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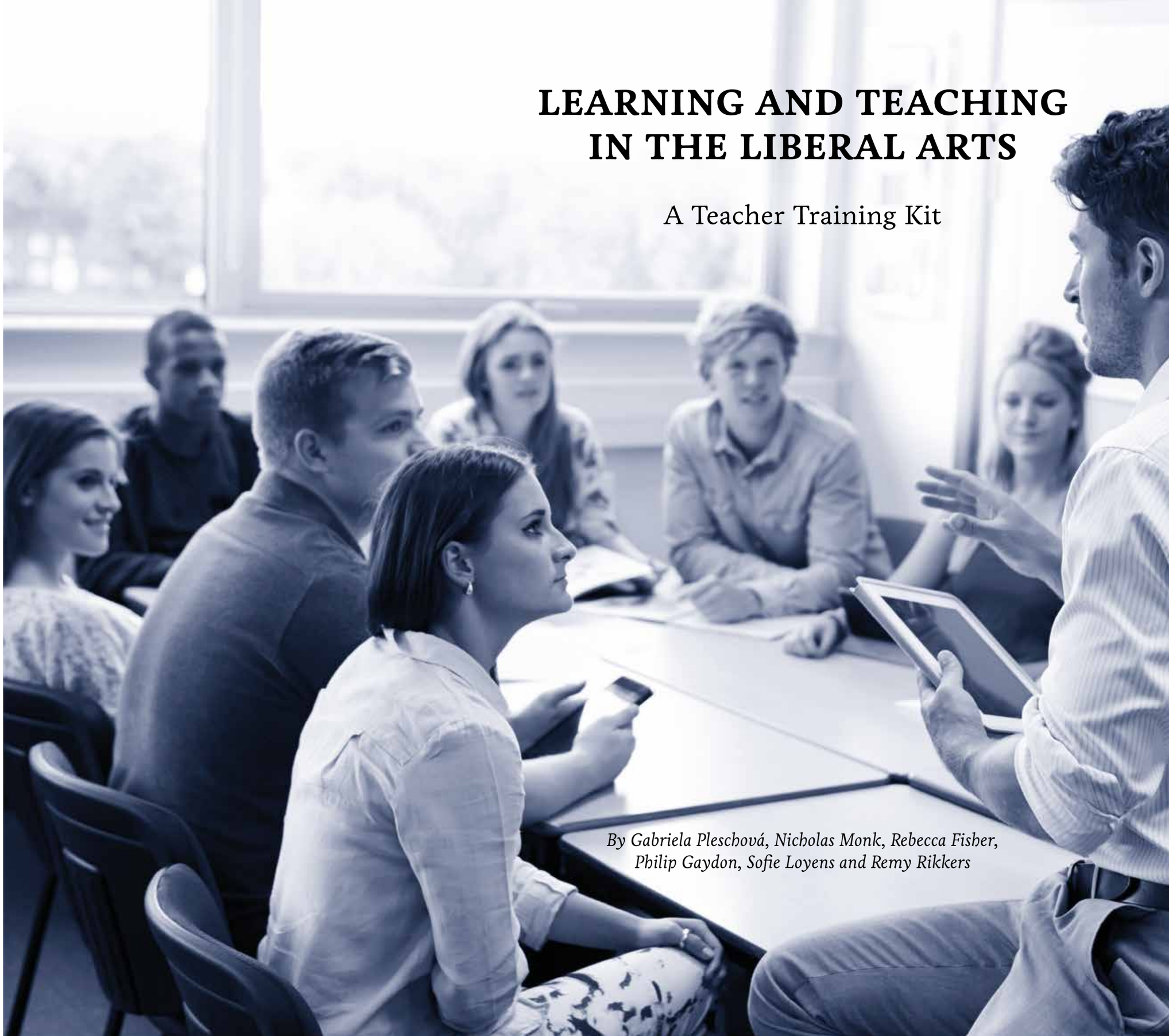
ISBN: 978-80-971827-1-7



LEARNING AND TEACHING IN THE LIBERAL ARTS

A Teacher Training Kit

By Gabriela Pleschová, Nicholas Monk, Rebecca Fisher, Philip Gaydon, Sofie Loyens and Remy Rikkers

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Prepared as part of the collaborative project
The Best Liberal Arts and Sciences Teaching Expanded and Reinforced (BLASTER),
ERASMUS+ KA2 (2015-1-NL01-KA203-008993)

Output: O2

Co-funded by Erasmus+ program of the European Union

Logos of project partners:

ISBN: 978-80-971827-1-7

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ABOUT ECOLAS

The consortium of European Colleges of Liberal Arts and Sciences (ECOLAS) is a non-governmental educational consulting group that proposes to address the central issues surrounding the development of undergraduate (first-level degree) education for 21st century Europe within the context of the liberal arts and sciences tradition. Established by three partners, Samuel Abraham (Bratislava International School of Liberal Arts, Slovakia), Hans P. M. Adriaansens (founding Dean of University College Roosevelt, Netherlands), and Laurent Boetsch (President Emeritus, ECLA, Berlin) all of whom are experienced, senior leaders in higher education, the group is designed as the first European network to implement and promote undergraduate liberal arts and sciences education as an expression of the Bologna reforms for European Higher Education.

The Bologna Process has made the potential appeal for multiple appropriate models of learning within European undergraduate education among its most attractive characteristics. To date the reforms emanating from the Bologna accords have been primarily structural and the breakdown of the degree cycles into a tripartite division of BA, MA, and PhD has yet to address in a substantive way alternative divisions of degree content or specifically appropriate methodologies for the delivery of that content within the various levels. Increasingly, employers in global enterprises express the need for university graduates with the very attitudes and abilities that characterize the objectives of liberal education that ECOLAS seeks to promote:

1) the capacity to understand the importance of multiple perspectives in examining and solving a problem;
2) the necessary cultural breadth of learning vital to trans-national relationships;
3) acute skills in critical analysis and synthesis;
4) the ability to articulate a position accurately and persuasively; and
5) a passion for life-long learning.

A key to the ECOLAS approach is the consideration of the importance of developing the quality of the undergraduate (bachelor) cycle as both stand-alone preparation for the workplace and as fundamental preparation for advanced degree work. By promoting the liberal arts and sciences tradition, ECOLAS seeks to cultivate and nurture programs which, in addition to providing the specific discipline-based knowledge necessary for subsequent specialization, also allow students to acquire the leadership skills that are vital not only to the global workplace but to the exercise of democratic civic responsibilities within an increasingly diverse European Union.

As a consortium of educational experts, ECOLAS serves as both a legitimate model and as an organization in the service of other European initiatives aimed at preparing undergraduate students in the critical, analytical and collaborative skills that traditionally distinguish this form of undergraduate education. In meeting its goal of contributing to the improvement of undergraduate education in Europe, ECOLAS' principal objectives are:

- to assist in and to encourage the development of liberal arts and sciences education throughout the EU
- to help establish specific criteria with which to measure liberal arts initiatives, and
- to stimulate the development of ways and means to evaluate undergraduate liberal arts and sciences programs through a formal accrediting process.

ECOLAS aims to serve as the clearing house for new initiatives in liberal learning, new ideas related to its objectives, and new relationships to ensure its advance within the European Community. Current ECOLAS Initiatives include following:

- Teacher training and professional development
- Small research grants for teachers
- Undergraduate research opportunities
- Faculty and student exchanges
- Accreditation and organisational consultation
- Support for student conferences and summer schools

INTRODUCTION
Pivotal issues for enhancing liberal arts and sciences education

Gabriela Pleschová

The purpose of this teacher training kit is to help early career teachers in liberal arts and sciences (LAS) programs to design, conduct and reflect on their teaching practices and their students' learning. The kit is the result of the collaborative efforts of educational developers who each work to support learning and teaching in institutions in three countries: the Slovak Republic, the United Kingdom and the Netherlands. The contributions in this kit focus on what teachers in various LAS programs across Europe consider central to improve their pedagogic practice. They include the following areas:

1. Enhancing critical thinking at students
2. Transdisciplinary teaching
3. Problem-based learning and teaching
4. Reflective and scholarly teaching
5. Using pedagogic theory to enhance student learning
6. Offering feedback to students and assessing student work
7. Facilitating student engagement

These topics came out of an online survey undertaken between January and March 2016 among teachers at LAS programs. In total, the 75 respondents who contributed were from institutions in eleven countries including the Czech Republic, Germany, Ireland, Italy, Lithuania, the Netherlands, Russia, Slovakia, United Kingdom and one unspecified country. The largest group of survey participants worked at LAS institutions in the Netherlands (40%), then came those in Russia (21%), and the UK and Slovakia (both 11%). Half the contributors were female and half male teachers.

In terms of their teaching experience, 47% of respondents were junior lecturers or assistant professors, 31% were senior lecturers or associate professors, and 17% were professors. Almost a third had university teaching experience of more than fifteen years. The second largest group of respondents had taught at university between one and five years (24%); the third and fourth groups in size were those had taught at university between six and ten and ten and fifteen years respectively (both 19%). However, when it came to respondants' pedagogic experience at liberal arts and sciences institutions, more than a third said they had taught at such an institution only between one and five years, while one fourth had taught for less than one year. This reflects the fact that liberal education is still a relatively new concept in Europe and many of LAS programs have short histories.

A large majority of the survey respondents had experience in serving in various pedagogic roles, including leading seminars, teaching large groups, and supervising student work, as well as course or program design and marking/grading. The smallest share of survey contributors had experience with online teaching (32%), which is, indeed, very rare in LAS programs.

Six of the topics reported by individual respondents as the most important for improving their teaching practice and student learning were chosen from a list of 15 possible things teachers would like to learn about in a future teacher development course. The seventh issue, assessment was spontaneously mentioned by a number of participants in their open-ended responses. Other issues raised by survey contributors included course design, making course topics more appealing for students, evaluation of one's own teaching, balancing teaching and research, and discipline-specific educational development. A number of these are addressed in this kit, too. A common thread through all

chapters is student engagement: various ways of engaging students are presented across the entire publication.
One of the central questions teachers were asked in this survey was their perception of the unique elements they valued the most in LAS courses and programs. The respondents listed a number of features that also contributed to identifying the topics for this teacher training kit.

- Interdisciplinarity and a large number of optional courses
- Competence oriented teaching and developing students holistically (in many aspects)
- Teaching small groups, interactive teaching and personal support of students
- Problem-oriented education and enhancing student critical thinking skills
- Working with engaged students
- Teaching in teams
- Focusing on developing students' writing and research
- Working in a supportive academic atmosphere

The survey results were further triangulated with the outcomes from surveying student participants of the 1st European Liberal Education Student Conference that took place in Lüneburg, Germany, on 12–15 May, 2016, which supported the choice of topics as identified by teachers' survey.

It is the kit authors' hope that teachers in liberal arts and sciences programs will find this publication helpful and will repeatedly use it while supporting their student learning. For further information concerning the workshops, summer school programs, conferences and other events for LAS teachers and students we recommend consulting following websites:

www.ecolas.eu
http://www2.warwick.ac.uk/fac/arts/schoolforcross-facultystudies/liberalarts/erasmus
http://teaching.eurea.sk

ENCOURAGING CRITICAL THINKING

Gabriela Pleschová

1. Definition: What is critical thinking?

One of the most frequently mentioned desired outcomes of liberal arts courses is the fostering of critical thinking in students. Many teachers want their students to manifest critical thinking skills, though they do not always clearly explain what they expect students to do. This is perhaps because there is no single definition of critical thinking, and in different cultures, critical thinking is differently understood (see, for example, Mason 2008 cited in HEA 2014 or Duron, Limbach and Waugh 2006: 160). This chapter uses Beyer's definition of critical thinking which is exceptionally clear and well suited for the purposes of liberal education. Beyer understands critical thinking as judging the quality of something such as information, an assertion or an event, against some criteria. He refers to the meaning of the Greek word *kriterion*, from which the English word critical comes, and sets that as the benchmark for judgements made. Critical thinking is thus a synonym for criterial thinking (Beyer 1995: 8-9).

2. Purpose: Why should teachers foster students' critical thinking skills

Liberal education aims for more than enhancing students' knowledge and skills so that they become successful in their jobs. Liberal arts and science programs typically intend to go beyond this narrow understanding of education by helping students to develop as valuable members of the communities they live in. To achieve this, critical thinking is a fundamental pre-condition. Critical thinkers come up with vital questions and issues, articulate them clearly and collect relevant data to respond to them. They know how to evaluate information, apply abstract ideas, think open-mindedly, and communicate effectively with others (Duron, Limbach and Waugh 2006: 160). Individuals who are able to think critically can resist manipulation and propaganda. They build upon past experience in future decision making. They connect with other people and encourage synergies while working with them. Such contributions are essential for any community.

However, thinking critically is difficult for many individuals. It calls for knowledge of criteria and how to use them in different contexts. Moreover, it requires habits of mind: avoiding quick judgements, questioning unsupported assertions and checking the reliability of sources together with effort and persistence (Beyer 1995: 26). Besides, people lack the time and capacity to critically assess everything around them, or they do not wish to hurt other people by always judging the quality of their work or challenging their opinions. An opportunity to practice critical thinking at school can hence offer a relatively safe environment where students can test their current level of critical thinking and advance it further.

3. Activities. Ten ways to stimulate and develop critical minds

This chapter presents ten learning activities teachers can introduce to improve critical

thinking in students. These activities range from facilitating students' first attempts to critically engage with facts and opinion to improving student argumentation and helping students to structure their knowledge towards one of the most complex learning outcomes, which is making a conceptual change.

First steps: setting the soil for critical thinking

Students, particularly first-year students, may find it very challenging if asked to manifest critical thinking. They can come from environments where other things have been valued more than critical thinking or where critical thinking historically has a different meaning than in liberal education. One teacher, Andrei Gheorghita (2005: 37), described the difficulty he encountered while attempting to encourage critical thinking in his students:

"Thinking critically is not a common ability for ... students in the Romanian education system. The explanations for this situation usually lay on cultural grounds, in the so-called 'politics of duplicity' in the communist period. In order to survive the communist terror, people developed a parallel ego that spoke in slogans. Criticizing or expressing personal opinions was dangerous, and the easiest way of avoiding that was reproducing the official discourse, the so-called wooden language. There was no danger in that and soon this culture of reproducing words deeply translated in the field of education. ... Learning lessons by heart, achieving knowledge without the least sense of usefulness, were common practices in the education during the communist period. After 1989, things changed very little..."

Gheorghita (2005) responded to this challenge by asking students first to compare cases and theories they were familiar with and to identify their weak and strong points. The reading list had a particular role in this respect, as it contained contending and complementary readings. Moreover, the teacher directed students away from introducing abstract arguments, but rather to put them in context. He focused on well-known cases and built hypothetical situations and follow-up questions, such as 'What are the chances for democracy in a North Korea conquered by American troops?" or 'How well does Kitschelt's theory of democratization fit the Romanian case?' The teacher's empathetic and enthusiastic remarks were seen by students as helpful as he also provided consistent bonuses for outstanding comments and critiques.

Another way to design a first exercise aimed at the development of critical thinking is to start by asking a question embedded in a story. The teacher can continue by helping students understand its significance, for example, by connecting the question to larger problems, raising it in provocative ways or showing its implications. Following that, the teacher can provoke students to answer the question by making an argument. The argument, in this case, includes providing evidence for their claim, reasoning, and a short conclusion. Ideally, the teacher should leave their own answers out (Bain 2004:107). Instead, after students generate some responses, the teacher can spend time discussing the strengths and weaknesses of student answers and offer advice on how to sharpen argumentation next time.

Teachers oftentimes start with questions to generate critical responses from students. However, they may find the class responding with silence, particularly when students are new to the school or to each other. In that case, it usually helps to rephrase the question or break it down into easier sub-questions. Aside from this, the teacher can give students a couple of minutes, individually or in very small groups, to write down a few notes in response to a question. Armed with their notes, most learners feel more confident to share their views (Race 2014: 211).

Because a large amount of the information students need for enhancing their critical thinking skills comes from articles, documents and books, students first need to develop their reading skills. Information retrieval does not necessarily imply reading everything word for

word, but identifying what is important. The teacher can equip students for their first reading assignments with several questions in order that they critically engage with content rather than merely 'read' it. Following a couple of such exercises, the teacher can help students to become more efficient readers by demonstrating how to make good use of the headings, the sub-headings, the contents and the indices of books and journals (Race 2014: 212). Similarly, teachers can compile the reading list by pairing each author with another who takes a different view. Students are then challenged not only to learn from important scholars but to choose between, for example, Plato and Aristotle, Anselm and Aquinas, or Kant and Mill (Bain 2004: 88).

