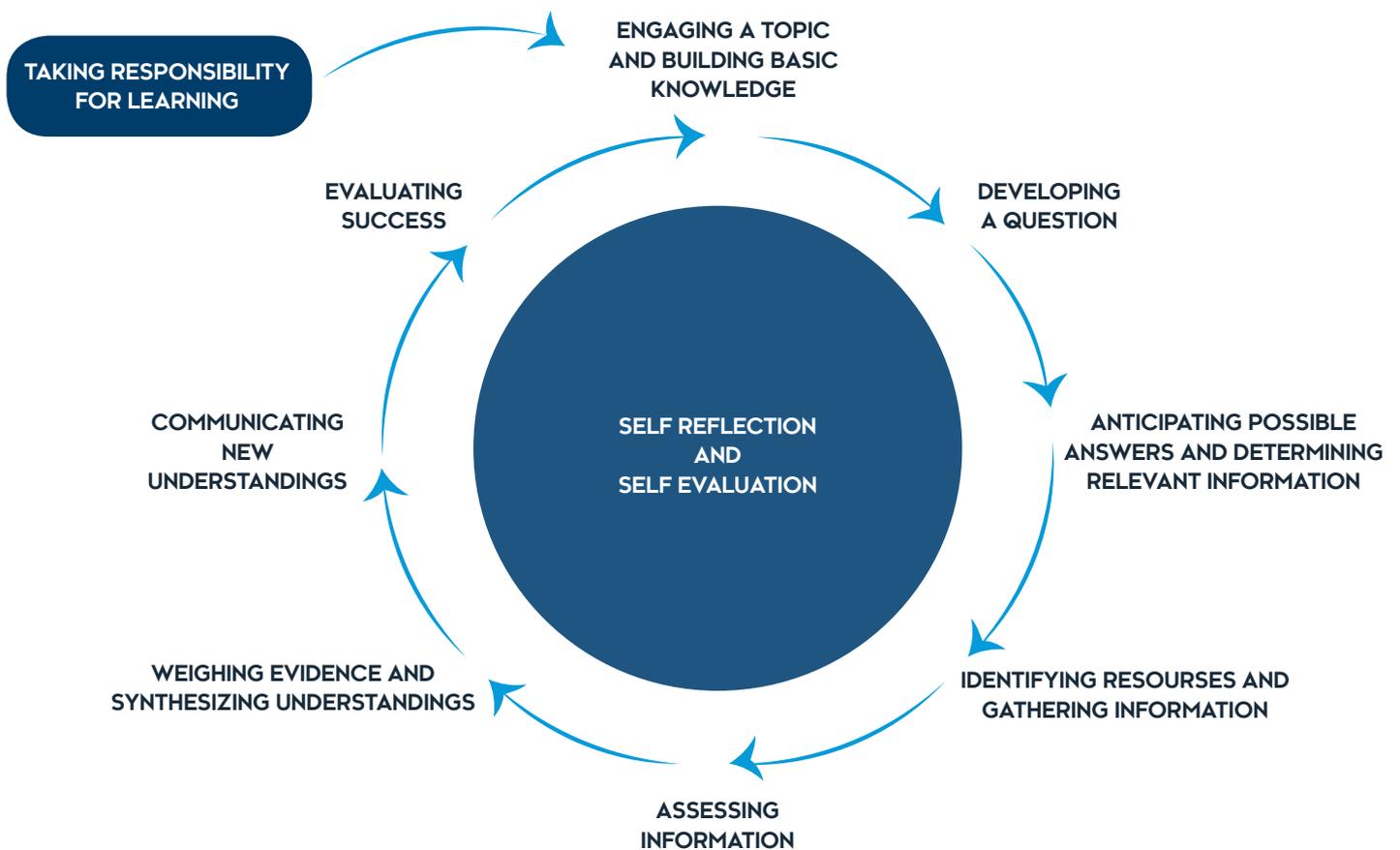


Fig. 4. The inquiry process
 Source: Justice et al. (2007)

Introducing an inquiry-based learning introductory course for social sciences had a significant impact on students' subsequent performance at McMaster University, Canada. Students taking a first-year inquiry-based learning course in learning how to learn in social sciences had statistically significant positive differences with comparable students who did not take the course, in obtaining passing grades, achieving Honours, and remaining in university (Justice, 2007). The course was typically taught in groups of around 25 students, who were subdivided into groups of four or five students.