Millionaire contest: helping students to formulate questions

The ability to pose questions is central to critical thinking. Some students, however, are too shy to ask questions, while others can come with questions that are not clear or relevant enough. Students should, therefore, have enough opportunities to practice formulating questions. Simulating the popular TV gameshow *Who Wants to be a Millionaire* can be a useful exercise, in this case, to help students pose closed-ended questions.

In this activity, the students' task is to prepare a set of questions concerning their class topic together with a variety of responses of which only one is correct. These are later used in a simulation of the show where students who choose the right answer go through to the following round. Students can provide answers either by raising their hand or paper cards, or via an app on their mobile phone/laptop. The winner(s) receives a small, sweet prize together with their colleagues' applause. Teachers report that students often enjoy this activity because they contribute to creating it (Langerová 2007). To stimulate critical thinking, this simulation should be designed so that it does not test factual knowledge but develops the capacity to make judgements according to criteria. The teacher can, for example, ask students to prepare questions around the core ideas from the text and to distinguish them from less important information. These can be questions such as 'What is the central argument of the author?' or 'What conclusion does the author make in the study?' A different set of student questions can include key terms, when contestants are asked to discriminate between similar definitions. Students can also design questions such as 'On what do the authors A and B differ/agree?' which invite the comparison and contrasting of different perspectives.

These examples indicate that students may find designing a meaningful variety of answers even more challenging than formulating questions. After students play the game, they should be given enough time to reflect on the nature of the prepared questions and answers. They can judge them against the previously given criteria, such as clarity, unambiguousness, completeness, correctness, etc. Also, they can discuss issues such as if the formulations of some questions suggested a certain answer or not. Students can, moreover, be asked to explain their choices and suggest alternative formulations.

Providing students with guidelines on how to improve reasoning abilities

Initially, many students are unsure of what an example of critical thinking would be. Some may mistakenly assume that critical thinking is the same as criticising others. To help students make good understanding of critical thinking, teachers can consider using some of following suggestions:

- provide examples of critical thinking and writing as expressed by previous students, ideally, on the same assessment task;
- share pieces from their own work that demonstrate criticality;
- model what it means to think critically,

for example by saying, 'When I read this, the first question I ask myself is...';
- highlight expressions that are used by academics in the discipline to indicate a critical stance, for example, 'can be questioned in terms of,' 'fails to consider the possibility that,' 'this may or may not reveal';
- show students how to take notes in ways that avoid direct copying but instead to transform the ideas and information from the material (HEA 2014: 5-6).

Critical thinking also entails the ability to make an argument. This is usually where students can improve most during the course of a semester. Making strong arguments means being exact in what one says as well as detailed in reasoning and providing illustrative examples. Teacher can assist students in learning this by compiling guidelines for them. These can include a list of what to do and what to avoid while making an argument. For example, Beyer (1995: 16) suggests that a strong argument should meet the following criteria:

- give a clear position (avoiding vague, ambiguous or general phrases like 'we can see from history');
- provide significant and sufficient reasons for a claim;
- include relevant, accurate facts;
- mention any conditions that possibly limit the claim;
- present in a logical order premises that lead conclusively to the claim.

It can be useful to spend a part of the class discussing these guidelines with students (students themselves can contribute to such a list) and then return to them regularly when students practice argumentation skills during semester. Students can be encouraged to use these guidelines not only in class discussions, but also when writing their papers.

An important part of argumentation is making references. Mentioning the ideas from a text together with the authors' names allows one to be more precise as well as create a mental map of ideas and concepts. This obviously needs some practice, or better said, constant training of memory. When asking students to provide authors' names, students can also be encouraged to find some essential information about these authors. This will allow students to link ideas with who the scholars have been, what issues they have address and how that has influenced their thinking. In addition, if students learn that they are reading a chapter from the book of the decade, for example, that might generate further interest in these thoughts.

While training argumentation, students can try to use other formats than arguing their own ideas. Whereas in Western academia, originality is highly valued, new ideas are appreciated and people like to disagree with others, in other cultures, such as in India, original ideas are often presented as old ones to provide certain credibility. This way, people cultivate relationships with other individuals who may otherwise feel offended if told they are disagreed with. Students can try to persuade their peers by saying, for example, 'yes, yes, I agree' but then offer a dissenting argument (Vihan 2005: 34).

Developing students' critical thinking: using Bloom's taxonomy

While designing activities to improve students' critical thinking skills, teachers can find useful Bloom's categorisation of learning outcomes. This so called taxonomy introduced by Benjamin Bloom demonstrates that students come up with qualitatively different outcomes of learning that range from the simplest outcome, which is knowledge of facts, through more sophisticated and complex outcomes such as comprehension, application, analysis and synthesis to the most challenging outcome, which for Bloom was evaluation including the judgement against external criteria (Krathwohl 2002: 213). Students normally learn through mastering the

lower-level abilities first and then proceeding on to the higher-level outcomes.
Each of the six levels of learning contained in this categorisation can be associated with a number of verbs to be used as expected learning outcomes. When teachers wish to effectively facilitate enhancement of student critical thinking, they can design learning activities to start with simpler tasks, such as asking students to define or describe (remembering level), through inviting them to compare or contrast (understanding level), explain causes, differentiate or classify (analysis level), relate, role-play and apply (application level) ultimately to build hypotheses, generalize, evaluate and reflect (evaluation level) (Duron, Limbach and Waugh 2006: 161). Bloom's taxonomy is described more into detail in chapter 5 of this kit.

Structuring student knowledge

Another important step in improving students' critical thinking is guiding students to structure their knowledge. A way to begin might be to use an 'advance organizer.' This is a preview of a class that mentions its main topics together with the concepts to which they are related (Ausubel 1968 in Biggs and Tang 2007: 94). This advance organizer may be an illustration, a diagram, a map, chart or other graphic representation of the subject so that students can organize the subsequent content into this framework. This way, the teacher not only makes the class structured, but allows students to understand the structure. The advance organizer can also be prepared for the whole course and be integrated into the syllabus (Gibbs and Habeshaw 1992: 46, 52).
As an alternative, the teacher can use a 'grabber' and start the class with a cartoon, an unusual slide or a short video to attract interest in the topics to follow. Whereas the advance organizer is conceptual, the grabber is affective, appealing to surprise or to humour and so helping to structure learning. Moreover, the teacher can make the connections more explicit by saying what was discussed last week and how it relates to the present lesson, by choosing familiar examples first, by asking students to build on their own experiences when discussing an issue or by showing where a topic connect to other topics (Biggs and Tang 2007: 93-94).
Nevertheless, it is important that students themselves learn to structure their knowledge. Classes that are too well structured may convey the wrong message to students that they should follow the given structure and memorize it. Teachers should therefore seek a balance between presenting students with chaos and firm structure. Student reactions while learning usually provide good guidance to find such a balance, including student responses to questions, participation in learning activities, and body language (Biggs and Tang 2007: 94).

Learning first to understand, then to critically assess

Whereas some students need incentives to publicly share their ideas, other students can be overly confident to make judgements about others' ideas without first developing a good grasp of them. Clearly, students should first learn to demonstrate comprehension and only then proceed to assessing others' arguments. Hence, teachers can find it helpful to guide students by asking them first to rephrase main claims, methods and conclusions others have made. Such questions can include the following:

- What contribution does the author claim to make to existing knowledge?
- What is the central argument?
- What concept or theory does the author frame his/her ideas in?
- What methodology underpins the investigation? (HEA 2014: 6).
- What data did the author collect for the study?

Students can then respond with their own questions that invite them to engage more crit-

ically with presented information and opinion, for example,

- Was the data collection and analysis appropriate, rigorous and ethical?
- Does the evidence presented prove the claim to knowledge made? (HEA 2014: 7)
- Is there anything missing, incomplete or wrong with the presented argument?

Developing critical thinking through linking theory with practice

Inviting students to connect what they learn from literature with what they have observed or experienced outside the classroom is another way to encourage critical thinking. For example, in an international relations course, students can be asked to find an article written by a policy maker that is relevant to the class topic and prepare a few questions for classmates that would initiate a discussion. Bringing in such articles has a double objective. On one hand, students actually go out from the classroom and look for an article, and on the other hand, they think about the ideas from the article and their relationship to the class topic (Sheppard 2005).

Alternately, the reality of world developments can be represented by primary sources, such as treaties and digitalized archival documents. These sources have many benefits including their availability on the internet when library resources are sometimes strained. Students can easily access them via links provided by the instructor. Many students, however, perceive primary sources as too difficult to understand. In one such a course, the teacher reported that with the exception of law students, most students had found the idea of reading treaties – or sections of them – almost unbelievable. To address this challenge, the instructor designed a structured task that asked students to read, for example, the protocol on the role of national parliaments attached to the treaty and to use it to answer a set of questions that progressed from descriptive, to interpretive, to requiring students to make normative judgements (Thorlakson 2005: 71).

Problem-based learning (PBL) is particularly suited for developing critical thinking through making links between theory and practice. To learn more about PBL, please see chapter 3 of this kit.

Peer assessment: enhancing critical thinking through judging the others' work

By evaluating peers' work, students can learn to offer constructive comments and accept appraisal of their work. This can have a number of other positive effects, including gaining insights into their own performance and learning to cooperate. Peer assessment can thus fundamentally contribute towards students developing the desired capacity of critical thinking.

However, in most educational contexts, peer assessment is rarely practised at the elementary and high-school level. Moreover, some students feel intiidted to openly critique their peers or they are unsure of what a high and low-quality assignment is. Therefore, teachers need to introduce well-designed activities and introduce enough opportunities to practice them so that students learn to offer and exchange comments on each other's work.

One typical challenge associated with peer assessment is worry about peers giving low ratings, fear of criticism, lack of trust, and the loss of respect and rapport in the classroom. Students also frequently feel hesitant to giving too low grades and recognize that they under- or overrate the work of their peers (Omelicheva 2005: 200-201). To moderate these fears, it is important to systematically work to create a positive learning climate in the classroom. This can include discussing with students their doubts and worries and putting together a set of rules for offering constructive feedback, such as avoiding ridicule, starting by commending the strengths, etc.

A different set of student anxieties tied to peer assessment includes student reluctance to de-

bate examples of outstanding work. To relieve this initial discomfort, students can be invited first to discuss mediocre assignments, especially if they are to suggest improvements. They can get photocopies of the assignment with the instruction: 'This assignment got 55%. How could it have got a higher mark?' As an alternative to this, students can be asked to compare two assignments which illustrate good and mediocre work or which are good or mediocre in different ways (Habeshaw, Gibbs and Habeshaw 1992: 143-144). In all cases, students should judge against clear criteria of what constitutes excellent, good and poor-quality work. Acting as peer reviewers should, indeed, help students to improve quality of their own work. Cowan (2006: 68) describes an exercise in which he, as a student, was asked to point out ways in which a classmate's report – particularly the reasoning in it – was unconvincing or incomplete and might be improved. "After all of this, I didn't really need to get my own report back in order to appreciate what had to be done to improve. ...I had often found myself thinking immediately that the same criticism would apply to my own report. ...I knew what I was going to be told before my draft came back to me. In fact, I had one or two extra suggestions of my own, which the group who looked at my report didn't pick up."

Self-assessment

Self-assessment – this time judging one's own ideas and work – also helps students to enhance their critical thinking. One way to introduce self-review is to ask students to submit along with their assignment an explanation of its strengths and weaknesses, as well as the mark they expect based on their own assessment (Cowan 2006: 87). This can take the form of a self-assessment sheet attached to student assignments. Sheets can address simple open-ended questions such as:

- What are the main strengths of this piece of work?
- What would be necessary to improve it?
- What aspects of it would you like feedback on? (Habeshaw, Gibbs and Habeshaw 1992: 149-150)

Students first, however, need to be directed to carefully read the assessment criteria from the syllabus and they need to have the possibility to discuss unclear issues in class. Teachers, besides marking in the usual way, then comment as endorsement of, or in addition to, the students' comments. According to Cowan's experience, students' explanations tend to be woolly, but will soon sharpen up, following the feedback from their teachers. Moreover, albeit students' grades can be all over the place at first, they soon start to match the teachers' marking and after some time of getting used to the system, student performance usually improves markedly. It particularly helps when the teacher not only indicates his or her mark, common at some institutions, but also describes the way in which he or she has reached it (Cowan 2006: 87, 92-93).

To reward students for their self-assessment efforts, self-assessed grades can stand for an agreed proportion of the mark. Naturally, this occurs when students' self-assessment skills achieve a certain level (Habeshaw, Gibbs and Habeshaw 1992: 150). However, including a student's mark into the overall grade can make students focus mainly on the mark rather than on the process of assessment. Instead, the teacher can include some points into the student's final grade for how well the student assessed their own work. This way, students are alerted to the value of judgements, rather than to a sole mark (Cowan 2006: 94).

Teachers can also show students that self-assessment is the usual practice in many professions. Cowan describes how he shares his self-assessment practice with students, in his case self-assessment of tutorial support offered to his students and says that students largely appreciate it. "Interestingly, I received little specific feedback on my assessments of my tu-

toring. But I received strongly supportive comments about the value which students placed on this reversed and open practice of mine" (Cowan 2006: 94).

Self-assessment and peer-assessment can bring another benefit to student learning. If students assess their own assignments and those of their peers, they are constantly focusing their learning on expected learning outcomes. This is a good way to attain higher level outcomes and to achieve the outcomes faster than with traditional assessment formats (Biggs and Tang 2007: 99). The investment into these assessment formats pays off: although students initially struggle with them, by the time the course finishes, the majority of students can carry out the process thoroughly, objectively and individually, and that to a commendable standard (Cowan 2006: 95).

Transforming student knowledge

Critical thinking not only implies the ability to judge information and opinion against some criteria but it should ultimately help students to transform their knowledge. This is because while learning, people are not accumulating more knowledge but rather find it challenging to integrate newly acquired facts and opinion with existing ones (Kvasz 2005: 23-24). The teacher's task is, therefore, to help students to identify and correct their earlier misunderstandings (Vihan 2005: 32) and to restructure what they already know in order to link it to new knowledge (Biggs and Tang 2007: 93).

However, people are often hindered from successfully transforming their knowledge by their minds opposing novel ideas and concepts that do not fit previous knowledge. This phenomenon is called cognitive resistance or cognitive dissonance. Kvasz (2005: 23-24) demonstrates its occurrence, describing how students often struggle with precisely the same aspects of the theory as scholars did in the past. In one experiment, for example, secondary school physics teachers were asked to explain the force that acts on a ping-pong ball jumping across the table. Obviously, the main force is gravity and, hence, teachers were supposed to draw its direction as downwards. However, many teachers depicted the forces as if they were acting in the direction of the motion of the ball itself. They solved the problem not in the framework of Newtonian physics, the physics they teach in their classrooms, but in the framework of Aristotelian physics, which they know to be false. This paradox can be explained by how these teachers have probably been educated: largely by adding new knowledge but not by relating it to the intuitive knowledge already present in their minds. Possibly, if the problem were formulated in the language of Newtonian physics, such as saying, 'an elastic body is moving in the field of the gravitational force...' the teachers would solve the problem using Newtonian physics. "The trick of the test is that it formulates the problem in the ordinary language," Kvasz says (2005: 24).

In liberal education, cognitive resistance may occur when students learn something which contradicts their beliefs. Such opposition can be very strong and cannot be overcome gradually. Instead, the teacher should first help students to identify the inconsistencies and show them where new knowledge confornts their tacit knowledge. This happens through initiating a so-called cognitive conflict. Here, the crucial aspect is determining the right time students are prepared for such a conflict because some may refuse new information entirely if it is presented to them too early (Kvasz 2005: 24). For example, in political science courses, a useful approach can be to start with historical cases, such as the Melian Debate and fictional examples rather than with controversial contemporary issues. This way students can first get a firm grasp of what forces shape the political world and can be equipped with the essential tools to pursue their political passions in the practical realm of politics. In one of the classes that used this method, students largely appreciated it and preferred spending more

time discussing assigned readings than merely exchanging opinions on the topic of war (Marks 2008). It is also advisable to explain to students the motivations for this approach: when students know they will later learn about contemporary issues, which they usually find fascinating, they can become more engaged with historical or hypothetical cases.

Cognitive conflicts also have implications for teachers themselves as they often result in teachers uncovering inconsistencies in their own knowledge. "In a cognitive conflict the teacher cannot hide behind memorized knowledge. When he or she enters the cognitive conflict, all the rifts between layers of their own not integrated knowledge become visible. And this is perhaps the most interesting thing about teaching. In discussions with students we can learn something about ourselves, about our own understanding and misunderstandings and so move forward in our cognitive development," Kvasz says (2005: 25-26).

4. Checklist: Am I helping students to enhance students' critical thinking skills? To what extent?

Class/course design

- Is enhancement of critical thinking among the intended outcomes of this class/course?
- Am I clear in defining what critical thinking stands for in this class/course? What evidence do I have that students understand this definition?
- What learning activities should help students advance their critical thinking in this class/course?
- Is homework designed to encourage critical thinking in students?
- Do students have enough time to spend on each activity so that they can master it?

Class/course conduct

- What is the initial level of critical thinking as demonstrated by students in their homework and in-class learning activities?
- What are the main challenges students struggle with in terms of critical thinking?
- Which learning activity appears to be the most/least successful while encouraging critical thinking? £ Which of them do students appear to enjoy the most?
- Is there any progress in student critical thinking between the mid-term and at the end of the term? How can such progress be described?

Assessment of student work

- Did students receive explicit criteria for assessing the level of critical thinking in their work?
- Did assessment methods include some form of self or peer-assessment?
- Which of these elements of critical thinking was easiest/most difficult for students to demonstrate?

Plans for the future

- What will I change in my course to help students to improve their critical thinking skills?
- Shall I add any new learning activities for the students to practice critical thinking?
- How will I modify the assessment to allow students to better demonstrate critical thinking?

5. Useful resources

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6. Conferences in the field

The 36th Annual International Conference on Critical Thinking, Sonoma State University, California, USA, July 25-29, 2016.
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TRANSDISCIPLINARITY

Nicholas Monk and Rebecca Fisher (with Philip Gaydon for the video component)

1. Applying 'transdisciplinarity' to pedagogy in the context of the Liberal Arts

The Institute for Advanced Teaching and Learning at the University of Warwick developed a shared understanding of the concept of transdisciplinarity as authentic learning beyond the subject areas—learning connected to the world—such that the subject areas are not in opposition to, but complement and support, transdisciplinary learning. It is a core strategy to foster a pedagogy that is committed to innovation, interdisciplinarity, inclusiveness and internationalism in priority areas such as academic literacy and physical and virtual learning spaces.

One of their successful projects has been the development of Open-space Learning[1], or OSL, a pedagogic methodology that was created, developed, and practiced at the University of Warwick beginning in 2007. OSL enables a social constructivist approach to teaching and learning, introducing dialogic and experiential inquiry between tutors and learners as the means of actively discovering, rather than passively receiving, knowledge. The project feeds directly into broader strategies concerning interdisciplinarity and transferable skills, particularly important when graduates need to be flexible in their approach to the world of work. OSL continues to be disseminated at Warwick particularly within the IATL-hosted interdisciplinary undergraduate modules which are designed to help students grasp abstract and complex ideas from a range of subjects, to synthesise these into a rounded intellectual and creative response, to understand the symbiotic potential of traditionally distinct disciplines, and to stimulate collaboration through group work and embodied learning. The parallels and convergences with the broadly defined liberal arts are clear.

IATL echoes Nicolescuian thought to a certain degree, representing the distinctions and connections between multi-, inter-, and transdisciplinarity:

Disciplinarity: how disciplines organise their knowledge and set their parameters.

Multidisciplinarity: how disciplines share perspectives with those outside their individual fields, e.g., collaborations between, say, departments in a faculty.

Interdisciplinarity: what happens if these shared perspectives begin to chalenge the pre-conceptions of partner disciplines, and question their own, e.g., 'Sport, Philosophy, and Practice.'[2]

Transdisciplinarity: a way to address an issue or problem that does not begin from a disciplinary stance, but looks first at the nature of the material/problem/ issue, e.g., 'Climate Change.'[3]

1 See 'Open-space Learning,' www2.warwick.ac.uk/fac/cross_fac/iatl/resources/outputs/osl-final

2 See www2.warwick.ac.uk/fac/cross_fac/iatl/activities/modules/ugmodules/sportphilosophyandpractice

3 See www2.warwick.ac.uk/fac/cross_fac/iatl/activities/modules/ugmodules/climatechange

2. Activities: Warm-up, introductory, long and assessed activity

The following is a description of a collection of activities that constitute a single imaginary workshop of approximately 3 hours in duration designed specifically for use by those engaged in learning and teaching as part of a liberal arts program. Some of the materials have been used in practice, and versions of the activities have been facilitated on many separate occasions. The theme, 'Art and Revolution,' has been selected as it addresses the interdisciplinary and problem-based characteristics of work in the liberal arts. The workshop is divided into four categories: warm-up; introductory activity; long activity; assessed activity.
Warm-up activity

The warm-up activity for this activity is generic, lasts up to five minutes and is titled, '1-2-3 Clap.' It is short and is designed to prepare workshop participants for a collaborative, embodied session. It is important to note that this, as is the case with all the activities detailed here, requires an open space free of tables and chairs.

- The facilitator asks the participants to form a standing circle. Participants are required to form pairs. The facilitator asks for a volunteer to demonstrate the activity. The idea is to take it in turns in a count of three, so the Facilitator says '1', the volunteer says '2', the facilitator says '3', the volunteer says '1', the facilitator says '2', and the volunteer says '3.' At this point the demonstration ends. The pairs now take up the activity.
- After a minute or so the facilitator stops the activity and recalls the volunteer. The demonstration is identical except that '1' is replaced by a clap. The pairs take up the activity.
- After a minute or so the facilitator stops the activity and recalls the volunteer. This demonstration is identical except that '2' is replaced by a stamp of the foot. The pairs take up this activity.
- Again, after a minute or so the facilitator stops the activity and recalls the volunteer. The demonstration is identical except that '3' is replaced by a click of the fingers.
- The pairs now take up the final activity.
- The facilitator finishes the warm-up by asking the participants to drop the gestures and return to counting.

As an icebreaker this activity is always successful: it is simple, but difficult to perfect, so participants find themselves laughing together at their failures. A short reflective session should be conducted after all these activities and the warm-up should be no exception. The exercise is intended to stimulate collaboration and provoke thinking about how collaboration works. Often, participants will note this contrast and, they tend to comment on the focus needed on one's partner in order for the exercise to work correctly. They also often note that the activity combines intellectual and embodied activity. In the terms in which we frame the pedagogy of the liberal arts this activity should suggest to participants that the kinds of global problems that the liberal arts seeks to address require collaboration; they cannot be dealt with by single individuals working alone on highly specific matters. The introduction implies the transdisciplinary, also, in the sense that there is no sense that the activity might have emerged from a particular discipline as they tend to currently constituted in Western universities.

Introductory activity

At this point, the next activity can be introduced. This represents a move from the personal into a more practical experience of transdisciplinary practice in the liberal arts. 'A Long Short Walk' requires the facilitator to select a walk, or a number of walks, of around 15 minutes in any environment they choose, but

for the purposes of this workshop it would be an area of the university campus.
A detailed route must be prepared and a precise map given to participants. Participants are split into groups of 3 or 4 and allocated a walk (or the same walk). The key to this activity is that participants are required to undertake a walk that would normally take 15 minutes in 45 minutes, and take notes as they go. It is vital to stress that progress must be slow.
At the end of the walk, participants return to a central point and are encouraged to create a narrative from their experience. Participants then show their work to the other groups and the session finishes with a plenary.
The activity is amenable to the presentation of results in a number of different forms: the activity can be extended by requiring participants to distil their findings into a still-image, or tableau, that represents their experience, or a performance might be created, or participants might want to film and edit their experience, or a written narrative might be chosen.
In terms of its relationship to the transdisciplinary status of the liberal arts, the exercise requires participants to slow down in order to read carefully the semiotics of an environment and the behaviour of the individuals and groups therein. Such activities transcend disciplinary categories. It is an activity that promotes 'noticing' as a means of engagement and response. It is very important, too, that the facilitator encourage participants to observe changes in themselves and in their own reactions. There is a significantly transdisciplinary notion, here in the idea that the liberal arts may function in a third space of self and environment, and self and other.

Long activity

The next activity is known as 'theory building.' Theory building requires that the tutor or facilitator prepares in advance a series of laminated images and/or fragments of text. Twelve to twenty is typical. Each laminate should address some aspect of the session's subject matter either directly or tangentially – please see the detailed descriptions below. It is important that the information does not lead participants in too specific a direction, but also that it is appropriate to their levels of knowledge and ability.
This exercise is for groups of eight to thirty. The facilitator divides the larger group into several smaller groups. The groups are each provided with a set of identical laminates. Each group is required to create a 'theory' or 'narrative' from the materials and represent this as a pattern on the floor of the space. The facilitator should be ready to step in at various moments to clarify, for example, what the images represent, and from where the quotations are taken. Each group, when they are ready, invite the other groups, in turn, to enter their space and 'read' the theories. This part of the exercise is complete when every group has 'read' every other group's work. This above lasts anywhere from forty minutes to an hour and can be concluded with a plenary of whatever length the facilitator determines is appropriate – this would usually involve the entire group of participants.
It is possible to add two stages to the process. Participants can, again, form a tableau or still image of their theory. They can also add movement through an improvized performance. It is also possible to conclude a theory building exercise with a writing session in which participants articulate their theory in five hundred words.

For the purposes of this exercise the following materials are used:

Quotations:

- 'Like art, revolutions come from combining what exists into what has never existed before.' Adorno.
- 'A writer or painter cannot change the world. But they can keep an essential margin of nonconformity alive.' Luis Buñuel.
- 'One big difference between now and

then is that in 1979 and 1980, artists actually believed there was going to be great change in society. Nowadays, artists believe there won't be any change in the next 20 or 30 years. The artists don't believe they have the strength to change. Their lives are comfortable, but they feel they don't have any freedom of expression.' Wang Keping.

- 'Take pictures of what you fear.' Diane Arbus.
- 'You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete.' R. Buckminster Fuller
- 'Sometimes people hold a core belief that is very strong. When they are presented with evidence that works against that belief, the new evidence cannot be accepted. It would create a feeling that is extremely uncomfortable, called cognitive dissonance. And because it is so important to protect the core belief, they will rationalize, ignore and even deny anything that doesn't fit in with the core belief.' Frantz Fanon.
- 'The role of the artist is to make the revolution irresistible.' Toni Cade Bambara.
- 'If the Revolution has the right to destroy bridges and art monuments whenever necessary, it will stop still less from laying its hand on any tendency in art which, no matter how great its achievement in form, threatens to disintegrate the revolutionary environment or to arouse the internal forces of the Revolution, that is, the proletariat, the peasantry and the intelligentsia, to a hostile opposition to one another. Our standard is, clearly, political, imperative and intolerant.' Leon Trotsky.
- Imitationalism.
- Emotionalism.
- Formalism.
- Institutionalism.
- Instrumentalism.
- 'The truth of art lies in its power to break the monopoly of established reality to define what is real.' Herbert Marcuse.
- 'Behind the aesthetic form lies the repressed harmony of sensuousness and reason.' Marcuse.

Images:

- A cartoon consisting off a tree with nooses hanging from it with the names of Arab leaders beneath a number of the nooses. The caption is: 'The Arab Spring bears strange fruit.'
- A photograph of Cairo street art featuring Snow White carrying a gun looking back at 9 oversized ants.
- A highly stylized painting of Mao holidaying happily with his 'Chinese family,' who consist of stereotypes of revolutionary heroes.
- An illustration of a 19th century factory.
- A photograph of large piles of skulls from the genocide in Cambodia featuring an individual in a seated position dusting one of the skulls.
- A photograph of an early printing press.
- A graphic representation of 'the internet.'
- A photograph by the artist, Shirin Neshat, showing a naked boy covered in henna tattoos. His mother is fully veiled standing next to him, holding his hand.
- A photograph of the celebrations in Tahrir Square during the revolution.
- An image of an auction taking place at Sothebys.
- Wanderer Above the Sea of Fog by Caspar David Friedrich.

The materials in this exercise are designed to guide participants towards a discussion of the idea that revolution and art are related in complex ways. The exercise does not offer right or wrong answers, but guides participants in their construction of a potentially sophisticated and contradictory representation of the nexus of art and revolution. The exercise should help partic-

ipants to understand that 'art and revolution' is an inherently interdisciplinary juxtaposition that requires a wide variety of disciplinary analysis in order to understand its inherent richness. Again, the mechanics of the activity – its form – demand that participants perform a negotiation at the level of discipline, temperament and opinion as the only means by which the collaborative activity can be successful.

Whilst it is true that it is the facilitator choosing the images, and she/he must be in some way leading the participants, the process can be made more impartial by asking that participants supply an image or phrase themselves before the session. It is also true that what might appear to be a simple exercise can create profound experiences for participants if the facilitator creates materials that allow participants to own the narratives they create. Furthermore, the final element of the exercise brings the two artificially divided notions of embodiment and intellectual activity back into closer proximity. What is most powerful in this exercise is the move students make from individual reflection to collaborative reflection, to changes in those reflections, to the shared embodiment of an idea. The phase in which participants are asked to make a tableau, or still-image, of the idea they have represented in images and text on the floor is always the most challenging. The requirement is that they should all be in physical contact with one another, and that they should be silent in the final moment of presentation. All other possibilities are open to them. An example of how these tableaux have worked is a session in which the facilitator wished us to understand the concept of hegemony. Two members of one of the groups of three blindfolded the third before leading them around the room and then stopping at the moment the facilitator counted them down to stillness to form a natural pose on the floor. The 'third' reached out towards the dominant two, meeting fingertip-to-fingertip, with an extraordinary expression on her face, which is almost impossible to describe – something like a combination of gratitude and puzzlement, but more subtle and varied than this. The readers from the other groups were obviously struck by some kind of 'authenticity' that clung to the image, and participants reported that they knew this concept, through feeling it, better and in a radically more meaningful way than they might have done before.

If I was asked for a 'learning outcome', it might be possible to say that 'participants are forced by the nature of the activity to engage. It both promotes collective action and encourages a sense of individual responsibility. It deepens understanding of the subject matter and provides a platform for later, more detailed discussion.' Other learning outcomes would be broader and, in this case, related to the specifics of the exercise in cultural geography that is at the heart of the session. Learning outcomes such as these might be monitored by asking participants to keep 'reflective notes' during the course of the workshop. The facilitator should pause at 6 or 7 points during the workshop in order to provide time for participants to record their reflections in the notebooks provided for the purpose. It should be made clear to the participants what the learning outcomes are, and how they relate to the subject matter. Above all it should be made clear that the journals should be immediate, unrevised, and reflective of a process of change in ideas and experience.

Assessed activity

Alternately participants may be invited at the end of the session to write 500 words, as a group, or as individuals. These pieces of work may be summative or formative. If they are to be assessed the facilitator has the choice of gathering the work and providing feedback later. Or the situation at the end of a session such as this is optimum for a peer assessment exercise. Participants will have already exchanged and embodied ideas, and otherwise collaborated, in a mutually-supportive atmosphere in which a significant degree of trust will have

already been built. Participants should be provided with very specific lists of grading criteria, and work should be anonymized before each student provides feedback on a reflective notebook not their own. The final stage is for the facilitator to collect the notebooks and moderate the peer assessment.

In certain important respects liberal education is designed to create a community of lifelong learners. In many cases we guide these learners along paths towards jobs and careers that we cannot define, or which do not yet exist. There is an increasing recognition in higher education that isolated academic disciplines neglect to accommodate the rich diversity of the global environment in which we live. In reality the world consists of problems, ideas and challenges that require multiple and various perspectives to understand and address. How then do we establish pedagogies that might be effective in the face of such a collection of unknowns? What becomes important is a balance between breadth and depth, and between learning methodologies and the acquisition of knowledge.

The activities described above are designed to respond to this need to balance what can appear to be competing imperatives. In a unit titled 'Art and Revolution,' for example, it is plainly necessary to provide students with readings that engage across a variety of disciplines, whilst ensuring these readings are pitched at a level that is sufficiently challenging. Such a foundation must be accompanied, however, with a pedagogy that equips students to communicate effectively, to develop insight, to work collaboratively, and to behave ethically and responsibly. In the collection of activities described above, such a pedagogy is designed into the process: it is impossible to complete the theory-building task, for example, without co-operation. Effective communication is necessary throughout the session from the first moment of the first activity, to the point at which students explain their theories or narratives to one another at the end of the theory-building session.

Equally important is an ability to transfer disciplinary skills from one situation to another, hence the application of the idea of 'close reading' from literary studies to observation of the environment. Collaboration, too, features heavily: the warm-up cannot work without it, nor the theory-building exercise. The latter, in particular, is deigned to go to the heart of a liberal arts curriculum in that it requires students to address an issue in terms of its breadth and its depth. It demands that they decide what is actually important in the juxtaposition of 'art' and 'revolution' and form their responses accordingly. Built into the session, also, is that there are responsibilities and ethical considerations in both how we address problems, but also in the language in which we frame those problems, and how we work together to solve them.