In the first two weeks each group had to come up with a researchable question related to the theme for that semester (e.g. self-identity). In subsequent weeks they had to explore the answer to their question through a variety of exercise including searching the library, critically reading academic articles, presenting their findings to other groups, and writing for different audiences. Each student kept a critical incident diary reflecting on what they learnt working in their group. By learning effectively how to learn about a topic they had chosen, helps to explain why the students did better in their subsequent academic careers (Justice, 2009).

For numerous mini case studies of undergraduate research and inquiry in different disciplines and countries from first year to final year and across programmes see: Healey and Jenkins (2009) and the 150 page handout under resources on our website www.mickhealey.co.uk

3. LEARNING THROUGH DEBATE

Higher education is an important space for critical engagement with challenging issues where there are clear differences in opinion (e.g. sustainability, strategies for dealing with pandemics). One way of highlighting these differences is through debate. Debates are distinct as an active, argument form of oral pedagogy, which can bring drama to the classroom and engage students in lively discussion. The method makes it necessary for students to seek reasons to justify their viewpoint by developing such abilities

as identifying value assumptions within arguments and judging whether data are misleading or absent (Green and Klug, 1990). This encourages students to evaluate critically the evidence on either side of a debate and creatively build counter-arguments. Historically debates have an oral tradition, although Web 2.0 technologies have the potential also to create a space for online debate in a written format (Selwyn, 2007), or virtual debates via platforms such as Second Life, Skype, Teams, and Zoom.

The right of asylum seekers to work in the UK debate, University of Chester, UK

This debate is part of a final-year undergraduate degree module on 'Excluded Peoples? Migrants and refugees'. The students are divided into groups, one in support of asylum seekers working in the UK, and one against. Each group is given access to the same 'starter pack' of online resources and a reading list. They are encouraged also to access evidence that their opposing team may not have. The groups are then given around three weeks to prepare their arguments. The debate itself takes up one teaching

session (four hours) using the schedule in Appendix 1. As a team, students decide who takes the lead on different stages of the debate. Anyone may respond to questions posed by the opposing team (Healey, 2012). The debate was initially an unassessed exercise, but in response to feedback, since 2018 the students are assessed individually on their understanding of the topic, presentation of the argument, and oral communication skills.

4. LEARNING THROUGH A WORLD CAFÉ FORMAT

A 'World Café' is an effective way of facilitating discussion and ideas within a large group. It is a useful way of providing everyone in a group with the opportunity to share their perspective on a range of different questions around a topic. A World Café operates in three main stages:

1. Welcome and explanations: This starts with a plenary where the full group is introduced to the format and the focus of the discussion. This includes outlining the guidelines and etiquette of a World Café (Fig.5).