Important too in this pedagogic environment are the ideas of experiment and failure, both of which are prevalent in the sciences, but tend to be viewed differently elsewhere. Students should have a safe space to try out ideas: a formative environment in which they are made to feel unafraid if their responses to a problem do not solve it, or their solutions fail to work the first time.

3. Checklist

- ☐ Does the activity I have designed address the key elements of a liberal education as detailed in my institution's aims and objectives?
- ☐ How might these aims and objectives be translated into learning outcomes for my session?
- ☐ Does the activity demand that students work together for all or most of its duration?
- ☐ Do I have a plan that scaffolds the session in 5-minute increments?
- ☐ Is the pedagogic space a 'safe' one in which students can experiment and be free to fail?

- ☐ If I imagine myself giving instructions to students and think of their likely responses does the activity seem to work?
- ☐ Have I set any limit for the amount I talk? (We would suggest you talking less than 10% of the session. Because the tutor's prime responsibility is effective preparation, you should practice with your own materials.)
- ☐ Are there cultural, gender, and other differences that I have to account for?
- ☐ Do I have a contingency plan if things seem not to be working? Do I have additional activities?
- ☐ Are there elements of the session I dispense with if certain sections require more time?
- ☐ Am I ready to contextualise the activities before I begin, and link to other sessions and the liberal arts more broadly?

4. The origins of transdisciplinarity: A timeline

Towards the end of the sixties and the beginning of the seventies, global events such as the Apollo moon landings led to an upsurge in optimism, in 'thinking big and imagining what the university could be in a perfect world', with a particular focus on the 'interconnectedness of many seemingly disparate things' (Bernstein 2015: 3). Combined with the creatively disruptive activities of dissatisfied students and academics, and the counterculture in general, scholars articulate trandisciplinarity in terms of 'utopian speculations about the future possibilities for universities' (Bernstein 2015: 3). The seventies also see the continuing growth of collaborative and interdisciplinary areas of study, as well as the creation of 'new specialities including disability studies and peace and conflict studies' (Bernstein 2015: 3). Transdisciplinarity doesn't become a consistent and wide-spread focus of scholarly attention until the nineties, but several key thinkers helped to establish the foundations of transdisciplinarity against this backdrop of global events.

1970: The next stage of interdisciplinary thinking
Jean Piaget (Swiss psychologist, 1896 – 1980) uses the term "transdisciplinary" at a seminar on interdisciplinarity in universities in Nice, defining it as

> A higher stage succeeding interdisciplinary relationships... which would not only cover interactions or reciprocities between specialised research projects, but would place these relationships within a total system without any firm boundaries between disciplines (Bernstein 2015: 2).

As Nicolescu notes, Piaget articulates the ability of transdisciplinary thinking to move across and between disciplines, but not the facility to move beyond: 'In such a way, transdisciplinarity is just a new, but "superior" stage, of interdisciplinarity' (Nicolescu 2006).

1970: Ethical considerations
Jack Lee Mahan, a doctoral student at the United States International University, writes that transdisciplinary thinking arises in response to the need for "reverence of life, man, and the human condition" in social sciences research.

1972: Transdisciplinary curricula
Also present at the seminar with Piaget, Eric Jantsch (Austrian astrophysicist, 1929 – 1980) follows his presentation with an article which situates transdisciplinarity within the context of the 'planning of future curricula in the context of emerging ideas about science as a source of innovation' (Bernstein 2015: 2).

1972: Systems of science
Another alumnus of the Nice seminar, Andre Lichnerowicz (French mathematician, 1915 – 1998) writes that, in mathematics, transdisciplinarity describes 'the homogeneity of the

theoretical activity in different sciences and techniques, independent of the field where this activity is effectuated' (Nicolescu 2006).

1979: '... So as to make education (and research) more socially relevant'

Joseph J. Kocklemanns (Dutch philosopher, 1923 – 2012) contributes a chapter ('Why interdisciplinarity') to *Interdisciplinarity and Higher Education* in which he states that the purpose of transdisciplinary work 'is not so much to find a reasonable solution to a given problem under study as to develop a larger, unifying all-encompassing theoretical framework for scholarly and scientific work' (Bernstein 2015: 3).

In the late seventies and eighties the debate about transdisciplinary lies mostly dormant. However, faced by global crises that do not recognise geographical, social, political, or disciplinary boundaries (the end of the Cold War and an increasingly globalized workforce, the AIDS epidemic, new forms of labour exploitation, and a growing awareness of climate change as a global threat) scholars use the concept of transdisciplinarity as a mode for tackling sustainability and environmental issues (Bernstein 2015: 4).

1992, 1994: 'A need for action in the scientific and academic communities'

The United Nations Earth Summit (Rio, 1992) takes place, and is pinpointed by Julie Thompson Klein (American scholar of the humanities, 1944 –) as a point at which the academics and industry and government come together to take action, using the framework of transdisciplinarity. The First World Congress on Transdisciplinarity follows two years later (Portugal, 1994), and produces a Charter of Transdisciplinarity.

1994: The Charter of Transdisciplinarity

Basarab Nicolescu (Romanian theoretical physicist, 1942 –), Lima de Freitas (Portuguese artist, 1927 – 1998), and Edgar Morin (French philosopher, 1921 –) publish the Charter of Transdisciplinarity, which is taken forward and developed by Nicolescu.

1990s: A philosophical approach vs taking action

Two separate approaches to transdisciplinarity emerge, opposing a 'philosophy of transdisciplinarity' against a 'descriptive and analytic' approach (Bernstein 2015: 5). Building on his statements in the Charter, Nicolescu goes on to articulates transdisciplinarity as

> that which is at once between the disciplines, across the different disciplines, and beyond all discipline. Its goal is the understanding of the present world, of which one of the imperatives is the unity of knowledge.[4]

In contrast, *The Production of Knowledge* (Michael Gibbons, Camille Limoges, Helga Nowotny, Simon Schwartzman, Peter Scott, and Martin Trow) takes a more practical approach, developing the concept of Mode 2 knowledge production, 'involving knowledge developed for a particular application and involving the work of experts drawn from academia, government, and industry' (Bernstein 2015: 5). This second school of thought is known as the 'Zurich school', named for the International Congress that took place in the city in 2000.

Whereas Nicolescuian thinking centres on 'a new way of thinking about knowledge and enquiry... and emphasizes a concept of the human life world and lived meanings', the Zurich

4 In this section of his article Nicolescu provides a very helpful description of the 'fertile complementarity' that he perceives between multi-, inter-, and transdisciplinarity:
Multidisciplinarity concerns itself with studying a research topic in not just one discipline only, but in several at the same time. Any topic in question will ultimately be enriched by incorporating the perspectives of several disciplines. Multidisciplinarity brings a plus to the discipline in question, but this "plus" is always in the exclusive service of the home discipline. In other words, the multidisciplinary approach overflows disciplinary boundaries while its goal remains limited to the framework of disciplinary research.

approach focuses on 'tangible solutions to real world problems... and the interface between science, society, and technology in the contemporary world' (Bernstein 2015: 5).

Current issues

Bernstein provides a concise definition of current approaches to transdisciplinarity:

> Transdisciplinarity involves work that creatively reimagines the disciplines and the possibilities for combining them... Transdisciplinary work challenges the entire framework of disciplinary thinking and seeks to assemble new approaches from scratch, using materials from existing scholarly disciplines for new purposes.

He also notes that other characteristics of contemporary transdisciplinarity include an awareness and balancing of power between the subject and researcher in social sciences research, and an intention to create 'engaged, socially responsible science' that invites participation from government, industry, and citizens as well as academics.

Key terms related to transdisciplinarity include:

WICKED PROBLEMS, which 'defy complete definition and cannot be solved using existing modes of enquiry and decision making... No final solutions for such problems are possible since any resolution generates further issues' (Bernstein 2015: 7). Transdisciplinarians are therefore the ideal people to tackle these problems, as they exist in the real world and can only be approached by moving fluidly between and beyond disciplinary approaches.

COMPLEXITY, which 'is not exactly synonymous with complicatedness, since a complicated system may be understandable in terms of its components, while in a complex system the individual components interact with each other and with their environment in such a way that the system as a whole cannot be explained in terms of its parts' (Bernstein 2015: 8).

Being a transdisciplinarian, Bernstein tells us, requires the ability to 'think in a complex, interlinked manner', an attribute which can make one inclined to tackle problems creatively and imaginatively. A result of this approach, Bernstein warns us, can lead to experiencing the 'pain inherent in abandoning one's intellectual comfort zone by working outside one's home discipline and engaging in new modes of thinking and taking action' (Bernstein 2015: 8). Transdisciplinarians often work together in collaborative teams but transdisciplinary work can be done by an individual: in addition to being able to think, act, and accept the sometimes unexpected and unwelcome consequences of transdisciplinary thinking, the solo transdisciplinarian must be able to 'fuse knowledge from a number of different disciplines and engage with stakeholders in the process of generating knowledge' (Bernstein 2015: 8).

5. Useful resources

Video component for this chapter:

Transdiciplinarity and Pedagogy: Theory Building
www2.warwick.ac.uk/fac/arts/schoolforcross-facultystudies/liberalarts/erasmus/transdisciplinarity

Bernstein, Jay Hillel (2015). Transdisciplinarity: A Review of its Origins, Development, and Current Issues. *Journal of Research Practice*, 11 (1), 1-20.

Jantsch, Erich (1972). Towards Interdisciplinarity and Transdisciplinarity in Education and Innovation. *Centre for Educational Research and Innovation (CERI): Interdisciplinarity: Problems of Tteaching and Research in Universities*. Paris, France: Organisation for Economic Co-operation and Development. 97-121.

Jantsch, Erich (1972). Inter- and Transdisciplinary University: A Systems Approach to

Education and Innovation. *Higher Education*, 1, 7-37.
Kockelmans, Joseph. J. (1970). Why Interdisciplinarity? In Kockelmans, Joseph J., ed. *Interdisciplinarity and Higher Education*. University Park: Pennsylvania State University Press, 123-160.
Mahan, Jack Lee, Jr. (1972). Toward Transdisciplinary Inquiry in the Humane Sciences. Doctoral dissertation, United States International University.
Monk, Nicholas, Sarah McDonald, Sarah Pasfield-Neofitou and Mia Lindgren (2015). Portal Pedagogy: From Interdisciplinarity and Internationalisation to Transdisciplinarity and Transnationalisation. *London Review of Education* 3, 62-78.
Nicolescu, Basarab (2006). Transdisciplinarity: Past, present, and Future. In Haverkort, Bertus and Coen Reijntjes ed. *Moving Worldviews: Reshaping sciences, policies and practices for endogenous sustainable development.* Holland: COMPAS Editions, 142-166. Also www.basarab-nicolescu.fr/Docs_articles/Worldviews2006.htm [accessed 4 August 2016].
Nicolescu, Basarab (2002). *Manifesto of Transdisciplinarity*. Trans. by K. Claire Voss. Albany: State University of New York Press, 147-152. Also http://inters.org/Freitas-Morin-Nicolescu-Transdisciplinarity [accessed 4 August 2016].
Piaget, Jean (1972). The Epistemology of Interdisciplinary Relationships. In *Centre for Educational Research and Innovation (CERI): Interdisciplinarity: Problems of Teaching and Research in Universities*. Paris, France: Organisation for Economic Co-operation and Development, 127-139.

6. Conferences in the field

There are many transdisciplinary conferences to choose from, some of which explicitly state the interface between disciplines (such as The Transdisciplinary Imaging Conference at the Intersection between Art, Science and Culture[5]), whereas some are more firmly located in their home discipline (for example, the International Conference on Transdisciplinary Engineering[6]).

Some examples of conferences concerned with transdisciplinary teaching include:

Inner and Outer Dimensions of Thinking: a Transdisciplinary Conference (Alanus University of Arts and Social Sciences, Germany, 2016);[7]

The European Conference of Educational Research: ECER 2013, Creativity and Innovation in Educational Research, which featured papers on transdisciplinary teaching in sustainability education (Austria, 2013);[8]

Disciplinarity and Transdisciplinarity: Challenges and Chances of Transdisciplinary Teaching in Subjects oriented towards Natural, Social and Human Sciences in Compulsory Education (University of Applied Sciences and Arts Northwestern Switzerland, Switzerland, 2016).[9]

5 See http://transimage.i-dat.org for the conference webpage [accessed 5 August 2016].

6 See www.tidep.ct.utfpr.edu.br/te2016 for the conference webpage [accessed 5 August 2016].

7 See www.crossfieldsinstitute.com/event/inner-and-outer-dimensions-of-thinking-a-transdisciplinary-conference for a description of the conference's aims and objectives [accessed 5 August 2016].

8 See www.eera-ecer.de/ecer-programmes/conference/8/contribution/21960 and www.eera-ecer.de/ecer-programmes/conference/21/contribution/39230 for paper summaries [accessed 5 August 2016].

9 See http://ishd.co/wp-content/uploads/2016/01/Call-for-papers_Disciplinarity-and-Transdisciplinarity.pdf for a description of the conference's aims and objectives [accessed 5 August 2016].

PROBLEM-BASED LEARNING: AN EXAMPLE OF STUDENT-CENTRED TEACHING

Sofie M. M. Loyens and Remy M. J. P. Rikers

1. Definition: What happens in PBL

Problem-based learning (PBL) represents a major development in educational practice that continues to impact both courses and disciplines worldwide (Schmidt, van der Molen, te Winkel and Wijnen 2009). Learning in PBL begins with a complex, ill-structured problem that describes one or more observable phenomena or events (Schmidt 1983). In a meeting together, students discuss these problems before they receive other curriculum input and therefore, rely on their prior knowledge. Collaboratively, they try to construct understanding of the problem and discuss possible explanations or solutions (i.e., prediscussion or brainstorm; 1st tutorial meeting). Because their prior knowledge is limited, they formulate issues that form the basis of their self-directed learning. Subsequently, they select relevant literature about the topic, plan their study activities to optimally prepare themselves for the next group meeting, and assess whether their self-study activities were sufficient to fully understand the subject matter introduced in the problem. Students engage in knowledge construction (Hmelo-Silver 2004; Schmidt 1983) during prediscussion and self-study, and when sharing and critically evaluating their findings after self-study. Prior knowledge is triggered during the initial problem discussion, and new findings are interpreted in light of this prior knowledge during the second tutorial meeting. Ideally, any misconceptions are also resolved here.

The PBL process is depicted in Figure 1. Initial discussion of the problem at hand as well as evaluation of self-study findings happen in small groups of students (i.e., tutorial meetings), which can also be labelled as *collaborative learning* (Loyens, Rikers and Schmidt 2007). These meetings are guided by a tutor, sometimes called a *facilitator* or *coach*, whose role is to stimulate discussion, make sure that relevant content information is discussed (e.g., by asking questions), evaluate progress, and monitor the extent to which each group member contributes to the group's work (Schmidt, Loyens, van Gog and Paas 2007).

→ Pre-discussion of a complex, ill-structured problem (i.e., *brainstorm*) in the tutorial group meeting
→ Formulation of learning issues in the tutorial group meeting (e.g., What is dyslexia?)
→ Individual self-directed learning (SDL) activities (i.e., selecting and studying literature resources)
→ Sharing and critically evaluating the literature findings in the second tutorial group meeting

Figure 1. The PBL process

2. Purpose: reasons to choose PBL

The prevailing goal preceding the development of PBL was to show students the relevance of the subject matter by putting it in a realistic context. Also, PBL was designed to foster several other desirable learning outcomes, namely, to help students

I. construct an extensive and flexible knowledge base;
II. become effective collaborators;
III. develop effective problem-solving skills;
IV. become intrinsically motivated to learn; and
V. develop self-directed learning (SDL) skills (Barrows 1985, 1986; Norman and Schmidt 1992).

An extensive and flexible knowledge base should enable students to retrieve and use information when needed. Activating prior knowledge through problem discussion in the group is seen to set the stage for the to-be-learned information, facilitating elaboration and increasing retention.
By working together in groups, students are expected to develop interpersonal skills and learn how to become good collaborators, learning to contribute to the discussion in an open and clear way, come to agreement about the learning issues and their answers, and resolve possible inconsistencies in their findings (Hmelo-Silver 2004).
Because the problem is the starting point, students are expected to learn to develop problem solving skills. In medical education, students usually encounter problems that need to be solved (e.g., diagnose a sickness and determine subsequent treatment based on the information in the problem). In other domains, however, the problem does not need to be or cannot be solved. Here the goal is to explain or understand the problem in terms of its underlying mechanisms. Either way, PBL aims to teach students how to analyse the problem at hand, to assess the importance of various pieces of information, and to decide which information should be used to understand, explain, or solve the problem and plan subsequent study actions.
With regard to PBL's goal to foster intrinsic motivation to learn, working on problems is believed to be engaging and interesting for students because they present realistic situations, usually related to future professional practice. Besides working on meaningful tasks, it was also assumed that the control students have over their learning would also be motivating (Bandura 1997).
The notion of control prefaces the final goal, namely developing SDL skills. SDL refers to "the preparedness of a student to engage in learning activities defined by him- or herself, rather than by a teacher" (Schmidt 2000: 243).