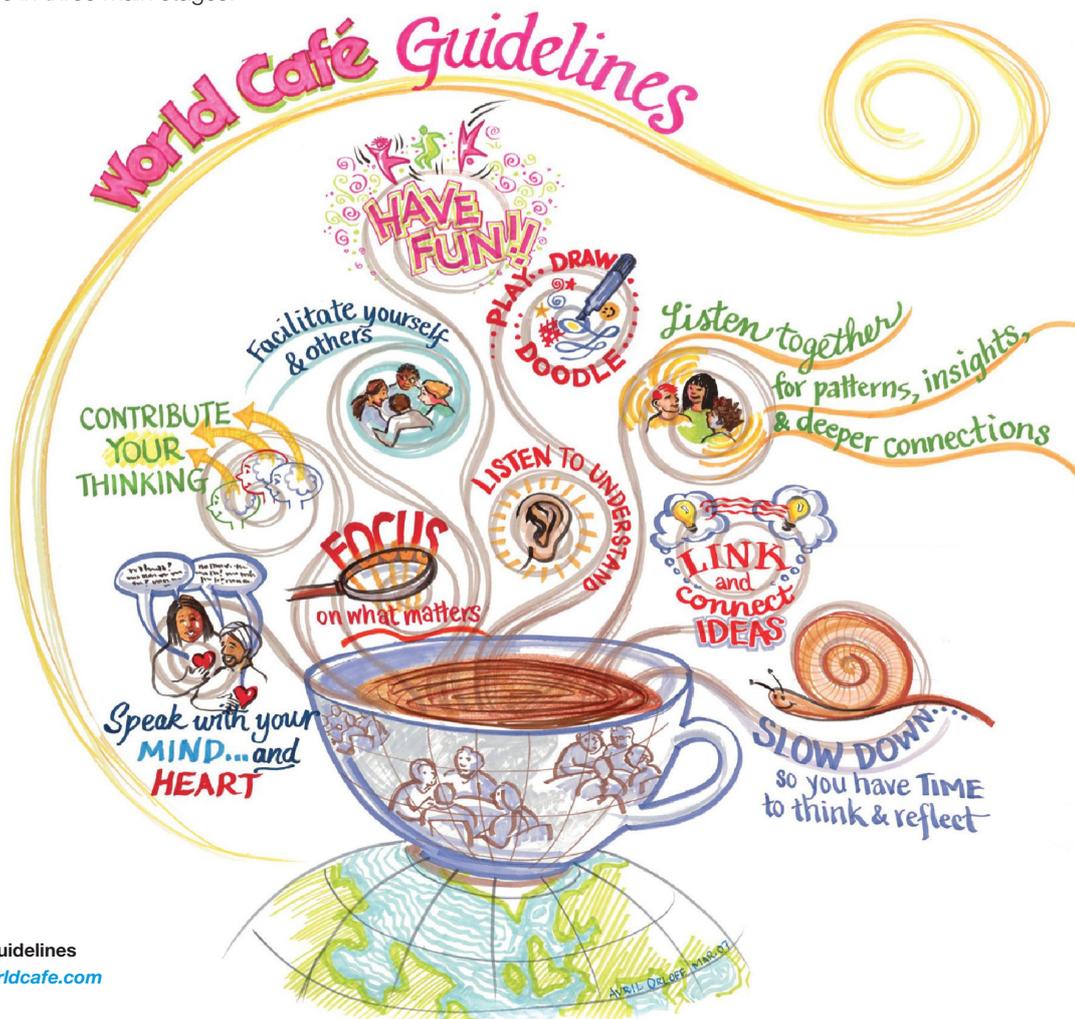


Fig. 5. World Café guidelines
Source: www.theworldcafe.com

2. Small group discussion: Small groups of four to six people meet to discuss a different question at each table. The total number of tables and questions will vary depending on the size of the group and the number of points for discussion. Each group focuses on their first question for around 20 minutes noting down their ideas and thoughts on a piece of paper or paper tablecloth. After the allotted time the whole group moves on to the next table and question; and the process repeats itself until each group has had the opportunity to discuss each question. It may be helpful for one person from the previous group to stay temporarily at the table to explain the nature of the previous group's discussion to the new group. Alternatively, each table may have a 'host' i.e. one person who stays at that table throughout the discussion session to facilitate the discussion and provide the links between the points raised by different groups.
3. Harvest ideas: The final plenary provides the opportunity to summarise the responses to each question. If you chose to have a 'host' at each table then this is a key role for them. Otherwise the last group for each question should be pre-warned that they will need to summarise the thoughts on the question for the other groups. Time limits may restrict this session to key messages, or the most significant points, or a 1-minute summary. Ways of circulating summaries of answers to each question may also be built in.