3. The problem in PBL: Five rules

The problem is the first input that students encounter in the PBL process. Often (e.g., in medical education), these problems originate in professional practice; in other cases, they relate to problems or events typical for a particular domain of study (Barrows 1996; Norman and Schmidt 1992). Because these problems need to be understood in terms of their underlying theoretical explanations, they need to have several characteristics that ensure sufficient scaffolding for the brainstorm, the formulation of learning issues, and students' self-study activities. To optimize the work with problems, a number of central features for problem construction in PBL have been proposed (Dolmans, Snellen-Balendong, Wolfhagen and Van der Vleuten 1997; Majoor, Schmidt, Snellen-Balendong, Moust and Stalenhoef-Halling 1990). These features can be narrowed down to five "rules" for effective problems: PBL problems must build on prior knowledge, elicit discussion, stimulate SDL, encourage knowledge integration and transfer, and be relevant for the students' future profession.

a) Building on prior knowledge

Research in cognitive psychology has shown that prior knowledge influences the quantity and quality of new knowledge acquired (e.g., Anderson 1990). Students need to be acquainted with at least part of the knowledge necessary

to solve or understand the problem. If not, the brainstorm is impossible. Problems that are too difficult (i.e., where prior knowledge is minimal or non-existent) can frustrate the student and decrease motivation. Problems that are too easy will be perceived as boring and insufficiently challenging. Therefore, problem complexity needs to be tuned to prior knowledge (Kirschner, Paas and Kirschner 2009a, 2009b; Otting and Zwaal 2006). An implication of this is that a PBL curriculum needs to have a balanced structure. A specific problem about diabetes, for example, can be presented to medical students only after they have knowledge of human anatomy and physiology (Dolmans et al. 1997).

b) Eliciting discussion

Problems must also be constructed so that learners can retrieve their prior knowledge and subsequently elicit discussion. Prior knowledge retrieval is crucial for relating new information to it. Problems can elicit discussion when they contain cues such as opposing viewpoints, allowing students to generate arguments for and against each view and discuss which view is best. The extent to which a problem can elicit discussion is indicated in the literature by the distinction between well-structured and ill-structured problems (King and Kitchener 1994). *Well-structured problems* are demarcated problems that lead to one solution by applying one or a limited set of rules. A mathematical equation where one has to "determine the value of x" is an example of a well-structured problem. In contrast, *ill-structured* or *ill-defined problems* can lead to multiple solutions and can be solved in multiple ways. Often, an ill-structured problem does not contain sufficient information to be solved or cannot be solved at all. In that case, it is often called a *wicked problem* (Rittel and Webber 1973; Van Bruggen and Kirschner, 2003) where one can only try to understand the underlying mechanisms. The question "What is the best bridge between two shores?" can be categorized as an ill-structured problem. Because of their multiple solutions and/or multiple ways to reach a solution, ill-defined problems are especially appropriate for eliciting discussion (Otting and Zwaal 2006). Furthermore, ill-structured problems often better represent problems encountered in daily life and are, thus, more realistic than well-structured ones.

c) Stimulating SDL

PBL problems need to be constructed so as to ensure the formulation of learning issues (Majoor et al. 1990) because PBL students determine themselves what they find relevant for their learning based on the learning issues (Barrows 1996). Learning issues are questions that are generated in the tutorial group and that guide students' self-study activities (e.g., Hmelo-Silver 2004). The self-study activities for dealing with the learning issues are assumed to prepare students for autonomous problem solving later in life (Dolmans et al. 1997). An ill-structured problem can stimulate the formulation of learning issues and further SDL because it can involve multiple solutions that generate discussion in the tutorial group while possibly also causing cognitive conflict within the student (Dolmans, Wolfhagen, Van der Vleuten and Wijnen 2001). Learners experience conflict because they may have had certain ideas about the problem that no longer seem to hold (either in part or as a whole) or that are questioned in the group discussion. Students become puzzled and—ideally—become motivated to find out more during self-study. In this process, the tutor is expected to stimulate students' identification of knowledge gaps (De Grave, Dolmans and Van der Vleuten 1999).

d) Encouraging knowledge integration and transfer

Problems need to encourage students to integrate their acquired knowledge in their already

available knowledge schemas so that they can apply this information in subsequent new situations. In other words, a problem needs to stimulate knowledge integration and transfer. To accomplish this, information needs to be presented in a broad context so that students can better understand the purpose of the problem. A description of somebody who hurt herself and feels a throbbing pain around the wound a few days later can stimulate students to discuss topics such as the natural healing process of a wound, infection, and characteristics of inflammation (Dolmans et al. 1997). These single processes and features become meaningful in the context of the story. Knowledge acquired in a meaningful context can promote transfer.

e) Relevance for future profession

Finally, PBL problems should be relevant to students' future professions as such problems are considered to be more motivating for students (Loyens, Magda and Rikers 2008; Otting and Zwaal 2006). They are also thought to narrow the gap between the learning situation and praxis because learning and praxis become more similar. Presenting medical students with a patient's file is a good example in this respect.

An example

> You work as a school psychologist, and your task is to diagnose possible learning disorders in the children attending the school, consult parents or guardians about their children, and give them advice about possible treatments. On a Monday morning, you see Harry (7 years old) in your office. Harry seems to be an intelligent and spontaneous child. Harry's teacher has told you that Harry has no trouble understanding things. He is good at mathematics and does not seem to have any problems in his social contacts, either at school or at home. An ophthalmologist has determined that Harry has no vision problems. But Harry has great difficulty learning to read. He often confuses the letters b and d, reverses words while reading, and even writes some words backward. The teacher told you that Harry has some trouble with his speech as well, but she could not give you any specific examples.

This example of a problem about dyslexia is meant for 1st-year PBL psychology students after they have studied how children learn to read, and thus is intended to build on their prior knowledge of the normal reading development. The problem is presented in the context of a school psychologist at work and is, thus, considered to be relevant to some of the students' future professions. It contains different relevant diagnostic elements such as language understanding, making social contact, and Harry's vision. This might lead to a discussion about Harry's possible problem, its signs and symptoms, and, most importantly, how it can be treated, because this is the school psychologist's task. There are multiple options possible, and students need to determine and explore these options during self-study based on the formulated learning issues (e.g., "What is dyslexia?" or "What are possible treatments for dyslexia?").

4. Working in small groups: points of attention

Another key element of PBL, alongside the problem, is small-group collaboration in tutorial group meetings. Tutorial groups typically consist of six to 10 students who meet for 2 to 3 hours per session, usually twice a week (Schmidt et al. 2007). These meetings are guided by a tutor and, in addition, two students in the group assume the roles of chair and scribe. The chair leads the discussion, makes sure it proceeds in a structured way, and encourages group members to participate. The scribe summarizes the contributions on a whiteboard (e.g., Wood 2003) or, if available, a SMART board (i.e., an interactive whiteboard). All group members al-

ternately function as chair and scribe throughout a course.

In addition to tutorial meetings, lectures can be part of the curriculum, but their occurrence is intended to be limited (Schmidt, van der Molen et al. 2009) and not compulsory. They are typically comprehensive rather than transmissive. For the dyslexia example, a school psychologist might be invited to talk about his or her job and would explain what occurs when a child is referred to him or her. By organizing the curriculum around tutorial meetings and giving lectures an optional status, PBL students have ample time for self-study (Schmidt, van der Molen et al. 2009).

Research findings

In a study comparing the quantity of instruction (i.e., lectures, small-group tutorials, practical sessions, and self-study) of eight Dutch medical schools, time available for self-study appeared to be the only significant determinant of length of study (i.e., number of years to graduate) and graduation rates. In addition, lectures were negatively related to self-study time and graduation rate, and positively related to the length of study. These findings led the authors to conclude that in higher education, students learn more by being taught less and curricula should provide sufficient room for students' self-study instead of increasing the number of instructional moments (Schmidt, Cohen-Schotanus et al. 2009). Research has shown that collaborative learning can stimulate discussion and task involvement. For example, an analysis of verbal interactions during a PBL group discussion revealed that the great majority of interactions were learning oriented in nature. Students engaged primarily in exploratory questioning (e.g., open, critical, and verification questions), cumulative reasoning (i.e., statements, arguments, and judgments), and handling conflicts about knowledge (i.e., counterarguments, judgment negotiation, disagreement, and evaluation), with cumulative reasoning accounting for most of the interactions. These results suggest that students' task involvement during tutorial sessions is high (Visschers-Pleijers, Dolmans, De Leng, Wolfhagen and Van der Vleuten 2006). Another study looked more closely into why students benefit from group discussion and determined that actively providing explanations during a discussion was crucial, yielding benefits for long-term memory (Van Blankenstein, Dolmans, Van der Vleuten and Schmidt 2009). Nevertheless, it should be mentioned that nonparticipation in a tutorial group does not always mean not learning. Feelings of being insufficiently prepared, whether justified or not, and the resulting reticence to speak can lead to a lack of verbal participation in PBL groups together with contextual and cultural constraints (Remedios, Clarke and Hawthorne 2008).

The role of the tutor

The role of the tutor is to facilitate and stimulate group discussion, ensure that problem content is considered in depth, and evaluate group members' contributions to unravelling problems (Barrows, 1985). Hence, whenever needed, the tutor is expected to ask open-ended questions such as "Explain in your own words what this article says about the learning issue" when students are primarily summarizing instead of discussing or "How does this article differ from the other?" or "What do you think?" By asking such questions and catalysing group progress, the tutor helps support knowledge building. Ideally, tutor interventions should diminish over time as students become more knowledgeable in the PBL process and more self-directed in their learning, although empirical evidence on this is scarce and not decisive (Hmelo-Silver and Barrows 2008). According to Barrows (1985), a tutor primarily facilitates the process and also possesses relevant subject matter knowledge. The issue of whether facilitation skills or content expertise carries the most weight and, more gener-

ally, which characteristics a good tutor should have is the subject of many PBL studies. One of the first in this respect was an investigation by Schmidt, Van der Arend, Moust, Kokx, and Boon (1993) on the influence of tutor expertise on student achievement, self-study time, and tutor evaluations. They concluded that both subject matter expertise and process facilitation skills are necessary for effective tutoring. In a subsequent study, Schmidt (1994) investigated the circumstances under which the tutor's expertise is most prevalent and concluded that all PBL students need a minimum level of structure. This structure can be provided by their own prior knowledge or by cues in the learning environment (i.e., learning objectives and/or available learning resources). When this structure is insufficient, students rely on tutors for this; and in those cases, students benefit the most from tutors with subject matter expertise. These findings led to the formulation of what constitutes a good tutor (Schmidt and Moust 1995). In their view, effective tutors possess cognitive congruence, social congruence, and expertise. *Cognitive congruence* refers to the ability to "frame his or her contributions in a language that is adapted to the level of the students" (Schmidt and Moust 1995: 709). *Social congruence* refers to the tutor's willingness to be involved with students' life and learning. A tutor also needs a suitable knowledge base of the topic being studied (i.e., *subject matter expertise*; Schmidt and Moust 1995, 2000).

5. Checklist

- ☐ Are the steps in the PBL process clear?
- ☐ Do I know the goals of PBL and are they in line with my goals as a teacher?
- ☐ Can I identify the topics in my course that I would like to transform into PBL-problems? Can I distinguish between topics that I would like to present in a PBL-format and topics that are introduced by another instructional form (e.g., lecture)?
- ☐ Do I understand why activating prior knowledge is so important for learning new information? Can I think of ways to activate students' prior knowledge?
- ☐ Do I have facilities to implement classroom discussions (e.g., splitting the group in half and putting them into two rooms)?
- ☐ Can I use learning materials other than textbooks? Can I identity multiple literature resources about the topic at hand? Do I feel comfortable in letting students select their own literature resources, within the boundaries of the course?
- ☐ Can I come up with assessments appropriate for self-directed learning?
- ☐ Am I prepared as a teacher to take a coaching role?

6. Useful resources

The Interdisciplinary Journal of Problem-Based Learning: docs.lib.purdue.edu/ijpbl

Barrett, Terry and Moore, Sarah. (2010). *New Approaches to Problem-Based Learning. Revitalising Your Practice in Higher Education.* New York and Abingdon: Routledge.

Conference: Annual Meeting of the American Educational Research Association (AERA), which has a special interest group on Problem-Based Education.

University College Maastricht, the Netherlands, a LAS College that works with the PBL-methodology: https://www.maastrichtuniversity.nl/education/bachelor/bachelor-university-college-maastricht/why-this-programme

The same is true for Erasmus University College in Rotterdam, the Netherlands.

https://www.youtube.com/watch?v=ITjZqK_zhcI

https://www.youtube.com/watch?v=9qLXfkb-61Jw

https://www.eur.nl/euc/why_euc/active_learning/

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REFLECTIVE TEACHING PRACTICE

Remy M. J. P. Rikers and Sofie M. M. Loyens

1. Definition and the origins reflective practice

The most distinctive of these very good teachers is that their practice is the result of careful reflection . . . They themselves learn lessons each time they teach, evaluating what they do and using these self-critical evaluations to adjust what they do next time. (Why Colleges Succeed, Ofsted, 2004)

The Origins of Reflective Practice

The development of expertise is a compelling topic for both students and teachers. Many studies have been conducted to explore the characteristics of teachers and students in terms of their knowledge base and skills (e.g., Berliner 2004; Grossman, Wilson and Shulman 1989; Shulman, 1987, 2000; Verloop, Van Driel and Meijer 2001). However, we still know little about how good teachers and students have acquired their expertise and, moreover, how they improve their competencies. Previous studies have shown that only some activities, which are chosen with the goal of improving a particular skill, can optimize performance (Ericsson et al. 1993). In particular, reflective strategies have shown to be essential to improve teaching and learning (Brookfield 1998; Korthagen and Vasalos 2005; Loughran 2006; Moon 2004; Ryan and Ryan 2013; Schön 1983, 1987; Zeichner 1996).

According to Dewey (1933) reflection is as an "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and further conclusions to which it tends" (p. 9). Decades later Schön (1983, 1987) proposed a theory of reflective practice, which considers reflection as the ability to validate knowledge that has been gained from practitioner practices (York-Barr, Sommers, Ghere and Montie 2006). Moreover, he distinguished two types of reflection: reflection-in-action and reflection-on-action. In reflection-in action, practitioners stop in the midst of action, make necessary adjustments, and, if necessary, alter their methods to improve their practice (Schön 1983). It entails building new understandings to inform our actions in the situation that is unfolding. Reflection-on action is done later, after the experience (e.g., teachers may write up recordings to reflect upon after class, or discuss things that have happened in class with their supervisor, etc.). Schön's (1983, 1987) perspectives on reflective practice have become the most widely adopted theoretical views of reflection in education since Dewey (Crain 2005).

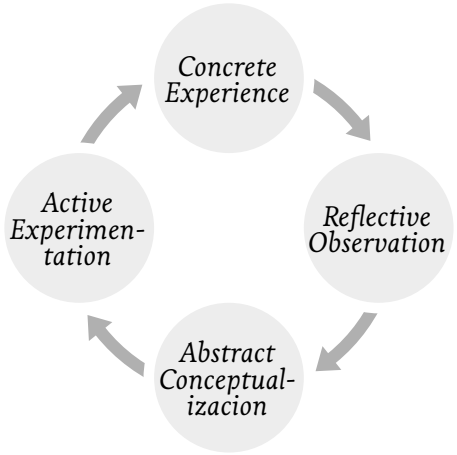

Figure 1. Kolb's Experiential Learning Cycle.

One influential model concerning reflection has been developed by David Kolb in 1984. His experiential learning theory works on different levels: a four-stage cycle of experiential learning and four separate learning styles. Kolb's theory is primarily concerned with the learner's internal cognitive processes. According to Kolb, learning involves the acquisition of abstract concepts that can be applied flexibly in a range of situations. In his theory, the incentive for the development of new concepts is provided by new experiences.

Learning takes place when an individual progresses through a cycle of four stages (see Figure 1): (1) having a concrete experience followed by (2) observation of and reflection on that experience which leads to (3) the development of abstract concepts (analysis) and generalizations (conclusions), which are then (4) used to test hypotheses in future situations, resulting in new experiences.

Kolb and Fry (1974) view learning as an integrated process with each stage of the cycle being mutually supportive of and feeding into the next stage. It is possible, however, to enter the cycle at any stage and follow it through its logical sequence. However, effective learning will only occur when a learner is able to complete all four stages of the model. Consequently, no stage of the cycle is effective as a learning procedure on its own.