Environment, Poverty and Health Online World Café, University of Chester, UK

This was an online session for a final year geography module for around 20 students that was focused on a discussion about the social, political, economic and cultural implications of Covid-19. In preparation for this discussion, students were asked to read at least two blogs, newspaper articles and writings of geographers, sociologists and philosophers on Covid-19 at:

<https://progressivegeographies.com/resources/geographers-sociologists-philosophers-etc-on-covid-19/>

For details on the process see Appendix 2.

For another example of the use of World Café workshop online, listen to this podcast where Jonathan Menary from the Lancaster Environment Centre talks about how he and his team had to transform in-person workshops into virtual workshops at short notice through quick and open thinking

<https://digitaleducationpractices.com/2020/04/28/episode-1-transitioning-from-in-person-to-virtual-workshops-without-much-notice/>

KEY TAKEAWAYS

1. Don't just think about **what you want to teach**; more importantly, think about **how the students will learn**.
2. Well-designed active learning can be both engaging and contribute to significant learning.
3. Experiment to find out the variety of activities that work for you and your students.
4. Ensure learning objectives, content, active learning activities, and assessments are aligned.
5. Pay attention to detail, particularly in the instructions you give to students.
6. Accept that it will not work perfectly the first time; ensure you obtain feedback from students so that you can improve the activity.
7. Design at least some of these activities in partnership with your students.

REFLECTIVE QUESTIONS AND ACTIVITIES

1. Reflect on Race's seven factors affecting quality learning in Table 1. Which do you incorporate well into your teaching? Which could you develop further? Use them to evaluate your active learning practices.
2. For each of the 10 examples of short learning activities in Table 2, identify which you have:
 - a. Tried using
 - b. Experienced, but not tried yourself
 - c. Neither experienced, nor tried.
 Choose ONE activity that is new to you that you will try out next semester.
3. Identify one of the four examples of longer activities that take one or more teaching sessions that appeals to you. How could you adapt it to your context?
4. Take a few moments to write down your take home message from this guide – the most important thing that you have learnt; and one action point – something you plan to do as a result of reading this guide.

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APPENDIX 1: STRUCTURING THE DEBATE