Over the years, many studies have shown that reflective strategies are important for instruction and learning (e.g., Brookfield 1998; Schön 1983, 1987). Reflection enhances the quality and depth of knowledge (e.g., Cunliffe 2004; Koster, Brekelmans, Korthagen and Wubbels 2005; Mezirow 1981; Moon 1999) because teachers are more likely to experiment, to investigate, and to compare their teaching behaviors with their adopted theory of action (Dewey 1933, 1938; Schön 1983, 1987). Furthermore, Wubbels and Korthagen (1990) have shown that the quality of relationships between students and faculty was improved by reflection, relationships were more positive and constructive for faculty with higher levels of reflective thinking, and reflection assists in achieving quality learning. Based on these findings Ostorga (2006) concluded that reflection informs teaching practices and, hence, strategies that intend to improve reflection should be developed and applied in educational contexts. However, little direction is given to faculty regarding reflective methods and processes, and it is unclear how faculty members apply the process of reflection. Moreover, we do not know whether both teachers and students can benefit from reflective strategies. Most studies on reflection have focused on higher education and professionals in different domains (e.g., medical doctors; Rikers and Verkoeijen 2007) and paid little attention to how reflective activities were implemented in daily practice. Moreover, it is still largely unclear whether reflection by teachers or students will lead to improved performance of the latter group, which is discernibly the primary goal of education.

To elucidate these issues, this workshop will explore the role of reflection within higher education, using Schön's (1983, 1987) framework of reflection as our theoretical framework. It will focus on LAS education because it is a complex and dynamic environment in which, in contrast to many forms of higher education, learning is less focused on one specific discipline and in which the acquisition of knowledge and skills are equally important. Moreover, in our contemporary world, with its increasing complexity and rapid developments in the workplace, emphasis is needed by teachers and students to be externally focused to keep their skills and knowledge up-to-date (Poortman, 2007; Reenalda et al., 2014).

2. Applying 'reflective practice' to the context of the Liberal Arts

In its essence, reflective practice is critically thinking or reflecting on what you do and

how you do it. It is closely connected to learning from experiences in that you reflect upon what you did, the consequences, and then decide what you could do differently in the future so the outcome will be more positive. Reflective practice has been adopted in current views of expertise development. For instance, Ericsson's Deliberate Practice Theory (Ericsson, Krampe and Tesch-Römer 1993) also emphases the role of reflection to improve performance. According to Ericsson and colleagues (2007), deliberate practice is essential to improve performance; without deliberate practice substantial progress in one's current level of performance is virtually impossible (Ericsson, Roring and Nandagopal 2007). More importantly, studies within this framework emphasize that most people, while engaging in complex activities, do not use a systematic approach to improve performance through reflection. In other words, improvement in one's the current level of performance is seldom the result of simply investing time in it but always demands a systematic approach in which reflection upon performance is essential.

Over the years, many studies have been published that demonstrated the importance of reflection (or deliberate practice). In particular, reflection has been shown to substantially improve the level of performance and reduce the number of mistakes while engaging in a specific task. For instance, recent reports and studies have shown the impact of medical errors in health care. Adverse effects of doctors' mistakes have been identified as important causes of mortality around the world. The Institute of Medicine report 'To Err is Human' (1999) estimates that, for instance, in the USA between 44,000 and 98,000 patients die every year as a result of clinical errors made by (experienced) doctors. If the lower estimate is considered, it exceeds the deaths attributable to motor vehicle accidents, breast cancer, or AIDS. Many of these deaths could have been avoided if the doctor would had invested a bit more time into rethinking his or her original hypothesis (e.g., diagnosis, treatment plan). That is, introducing reflection into the doctor's modus operandi may have a major effect on the quality of the provided care, and may eventually save lives.

Within a medical context it might be considered fairly easy – given that somebody's life might be at stake – to convince doctors of the importance of using reflection as part of their daily routine. However, it is important to note that expertise research has shown quite the opposite. That is, reflection is an activity that most people do not "naturally" engage in unless they are more or less forced to do so, because it not only takes extra time but also entails that the learner should be willing to constantly confront him/herself with the limitations of their own interpretations (Ericsson, Roring and Nandagopal 2007). Moreover, it is not always obvious how to improve things, or how things can be done differently. Consequently, it might become a frustrating activity, in particular when external and high-quality feedback is lacking. Nonetheless, the benefits of introducing reflection as part of someone's daily routine even when feedback is absent are superfluous. It goes without saying that the benefits of reflection are obviously not limited to the domain of medicine alone but can be applied within a wide range of activities and professions.

3. Checklist I.

- ☐ What are the core components of reflective practice?
- ☐ How does reflection help in building expertise?
- ☐ What is the added value of reflective practice in an educational setting?

4. Purpose workshop

For our purposes, we will apply recent insights from research on reflection and expertise devel-

opment to improve teaching practices aimed at university level students. The following is a description of activities that constitute a workshop of approximately 2 to 3 hours in duration designed specifically for use by those engaged in learning and teaching as part of a liberal arts program. The main goal of this workshop is to provide a better understanding of reflective practice in education and how to include reflection within a teacher's workflow.

The workshop is divided into three activities:

- warm-up (i.e., short icebreaker activity to stimulate reflection);
- case studies (i.e., examples from educational practice);
- transfer task (i.e., assessment activity).

Warm-up

The warm-up activity lasts up to ten minutes. It is short and designed to prepare the participants for the session on reflective practice.
The facilitator asks the participants to form a group of three participants. They should sit together so they are as little as possible disturbed by the other groups. One of the participants in the group should take the lead and has to make sure that the questions below are discussed within the timeframe of ten minutes. Next, each participant will get one of the following questions:

I. What do you think about this quote from Francois Domergue? "Some people study all their life and at their death they have learned everything except to think."
II. As a teacher, how do you know that learning has occurred?
III. Do you want your students to do more than recall facts and state opinions in class?

The participant answering the first question will formulate his or her opinion about it. Next, the other (two) participants respond to this and motivate their views. After a couple of minutes of discussion, the second question will be discussed in a similar manner but now another participant of the group will start the discussion. This procedure will be repeated for the third and final question.
The main goal of this exercise is to break the ice by giving participants sufficient room to voice their own opinions and become more reflective about their teaching. Furthermore, it is important that they realize that although these questions are fairly straightforward, we often forget them while we are organizing our courses. Finally, from a cognitive perspective, it also leads to the activation of their prior knowledge and attitudes about the added value of reflection in an educational setting.

First activity: Case Studies

General assumption: Teachers who regularly reflect upon realistic problems from educational practice, ideally with the help of experienced teachers, will improve more than teachers who do not reflect.
This first activity enables teachers to reflect, in a safe a constructive environment, upon problems or cases that they have seen on a regular basis. In particular, the cases will consist of realistic problems that are frequently encountered in LAS education (e.g., related to classroom management, study skills, motivational problems, procrastination, etc.). Ideally, these cases will be based on existing cases used as instructional tools in professional development courses, and will be adapted to the local context in collaboration with experienced LAS teachers and students. It is, however, also possible that participants start this part of the workshop by creating one or two cases themselves based on their own teaching experiences (or that they got this task as homework before the workshop). By doing so, they have the opportunity to discuss cases that they consider highly relevant for their own teaching practice. Another alternative is that participants work in

small groups of two or three participants to develop several cases. However, this part should not take longer than 30 minutes because otherwise there might not be sufficient time left to discuss the most essential part of the workshop, namely the role of reflection.

The first part of this workshop is divided into a number of steps. Try to follow these steps as closely as possible. The steps are divided in two phases: First, there is a training phase in which participants learn how to reflect upon a case, and second, in the test phase, they can demonstrate that they can effectively reflect upon cases without the need of external help.

I. During the training, participants will sequentially handle a set of cases (see examples below concerning study strategies and motivation). As indicated above, these cases might be developed beforehand or during the training session. Next, they have to explain what the case is about (i.e., problem identification) and describe, based on their own experiences, which steps they think should be taken to resolve the issue described in the case. They should try to do so as concretely as possible; the solution should be understandable to everybody else.

II. Each participant will receive feedback on their ideas after each case by providing and discussing ideas how to manage the case at hand from the other participants, or by showing them ideas from experienced teachers who will ideally base their feedback on recent insights from educational research).

III. Next, they are given some time to carefully study the provided feedback and to write down a summary for each case.

IV. After they have written down the summaries, participants are required to compare the feedback to their own original ideas and identify (and write down) the differences and similarities. A good way to do this is by creating two columns. One column contains the ideas that were the same and the other contains the ideas that were different. Thus, the extensiveness of the overlap and deviations becomes more obvious.

V. With a partner (e.g., from the warm-up exercise), they each discuss their findings and exchange ideas. An important goal of this part of the exercise is to try to understand why the overlap is large, average, or small, and why this is so.

VI. During the assessment phase, participants receive a new set of cases to deal with, but now no feedback will be provided. In contrast to the cases in the training phase, these cases have been prepared beforehand by the instructors of the workshop.

VII. Based on a pre-established scoring rubric (e.g., Mertler, 2001) each case will be independently assessed by two "judges" (other participants or experienced educational researchers/ teachers). They will assess the extent to which the ideas provided by the participants overlap with those provided in the rubric. A large overlap is an indication of a solution that is of high quality and little overlap is an indication of the opposite.

VIII. The outcome will be collectively discussed and implications for educational practice will be identified. Ideally, participants will discuss with each other how they can implement reflection as part of their daily routine.

Case study I

Susan is 18 years old and she always had good grades during her secondary education. Recently things have changed and her grades dropped dramatically. Her mother thinks that she has not been able to deal with the increased workload at college. Her mother explains: "Susan works very hard and highlights all important information in her textbooks and studies at least five hours per day. Moreover, she writes extensive summaries of each chapter that she has to study. A couple of months ago she did an IQ test and her score was way above average."

What would you suggest to improve Susan's academic performance?

Case study II

It is the first lesson of the semester. During the lesson your teacher, John Smith, describes the central assignment for this semester.

John introduces the assignment by presenting a professional dilemma to the students. This professional dilemma reflects a realistic situation that students are likely to face after graduation, making the assignment relevant for students' professional development. The purpose of the assignment is to find an adequate solution to the professional dilemma, while taking into account the available time and equipment. Solving the dilemma will help students to become better professionals.

One of the students wonders whether there is sufficient time to finish the assignment. John explains that students have to plan their work well, but that they can choose at what time they will work on the assignment and which approach they will take. However, they cannot choose the professional dilemma, because otherwise they would lose too much time designing the dilemma. In addition, with a predetermined professional dilemma John can make sure the assignment is relevant for the students' learning processes.

One of the students calls this restriction patronizing and he wants to discuss his own case for this assignment. John listens to the student's arguments and asks him whether his case could fit within the outlined dilemma. However, the student still tends to disagree with his teacher and would like to have more freedom to select a professional dilemma.

Second activity: Transfer Task

The next activity is known as 'Transfer task' and directly builds on the knowledge and skills acquired during the first activity. As is commonly known, transfer of knowledge is one of the biggest challenges for modern education (Gentner, Loewenstein and Thompson 2003). That is, the knowledge and skills acquired within an academic context are often poorly or suboptimally applied in practice. It is assumed, however, that teachers who have been trained to reflect are more likely to transfer their newly acquired knowledge and skills to the classroom.

In order to promote transfer, participants will be trained on a set of related cases that will introduce them to a particular instructional strategy, for instance, the use of worked examples in solving equations (Renkl 2005). The worked-example effect is a learning effect that has been extensively studied within Cognitive Load Theory (Sweller 1994). Specif-

ically, it refers to the positive learning effects observed when worked out examples are used as part of instruction, compared to other instructional techniques such as problem-solving (Renkl 2005). In contrast to the cases in the first activity, these cases provide concrete examples of how to use this approach in class.

I. Teachers carefully study the set of related cases demonstrating a particular instructional design approach (e.g., worked-example effect). For training purposes, these cases should be as concrete as possible.
II. Next, they are instructed to contrast the approach described in the cases (e.g., using worked out examples) with their own approach of teaching by indicating (and writing down) how it resembles or differs from their own approach.
III. After the training phase, teachers are instructed to create a short 10-minute lecture (on any topic) that is related to the instructional approach that has been depicted in the cases.
IV. This lecture will be evaluated by a team of experienced educational researchers/ teachers to assess the degree to which the ideas and principles discussed in the cases are present in their lectures. In other words, can participants successfully implement the ideas that is the approach to teaching depicted in the cases, in their own teaching?
V. The team of experts will provide each participant with detailed feedback on their performance.
VI. This session will be recorded so each participant has the opportunity to go over the feedback in their own time.

5. Checklist II.

☐ Do I understand why cases play such an important role in promoting reflection?
☐ Why is getting feedback on my reflections essential?
☐ How do I organize my own teaching so reflection becomes a part of it?

6. Useful resources

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USING PEDAGOGIC THEORY TO ENHANCE STUDENT LEARNING

Gabriela Pleschová

1. Definition: What is pedagogic theory
2. Purpose: Why should teachers know and make use of theory. A list of theories teachers can build upon to enhance student learning
3. Activities and checklists: five examples on how to use theory to better design, conduct and evaluate teaching
4. Useful resources
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1. Definition: What is pedagogic theory

When we speak of pedagogic theory, we mean various concepts that explain how people learn, what hinders and facilitates learning and how teachers can effectively enhance learning. These are the outcomes of research into learning, in this case learning at the university level, which for many decades has been a vibrant area of scholarly study.

2. Purpose: Why should teachers know and make use of theory. A list of theories can teachers build upon to enhance student learning

As the world around us changes, so too are students changing, as are their needs, learning context, knowledge and the skills they should develop to become successful in the future. Approaches and methods that worked well for one group of students often end up not working for the other one. What is more, differences among individual students in one class can be so big, that what clearly helps one student appears useless for another. This implies that teachers cannot simply learn a set of general rules and apply them in their daily work. Instead, good teachers strive to better understand learning and use these insights to re-design and teach their classes.

While constructing this understanding, teachers need not learn solely from their own teaching experience. Existing scholarly literature includes numerous works by educationalists and teachers-practitioners that uncover why students sometimes struggle in classes and what can help them overcome barriers to learning. Whereas a large part of this literature is disciplinary-based, another part refers to higher education learning in general and can be a useful source for teachers regardless of their discipline. The examples of concepts that are relevant for teachers in liberal arts education include the following:

a) Bloom's and SOLO taxonomies
b) Constructive alignment
c) Deep and surface learning
d) Extrinsic and intrinsic motivation to learning
e) Reflective learning (Kolb's learning cycle)
f) Cognitive resistance/dissonance (discussed in chapters 1 and 2)

The next section introduces these concepts and offers guidelines on how to use them while planning, conducting and improving teaching.

3. Activities: five examples on how to use theory to better design, conduct and evaluate your teaching

a) Bloom's and SOLO taxonomies

Concepts' definition

When teachers think of their students, they rarely say, 'my students can (or cannot) do something.' More often, they talk about how

differently their students have learnt something. Clearly, students end up in courses with qualitatively different outcomes of learning. If teachers start their courses by providing students with clear descriptions of these different levels of results, they can better guide students towards achieving more difficult learning outcomes. This is because learning typically occurs step by step: from easier to more challenging things.

There are several concepts that help to formulate these qualitatively different results of learning. Bloom's categorisation of learning objectives was introduced as a result of discussions among American university administrators chaired by Benjamin S. Bloom and was later revised by Bloom's colleagues, Anderson and Krathwohl. It differentiates between six outcomes of learning. These are ordered from the simplest to the more challenging and include the following outcomes: remembering → understanding → applying → analysing → evaluating → creating (Krathwohl 2002: 215). Following table summarises what a student's assignment, answer or work should demonstrate to be categorised in each of the outcomes.

Table 1: Categories of outcomes in Bloom's taxonomy. Source: Krathwohl (2002: 215).

Category of an outcome	Abilities that the outcome of learning demonstrates
1. Remembering	Recognize, recall
2. Understanding	Interpret, classify, summarise, infer, compare, explain
3. Applying	Enumerate, describe, list, combine, do algorithms
4. Analysing	Differentiate, organize, attribute
5. Evaluating	Check, critique
6. Creating	Generate, plan, produce

SOLO taxonomy, on the other hand, was introduced by Australian educationalist John Biggs. SOLO stands for the structure of the observed learning outcomes. Like Bloom and his associates, Biggs tried to express what students usually demonstrate as a result of their learning. He formulated five different categories that also range from the simplest to the most difficult: pre-structural → uni-structural → multi-structural → relational → extended abstract (Biggs and Tang 2007: 76-80). The table that follows summarises what a student's assignment or answer should demonstrate to be categorised in each of the outcomes.

Table 2: Categories of outcomes in SOLO taxonomy. Source: Biggs and Tang (2007: 79).

Category of an outcome	Abilities that the outcome of learning demonstrates
1. Pre-structural	Misses point
2. Uni-structural	Identify, do simple procedure
3. Multi-structural	Enumerate, describe, list, combine, do algorithms
4. Relational	Compare, contrast, explain causes, analyse, relate, apply
5. Extended abstract	Theorise, generalise, hypothesise, reflect

Practical use

These two categorisations can be particularly useful while planning learning objectives for courses and classes. If teachers use some of the verbs associated with each of the categories, they will provide students with clear guidelines on what is expected from them. These classifications further suggest that teachers should organise courses and classes in a way that helps students to first master the easier outcomes (i.e. objectives) and then proceed to more difficult outcomes.

The challenge associated with both concepts lies in adopting them for particular courses and disciplines. For some areas of study, such as for Political Science, the ability to enumerate or describe would fall into the category of remembering, rather than applying. Similarly, the analysis level would be better expressed by a verb such as 'explain' rather than 'organise' or 'attribute.' The application of these concepts thus calls for careful judgement and discussion among colleagues about what students should be able learn as a result of taking the entire course.

These concepts moreover put forward that course outcomes should be formulated as clearly as possible so that they allow assessment of the demonstrated outcomes. For example, the usage of the verb 'understand' is problematic, as teachers can only know if students understand something after considering their ability to describe, select, solve or present the results of something (Biggs and Tang 2007: 71).

Activity

Think of what you wish your students to be able to do at the end of your class or course. Write these down as objectives using some of the verbs from either of the taxonomies. Think of what levels of outcomes the students should achieve. Proceed from those objectives you consider easiest for your students to master towards the most complex outcomes.

Checklist

- ☐ Does my class/course aim to achieve some of the more complex levels (i.e. levels 3-6 in Bloom's taxonomy and levels 4 or 5 in SOLO taxonomy)?
- ☐ Are the expected outcomes of learning formulated clearly, i.e. avoiding verbs such 'understand' that do not allow assessment of observed outcomes?
- ☐ Given my and colleagues' experience with teaching this course/class, is the number and complexity of outcomes realistic for the students to achieve?

b) Constructive alignment

Concept's definition

Most teachers can say relatively easily what they want their students to know after taking their class or course. They can also give examples of the activities they will ask students to do and what assessment methods they will use. The challenge, however, comes in designing activities in which all these three components of learning are mutually supportive. Briefly, the principle of constructive alignment says that outcomes, activities and assessment of a class or course should be designed to support each other (Biggs and Tang 2007: chapter 4).

This means that teachers should prepare at least one activity for each of the expected learning outcomes in order to help students develop expected knowledge and skills and to provide them with feedback on their progress. If students struggle with achieving that outcome, they should be engaged in additional activities. Similarly, for each of the outcomes, teachers should prepare an assessment method that allows collecting enough evidence on the results of student learning. Naturally, one assessment task may be used to measure several learning outcomes. This also has implications for the number of expected outcomes. If teachers set too many outcomes for their courses or classes, they risk collecting not enough evidence for the attainment of each outcome. At the same time, it is important that the assessment tasks also allow for attaining unplanned learning outcomes, which frequently occurs when students have freedom to construct their knowledge (Biggs and Tang 2007: 54).

Practical use

Both teachers and students have limited time and effort which they can devote to a certain course or class: if learning is not well planned, it can easily become a waste of time. And even if the concept of constructive alignment conveys a message that is logical, simple and easy to understand, many courses could be improved by

paying more attention to how their elements align with each other. The following table presents an example of how to design components of an international relations theory course to follow the concept of constructive alignment.

Expected learning outcomes (What students should know or be able to do at the end of a course)	Learning activities (Students receive feedback)	Assessment tasks (Contribute to students' grade)
1. To characterise key postulates from each theory using their own words and references from the original articles	Literature reading (textbook and original articles) Ten minute paper where students are asked to write a theory definition (using own formulations plus references from the articles)	Short in-class written exam where students are asked to define certain theories
2. To compare and contrast various theories	In-class discussions of literature Drawing of comparative charts	Short in-class written exam on which students compare and contrast merits and pitfalls of two theories
3. To apply a selected theory to a case	Literature reading where students are assigned studies that apply theory In-class discussions of literature Application cards where students learn to match cases with theory	A take-home essay where students are to choose a case and discuss it while applying a selected theory (first, a one-page outline and, then, a full paper)

Activity

Teachers can easily test to find out whether or not their course components are well aligned by trying to complete a similar table themselves.

Expected learning outcomes	Learning activities	Assessment tasks

Checklist

- ☐ Are one or more activities designed for students to attain each objective of learning? Do students receive feedback on each of these learning outcomes?
- ☐ Do assessment tasks allow for the measuring of the achievement of all outcomes?
- ☐ Do tasks allow for the assessment of unplanned outcomes?

c) Deep and surface approach to learning

Concept's definition

As with the concepts mentioned earlier, the concept of deep and surface learning also enquires into why students of a course end up with qualitatively different outcomes. In this case, it looks at how students approach the given task. It finds two profoundly different ways:

while some search for meaning of the task, others ignore its meaning.
These results come from a series of experiments on how various students proceed when studying. Swedish educationalists Ferenc Marton and Roger Säljö gave students a text to read and told them they would be asked questions afterwards. Students responded in two fundamentally different ways. The first group read the text in anticipation of the questions, concentrating anxiously on the facts and details that might be asked. What these students remembered was a list of disjointed facts; they did not comprehend the point the author was making. The second group attempted to understand and interpret the meaning of what the author was trying to say. They gave an answer in line with the intentional content of the author's argument. The researchers labelled these different forms of engagement surface and deep approaches to learning (Marton and Säljö 1976a, b).

Practical use

Numerous studies have documented that what students learn is closely associated with how they go about learning it. The surface approach was found to lead students to achieve only those simpler learning outcomes as described by Bloom's or SOLO taxonomies. Moreover, students cannot overcome their misconceptions and forget rapidly. On the other hand, the deep approach allows attainment of more complex outcomes, promotes conceptual change and retention of factual knowledge (Ramsden 1991: 55-57, Gibbs 1992: 4).
In addition, the approaches are related to how much satisfaction students experience in their learning. Deep approaches are clearly more enjoyable. Usually, students obliged to use a surface approach to a task, or to an entire course, describe feelings of resentment, depression, and anxiety. In contrast, deep approaches are almost universally associated with a sense of involvement, challenge, and achievement, together with feelings of personal fulfilment and pleasure (Ramsden 1991: 53, 58).

The processes associated with deep and surface approach differ for various disciplines. In describing surface approaches, students of science are more likely to speak of a narrow focus on techniques, procedures, and formulae. On the other hand, humanities and social scientists tend to report a more generalized and vague approach, which frequently includes an oversimplification of main ideas in reading and essay writing, or memorizing unrelated generalities in preparation for exams (Ramsden 1991: 50).
What is most important, typically it is not two different students that would each decide for either the deep or the surface approach. Instead, the same student can take the deep approach while studying one topic or class whereas, at another occasion he or she uses the surface approach (Gibbs 1992: 9, Ramsden 1991: 49). Student preference for one approach depends upon a range of factors. Biggs and Tang (2007: 22-24) distinguish two sets of factors that encourage students to adopt the surface approach:

For the student:

- an intention to only achieve a minimal pass;
- non-academic priorities exceeding academic ones;
- insufficient time or too high workload;
- misunderstanding requirements, such as thinking that factual recall is adequate;
- a cynical view of education;
- high anxiety;
- a genuine inability to understand particular content at a deep level.

For the teacher:

- teaching by bullet lists, instead of bringing out the intrinsic structure of the topic or subject (The authors add that some bullet lists, like these two here, for instance, are OK.);
- assessing for independent facts, for example, using short answer and multiple-choice tests;
- teaching and assessing in a way that en-

courages cynicism: for example, if the teacher says that he or she dislikes a topic and the students will dislike it, too;
- providing insufficient time to engage in the task;
- emphasizing coverage at the expense of depth;
- creating undue anxiety or low expectations of success.

Gibbs (1992: 9, 10) adds a few more issues facing the teacher:
- a lack of choice over subjects or the method of study;
- little clarity in assessment methods;
- study skills courses which focus on techniques such as reading, note-taking and time management, i.e. skills which can be used to implement either a surface or a deep approach.

Nevertheless, even if teachers eliminate these factors in their class, the approach to learning students will take depends on how individual students perceive their learning situations. As uncovered by Prosser and Trigwell (1999: 2, 8-9) students' previous experiences strongly influence their views on what is expected from them in a course. Two students may thus see their situations in quite different ways. For teachers, this means they need to monitor student performance and introduce additional explanations and examples on what is required from students.

Activity

Think of one or two most important activities students are asked to complete in your class. Using the information above, try to evaluate if they most probably encourage students to take a surface or a deep approach to learning. How can you redesign those activities to stimulate the desired approach to study?

Checklist

- ☐ When I observe students learning in class, do most students seem to take a deep or a surface approach to learning?
- ☐ Why could some that individual students adopt a surface approach? What am I doing to encourage a deep approach to study?
- ☐ Is the assessment in this course designed to stimulate a surface or a deep approach?

d) Extrinsic and intrinsic motivation to learning

Concept's definition

Obviously, students also learn differently because they put dissimilar efforts into their study. The level of student engagement is predetermined by their motivation. While observing students learning in class, teacher can see some are interested in the topic or subject of study, whereas others appear apathetic, bored or disengaged. Research has distinguished between various types of motivation for learning. Extrinsic (external) motivation comes out of the reward a student receives after completing a course or degree. That can be a grade or a diploma, a stipend or necessary qualification for entering a profession but sometimes it might also be a result the fun had in lectures (Kvasz 2005: 25). Intrinsic motivation, on the other hand, is the academic ideal making students learn because they are interested in the task or activity itself, for the intellectual pleasure of problem solving and exercising their skill, independent of any rewards that might be involved (Biggs and Tang 2007: 35).

Practical use

Intrinsic motivation is important because it drives deep learning and the best academic work (Biggs and Tang 2007: 35). When speaking about motivation, Rulíková (2006) uses a metaphor of influencing student bodies, minds and souls. While teaching, the instructor may have students coming to the class (bodies), study-

ing and actively participating in class activities (minds) and winning students for the subject (souls). Meeting students in class (bodies) is a prerequisite for further interactions with students that gives a teacher the opportunity to encourage learning (minds and souls).

Activity

Attracting students to physically attend classes can be practically solved by extrinsic motivation, for example by making attendance a requirement for passing the course, by assigning points for in-class activity or by asking the students to complete an assessed task. However, this should not be an end in itself – teachers should ultimately strive to encourage students' intrinsic motivation. i.e. enthusing students for the subject itself. Several strategies can help to stimulate intrinsic motivation in students. For example, if teachers work to create an atmosphere in class where everyone has enough opportunity to contribute and receive feedback, students can overcome any shyness or anxiety from possibly saying or doing something wrong. Also, when students can proceed from easier to more difficult tasks, they can enhance their self-confidence. To prevent boredom of more advanced students, tasks should challenge students to go beyond their current level of knowledge and skills or combine knowledge from various fields. Linking theory with practice is another good way to stimulate intrinsic interest because students are naturally interested in the practical implications of what they study in class. This all helps to develop in students a feeling of 'ownership' over their learning, which is in the heart of intrinsic motivation.

Checklist

- ☐ Are students equally contributing in class or is it always the same few students who are willing to contribute?
- ☐ Have I introduced rewards to students for their activity and initiative? Do they seem to work?
- ☐ Can students choose among various activities and assessment tasks, including those more challenging and novel which could develop their intrinsic interest in the subject?

e) Reflective learning (Kolb's learning cycle)

Concept's definition

The concept of reflective (or experiential) learning helps to explain how learning occurs. It was introduced by David A. Kolb who built upon the work of earlier educationalists, mainly Dewey, Lewin, and Piaget. For Kolb learning is the process whereby knowledge is created through the transformation of experience. It describes how the learner first experiences something which stimulates his or her reflection on the phenomenon. The individual then tries to formulate a generalization, in other words, an explanation that is also valid in similar cases experienced earlier and consistent with their knowledge. Afterwards, learner tests this abstract concept after going through other experience. These four stages (concrete experience, reflective observation, abstract conceptualization and active experimentation) then repeat (Kolb 1984: 38, 40).

Activity

In liberal arts education, the application of the reflective learning model may not be as obvious as in science courses that include field trips, field work and lab work. One way to use Kolb's cycle in liberal arts education is to help students to better learn from literature. For example, many first-year students struggle with what to extract from the assigned readings and how to use them in further classes. The teacher then asks students first to summarise the key ideas from a reading (this would represent the experience stage). Then students are asked to reflect on these key ideas by connecting them to their existing knowledge from other classes or to their experience (reflection stage). The next task for the students is to formulate some

general rule or principle these ideas suggest (conceptualisation stage). A follow-up reading should then be selected with the purpose of effectively testing this rule, principle or theory (experimentation) (For a similar approach see Kas 2005).

For some courses, however, it might be possible to organize field trips where students have the opportunity to observe phenomena such as campaigning, social work or voting behaviour, reflect on them later and then make own generalizations. Moreover, they can be invited to compare and contrast what they have learnt from literature with their observations.

Another way to use the concept of reflective learning is to design the class to formulate questions or tasks for the students so that they stimulate students to move from one stage to the next and construct their own understanding. Alternatively, students can be asked to identify which stage in the Kolb's cycle they currently are in and to reflect on how to be more productive at each stage or when moving from one phase to another (Cowan 2006: 46-53).

Checklist

- ☐ Have I designed my class so that it includes an element of experiential learning?
- ☐ Can students make proper generalisations from what they read or experience and use them in further classes?
- ☐ Can I design a learning task where I can observe students going through all the stages of Kolb's cycle to see where students get stuck in their learning?

4. Useful resources

Adamová, Ľudmila and Murárikova, Petra, eds. (2013). *Innovating Teaching and Learning: Reports from University Lecturers*. Opladen: Budrich Unipress.

Contains case studies on how university teachers used theory to redesign, teach and evaluate their courses.

https://www.learning-theories.com/cognitive-dissonance-festinger.html

Presents 60 learning theories and concepts that are categorised into ten groups: main paradigms, constructivist, social and situational theories, behaviourist theories, motivation and humanist theories, cognitivist theories, descriptive and meta theories, child and development theories, design theories, media and technology theories, identity theories and miscellaneous theories.

5. Conferences and other events in the area

Teaching and Learning Summer School (bi-annual): http://teaching.eurea.sk/summer-school

This summer school leads participants to learn various theories and concepts from higher education and use this knowledge to enhance their classes.

2018 summer school will be held in Bratislava, 15 – 23 July 2018.

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ASSESSMENT FOR LEARNING

Gabriela Pleschová

1. Definition: what is assessment

The term assessment comes from a Latin expression 'ad sedere,' which means 'sitting beside' and denotes offering feedback on a learner's progress (Szabó 1995: 30). Although in contemporary mass education teachers do not usually sit beside each individual student giving feedback on his or her development, the primary role of assessment remains the same: to inform both student and teacher on the progress of learning. Through assessment, students can learn better because assessment improves their understanding of the goals of curricula (Ramsden 1991: 188) and helps them to identify the areas and means for further improvement. This makes assessment an integral part of teaching and learning.

Learners can be assessed for various purposes, for example, for selection, control or as a way of encouraging better performance. Assessment can also be undertaken in order to satisfy public expectations as to standard and accountability. Today, students are still primarily assessed for two reasons: for formative feedback and summative grading. Both are referred to as 'assessment' as they document how well students are doing, or have recently done. However, while in formative assessment, the results are used for feedback during learning, in summative assessment, the results are given at the end of a learning period to provide information on how well students have attained the expected outcomes of learning (Biggs and Tang 2007: 97, 163).

The main purpose of summative assessment is the objective evaluation of individual performance. Therefore, summative assessment needs to be verifiable, i.e. it must be supported by the evidence. Typically, these are outcomes of student work that was assessed, including, but not limited to, written assignments, tapes of oral exams, and copies of presentations. In addition, unambiguous definitions of what was required and how it was being assessed must be provided, for example, in the course syllabus or written assignment guidelines (Rybář 2007: 109).

Feedback can be one of the most powerful drivers of learning. It tells students how they are progressing while learning and what might need improvement. However, in order for students to admit their own error, they cannot be afraid of saying or doing something wrong that will result in a worse grade or in some form of punishment. Therefore, to make feedback powerful, teachers need to create a learning environment where free exchange of opinion and ideas is valued and encouraged (Biggs and Tang 2007: 97).