DEBATE TEAM:	AFFIRMATIVE: FOR THE TOPIC (FOR ASYLUM SEEKERS WORKING) NEGATIVE: AGAINST THE TOPIC (AGAINST ASYLUM SEEKERS WORKING)
1. FIRST AFFIRMATIVE CONSTRUCTIVE – 3 minutes	
<ul style="list-style-type: none"> • This is an opportunity for the Affirmative team to speak uninterrupted • A good introduction that attracts the audience's attention and interest in the topic • Clearly state the Affirmative's position on the topic • Clearly state the Affirmative's arguments and support these with reason and evidence • Conclude effectively 	
2. Cross Examination of the AFFIRMATIVE by the NEGATIVE – 5 minutes	
<ul style="list-style-type: none"> • This is an opportunity for the Negative team to question what the Affirmative team have introduced • The Negative team ask questions of the Affirmative team ensuring that the Affirmative team have the opportunity to respond to those questions • The Negative team should have a strategy or at the very least a direction to their questioning • New evidence may be introduced to challenge the points made by the Affirmative team 	
3. FIRST NEGATIVE CONSTRUCTIVE – 3 minutes	
<ul style="list-style-type: none"> • This is an opportunity for the Negative team to speak uninterrupted. • A good introduction that attracts the audience's attention and interest in the topic • Clearly state the Negative's position on the topic • Clearly state the Negative's arguments and support this with reason and evidence • Question the Affirmative's contentions/evidence • Conclude effectively 	
4. Cross Examination of the NEGATIVE by the AFFIRMATIVE – 5 minutes	
<ul style="list-style-type: none"> • This is an opportunity for the Affirmative team to question what the Negative team have introduced • The Affirmative team ask questions of the Negative team ensuring that the Negative team can respond to those questions • The Affirmative team should have a strategy or at the very least a direction to their questioning • New evidence may be introduced to challenge the points made by the Negative team 	
5. SECOND AFFIRMATIVE CONSTRUCTIVE – 3 MINUTES	
<ul style="list-style-type: none"> • This is an opportunity for the Affirmative team to speak uninterrupted • Clearly state each of your contentions – support with reason and evidence • Respond to Negative arguments/attacks • Conclude effectively 	
6. Cross Examination of the AFFIRMATIVE by the NEGATIVE – 5 minutes	
<ul style="list-style-type: none"> • This is an opportunity for the Negative team to question what the Affirmative team have introduced • The Negative team ask questions of the Affirmative team ensuring that the Affirmative team have the opportunity to respond to those questions • The Negative team should have a strategy or at the very least a direction to their questioning • New evidence may be introduced to challenge the points made by the Affirmative team 	
7. SECOND NEGATIVE CONSTRUCTIVE – 3 minutes	
<ul style="list-style-type: none"> • This is an opportunity for the Negative team to speak uninterrupted • Clearly state each of your contentions – support with reason and evidence • Respond to Affirmative arguments • Conclude effectively 	
8. Cross Examination of the NEGATIVE by the AFFIRMATIVE – 5 minutes	
<ul style="list-style-type: none"> • This is an opportunity for the Affirmative team to question what the Negative team have introduced • The Affirmative team ask questions of the Negative team ensuring that the Negative team have the opportunity to respond to those questions • The Affirmative team should have a strategy or at the very least a direction to their questioning • New evidence may be introduced to challenge the points made by the Negative team 	
REBUTTAL SPEECHES – NO NEW ARGUMENTS – NEW EVIDENCE AND ANALYSIS ARE ACCEPTABLE	
9. NEGATIVE REBUTTAL – 3 minutes	
<ul style="list-style-type: none"> • Rebuild the Negative case • Summarize how the Negative position is superior • Respond to the Affirmative arguments – extend arguments by giving additional support for them • Conclude effectively 	
10. AFFIRMATIVE REBUTTAL – 3 minutes	
<ul style="list-style-type: none"> • Rebuild the Affirmative case • Summarize how the Affirmative position is superior • Respond to the Negative arguments – extend arguments by giving additional support for them • Conclude effectively 	

APPENDIX 2: STRUCTURING THE ONLINE WORLD CAFÉ

The students were sent a written handout a week before the session outlining the preparation work and how the session would run online. The session began in plenary on a module specific Microsoft Teams channel where the tutor talked through the session online with a short PowerPoint that included explaining the technicalities of how they were going to breakup into separate 'virtual' tables for the small group rounds. For the small group rounds the students were allocated to a 'breakout' room as part of the module specific channel. When they entered this room, they were provided with the link to their first question on a shared One Drive document. Each group made their notes in relation to that question on the One Drive document. After the allotted time, the group were given the link for their next question. This link now contained the question and the notes from the previous group(s) who had already discussed that question. This process was repeated until each of the four groups had discussed the four different questions. For the final question, each group looked at, they were asked to nominate a member from their group to provide a summary of all the notes on the One Drive document to the rest of the class.

During this time, we had two tutors monitoring the discussion groups and moving the groups on to the next question at the appropriate time. These tutors would post the new link and/or 'pop in' to each discussion group at the beginning of each round to ensure that the groups were on task and monitored the One Drive documents to ensure that the students understood the task and were populating the documents. It is important that students have the links for all the documents at the beginning of the process to enable a smooth transition between questions in the online format. During the 'harvest' the nominated member from each group summarised the discussion for the final question that they had discussed. The students who participated were very positive about the experience, particularly as this was one of the first interactive online activities that they had participated in. They noted that they found the experience enjoyable and interesting.

Further information:

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