Creating such a learning context requires that the teacher considers a number of issues. One of the important dilemmas the instructor needs to solve is whether to correct student mistakes during class (which may discourage students from contributing) or allow misconceptions to pass unquestioned and uncorrected (which can strengthen student misunderstanding).

There are various ways to deal with this challenge. For example, Biggs and Tang (2007: 98) advise the instructor to smile encouragingly,

and say 'Yes, not bad. Can anyone else elaborate on that?' This signals that there is some problem with the answer and the students, as a collective, should achieve better. At the same time, it tells the individual student that he or she is not to be blamed for not having the perfect answer. Gibbs and Habeshaw (1992: 95), on the other hand, propose starting feedback with praise and balancing negative points with positive. This way, teacher can turn criticisms into suggestions for ways for improvement in the future.

In the liberal arts and sciences, the problem whether to correct student mistakes or not can be even more salient than in natural science disciplines. For many problems discussed in liberal eduction, a variety of opinion exists, which may be profoundly different but still acceptable if properly supported by arguments and evidence. This includes, for example, causes for some conflicts in international relations, interpretations of the writings of ancient philosophers or critique of artwork. Yet, some contributions are fundamentally wrong, for example, misconceptions of a concept, the wrong reproduction of ideas from a text and/or factual mistakes. It is then the teacher's responsibility to distinguish between these two cases and to make students aware of their misunderstanding.

What makes up a student's grade is another issue to consider while working to create an environment where students feel free to reveal what they think. If the same task is used formatively throughout the course and summatively at the end, this creates a conflicting situation for the students: they are being asked to display and to hide error simultaneously (Biggs and Tang 2007: 164). For example, when students do several presentations throughout the semester, it must be clear, which of these is a trial presentation for students to get feedback and which presentation is the graded one.

This is the same with class participation. Some teachers make grades for student in-class participation part of their overall grade. The reason is to encourage all students to regularly contribute to class activities and to reward them for their pre-class preparation. However, grading participation may at the same time hinder some students to freely expose their opinion, especially those less self-confident students.

To avoid such situations, teachers can use other tools such as calling on students by names to invite them into the class discussion or group work where all students have their roles and students rotate as they report on the outcomes of their activity. Alternatively, student preparation may be encouraged by a short quizz carried on at the beginning of seminar where students respond to questions that are relatively easy to answer if students have prepared for the class. Another option is making it clear right at the beginning of the course that students will get points for participation for being active in class, rather than for being right.

2. Purpose: Reference models for assessment; holistic and analytic assessment

Different perspectives on the purpose of assessment determine the approaches to it. Three main dilemmas can be distinguished here: 1) assessing students either for how they rank against each other or for how they have achieved the expected outcomes, 2) assessing student work for the quality of its parts or for its quality as a whole and 3) assessing what students know or how students can apply that knowledge.

Using the measurement or standards model?

In higher education, students are mostly assessed by comparing their results to each other or by assessing an individual's work independently of other students. These approaches are referred to as the measurement and the standards model. The measurement model requires that the learning outcomes of students are quantified so that individual students may be compared with each other. Teachers applying this model believe that results of a class of

students should follow the bell curve. However, grades follow the bell curve only if ability is normally distributed, and if ability is the sole determinant of academic results. Nevertheless, student ability is not likely to be normally distributed because students are not randomly selected. And apart from ability, other factors play a role in influencing students' learning outcomes, such as their approach to learning. Therefore, after good teaching, high scores should be more frequent than low scores (Biggs and Tang 2007: 171-172).
Using the standards model of assessment, results are reported in terms of how well an individual meets the criteria that have been set. The point is to identify what has been learned, and how well. Students are assessed independently of each other, which is done by setting the standards as intended learning outcomes of the teaching and by comparing student results against these criteria. This allows for the assessing of students even when they choose different types of tasks such as portfolio (Biggs and Tang 2007: 177-178).

Assessing analytically or holistically?

Another issue related to the purpose of assessment is whether teachers should assess work in an analytic or holistic way. In higher education, assignments are often graded analytically. This means that the essay or presentation is reduced to independent components, such as content, style, argument, referencing or format, each of which is rated. The grade then reflects the sum of these ratings. This method gives students feedback on how well they are doing on each important aspect of the assignment. However, as argued by Biggs and Tang (2007: 183-185), it comes with an important shortcoming: the value of the essay should be in how well it addresses the problem as a whole rather than a list of related points. This is similar to treating a patient, making a legal case or defending a dissertation; these activities only make sense when seen as a whole.

On the other hand, analytical assessment also has merits beyond providing feedback on individual aspects of an assignment: it can serve as a useful guideline for students while working on the assignment itself. Therefore, a combination of both assessment approaches is recommended: marking the components as well as formulating a judgment of the assignment as a whole.

Assessing declarative or functioning knowledge?

While assessing students it is of great importance to distinguish whether the teacher aims for learners acquire declarative knowledge (i.e. can reproduce facts and opinion) or functional knowledge (i.e. can apply knowledge to new situations or tasks derived from practice). Declarative knowledge is usually seen as a lower stage of functional knowledge and hence, students are frequently tested on their grasp of this knowledge, usually by student answering the teacher's questions under either invigilated or open conditions (Biggs and Tang 2007: 195). Nevertheless, knowledge may be acquired as functional even from the start of learning, as in project based learning. Also, when assessed, students should be given 'credit' for relevant knowledge and skills regardless of how or when they learned them. Their knowledge and skills acquired before and outside the current coursework, if they are relevant to the course in question, can and indeed should become part of their assessment (Szabó 2005: 31).
Another indication of functional knowledge is that students make use of their knowledge and skills in real-life situations, which is the ultimate aim of learning. In order to uncover that, students should be assessed choosing tasks testing this functional knowledge via, for example, critical incidents, team debates, individual and group projects, reflective journals, case studies, portfolios, and interviews (Biggs and Tang 2007: 243). To assess functional knowledge, teachers need not assign huge tasks to students. All questions that simulate practice, provide

students with real-life data and trial settings that students may experience in their future profession thus equally stand as examples of assessment tasks for functional knowledge.

3. Tasks and checklists: two examples of assessment tasks that support good learning

In what follows, two less frequently used assessment tasks are described that can be used to determine how students can put theoretical knowledge into practice.

Ordered-outcome item

In ordered-outcome, students are asked several related questions which range from relatively simple to the most complex. SOLO or Bloom's taxonomy (mentioned in the chapter on the use of theory) may be used as a guide to the levels of complexity. The first question then addresses low-level knowledge; follow-up questions require increasingly complex declarative relational knowledge and the last requires functional knowledge at a relational level (Biggs and Tang 2007: 204-205).

One example of such ordered-outcome item could be:

a) unistructural: *Identify* in the text above (President Woodrow Wilson's speech) expressions that document an idealist approach in international relations.
b) multi-structural: *Compare* the speech with the following address by Prime Minister Winston Churchill. What are the main differences?
c) relational: While *applying* idealist and realist IR theory to both talks explain the difference between them.
d) extended abstract: *Hypothesize* what the address by President Wilson would look like if it were given in 1946? Provide supporting evidence for your opinion.

Grading sheets

Although all assignments are unique, some teacher feedback becomes very repetitive: particular misunderstandings, omissions or mistakes occur over and over. Hence, the instructor may consider designing a grading sheet, which is one- or two-page rubric that lists the criteria for the work, contains qualitative descriptions that are matched with numerical scores, and, moreover, offers space for brief comments. Instructors can use grading sheets to assess in-class exams, take-home assignments, and longer term papers (Roever and Manna 2005) but also oral coursework, such as presentations.
Grading sheets may be used for analytic and holistic grading. Analytic assessment of an essay may include, for instance, criteria such as clarity of the overall argument, use of class readings or clarity of prose and grammar. On the sheet, each of these criteria is assigned a weight and corresponding point values. In addition, standards are defined in order for the student work to be given a certain number of points for each category. For example, for the criterion 'use of readings as evidence,' papers that score a 30 clearly draw on specific concepts from the readings to develop a persuasive argument, and demonstrate excellent conceptual understanding; those that score a 26 are headed in the right direction, but suffered from some problem, be it a conceptual error, a gap in explanation or a misunderstanding of the key concept. When assessing student work, the teacher writes '26', for example, and checks the 'conceptual error' phrase from the criteria. The instructor may then add a brief explanation: 'Divided government is about partisan divisions across institutions, not simply differences in opinion between elected officials; see Mayhew reading' (Roever and Manna 2005). Similarly, criteria and standards for holistic grading can be defined.
While preparing descriptions of assessment criteria, it is important that the teacher avoids value words. For example, rather than 'ade-

quate coverage of the literature,' the criteria should list the number and types of literature sources what he would regard as 'adequate.' This helps students faced with a new type of task to produce the expected work faster and moreover attain the desired standard of work. In addition, this encourages dialogue between the teacher and students not indicating disagreements with marks, but questioning what precisely has been required and valued (Cowan 2006: 85).

Unless the teacher has used the grading sheet previously and refined it over the course of several semesters, it is useful to test it on a few randomly selected student assignments. Then it should be given to students together with the task (Roever and Manna 2005). Again, it is advisable to discuss the rubric with students, rather than merely presenting it to them.

Grading sheets may be particularly useful when several teachers are involved in assessment. In order to achieve consistency in grading, field testing is helpful, i.e. having all instructors read the same set of student work and using the draft sheet to assign points. Another plus of grading sheets is that they make it easier for teachers to balance the positive with the negative comments. The instructor just writes over one criterion the annotation 'super' and circles around another with the word 'inadequate' (Roever and Manna 2005). Examples of analytic and holistic grading sheet are offered below.

Table 1: Example of a holistic grading sheet of a presentation (currently used in a course by the author).

A: outstanding presentation: logical structure, clearly formulated main idea backed up with arguments, excellent theoretical background, perfect application, in-depth analysis, realistic, well-summarised conclusion, proper references to literature, very-well delivered in terms of language and presentation skills (such as speaking loudly and clearly, maintaining eye contact, proper speed, quality of visual material, etc.)
B: very good presentation: structured, clearly formulated ideas backed up with arguments, some weaknesses in theory or in application, not entirely realistic, clear conclusion, proper references to literature, very-well delivered in terms of language and presentation skills
C: good presentation: structured but with some parts not fitting the structure, some ideas are less clearly formulated, presents arguments but they are not entirely clear, logical or in-depth, has some weaknesses in theory or in application, a number of parts or ideas are not realistic, conclusion does not sum-up main ideas from the presentation, references to literature have some failures, better than average quality of presentation format
D: average presentation: needs improvement in terms of structure, unclear in a number of parts, surface explanation of many points rather than in-depth discussion of a limited number of key points, has many weaknesses in theory or in application, not very realistic, misses clear conclusion, references to literature have some failures, average quality of presentation format
E: below average presentation: unclear or missing structure, missing theoretical explanation, unclear presentation of facts or opinion, surface explanations rather than in-depth discussion of a limited number of key points, largely unrealistic or idealised, references to literature have many failures or are entirely missing, poor quality of presentation format
F: below E or presentation not delivered

Table 2: Example of an analytic grading sheet for an essay (used in a course by the author).

Criterion	Points
Problem difficulty and appropriateness Can the problem be characterized as a problem related to the course topic? Is the main question of the paper clearly stated in the introduction? Is the main question analytical? Does the author explain why it is important to study the problem in the context of existing literature? Does the author explain clearly his or her opinion on (or solution to) the main question? Is the main problem difficult to analyse? (Is it a narrow problem that requires the study of specific scholarly literature, and poses challenges to student thinking?)	10
Focus Is the paper focused on the main question rather than_discussing several or many problems? Is the opinion of the author explained clearly, stressing the main arguments? Are the arguments logical and appropriate?	8
Problem analysis Does the author analyse the problem in its depth? Does the author support his/her claims with sound arguments? Are these arguments carefully explained, however without going into unnecessary details? Does the author compare two or more relevant opinion/information from different resources? Does the author oppose any opinion explaining clearly his/her reasons? Does the author draw mainly from scholarly resources including at least five scholarly articles or book chapters?	10
Theory application Does the author apply the IR/comparative politics theory? Is the theory application appropriate and correct?	10
Conclusion Does the author clearly sum-up the main problem and his or her arguments in the conclusion?	5
References Does the author refer to all sources from which he or she took up particular information or opinions? Does he or she refer to the literature in the specific part of the paper (mostly at the end of the paragraph or at the end of a particular sentence?) Is the format of references standard or the same in all cases? Note: Students can choose any standard system of referencing, but it shall be consistently applied in the entire text. Essays lacking proper referencing will not be graded!	4
Writing skills Is the paper written in a coherent style? Is it within the maximal and minimal word limit? Are there major spelling and grammar mistakes?	3
Total	50

4. Making assessment effective: seven principles

In order for assessment to stimulate a deep approach to learning and enable students to reveal the full range of their knowledge and skills, teachers can find several principles useful. They include the following:

- using a combination of assessment methods;
- explaining tasks and grading to students;
- designing assessment in a way that empowers learning;
- assessing formatively first;
- announcing assessment results early on;
- offering individualized feedback that goes beyond a narrow subject;
- aligning assessment to outcomes and activities.

Using a combination of assessment methods

Some assessment techniques are discriminatory against certain students. Time pressure and a stressful environment, for example, inhibit one student's performance but stimulate another's. And whereas some students prefer to express themselves in written form, some are naturally better in a discussion. What is more important, applying a single assessment method would give only a partial picture of a student's knowledge and abilities. Therefore, a combination of various assessment methods is always recommended (Szabó 2005: 31).
Alternatively, students can be allowed to choose an assignment from a set of similarly complex tasks. Nevertheless, this does not mean that students should be tested always using the format in which they are more skilled. Instead, students should be encouraged or required to develop different skills to demonstrate what they have learnt (Biggs and Tang 2007: 219).

Explaining tasks and grading to students

Without adequate explanation or training students are bound to fail to understand what to do and will remain demotivated and uncertain of their skills or progress. Therefore, each task given to students should be explained into detail (Renc-Roe 2006: 40). The relative importance of each task should be made clear, too (Ramsden 1991: 188).
Essential points such as the elements of the work that are being assessed, how much of the grade comes from each element, and what the teacher is looking for in a good piece of work, must be given in writing. It is possible to discuss these standards with the students as well, but anything the instructor tells the students in class is likely to be forgotten or remembered inaccurately by a large minority, and missed by those who are not present. Unclear ground rules encourage disagreement later (Henderson 2007: 138).

Designing assessment in a way that empowers learning

Because the ultimate aim of assessment is to stimulate quality learning, well-designed assessment should accurately test and encourage understanding, application, concepts and skills – and not memory alone. Teachers should use assessment to learn about students' levels of performance and difficulties (Ramsden 1994). Students, on the other hand, need to perceive the tasks as relevant and important and to see themselves as likely to succeed at it. The tasks have to build on previous relevant knowledge, require the learners to be relevantly active, and allow them to be reflective as learning progresses (Biggs and Tang 2007: 99-100).
Information about progress has to be regularly and freely given and students need to be involved in dialogue about their achievements so that assessment helps them to find out where they need improvement. Assessment that impacts student learning is designed to help stu-

dents develop self-evaluation skills and responsibility for their own learning. Assessment information should be well used to evaluate the effectiveness of teaching, and to change teaching strategies in order to improve student learning (Ramsden 1994).

Assessing formatively first

While preparing for their exams, students typically feel under stress, particularly when they lack feedback and guidance. To relieve this pressure, students need enough opportunity to trial how they would perform in assessed tasks. Teacher should, for example, organize mock exams, trial presentations or similar assignments during the year and discuss student outcomes in class (Habeshaw, Gibbs and Habeshaw 1992: 155).

Because some students tend to neglect preparation and attention to assignments which are not graded (Jubb and Lightfoot 2005), teacher can consider making the results of mock assignments comprise a very small part on the student mark. In that case, students who markedly outperform when doing the mock assignment should be allowed to repeat the work.

Announcing assessment results early on

It frequently happens that by the time the students read the teacher's comments on an assignment, several weeks have passed. The piece of specific learning in the assignment is by then in the past as students are already immersed in other activities (Cowan 2006: 73). For that reason, teachers should come up with coursework which is not overly demanding on their time considering the number of assignments to be assessed. Students need to learn the results of and feedback on their assessed tasks, ideally within two weeks of submitting them for assessment.

A different practice related to the timing of assessment results is telling students their grades personally. In some countries, teachers sometimes face the challenge of announcing grades to students in a face-to-face meeting. Even if such a meeting brings the opportunity to discuss the strengths and weaknesses of student performance, a student who has just been shocked and disappointed by an unexpectedly low grade is not in the frame of mind to think critically and objectively about their work. The practice of telling students their grades personally is thus stressful both for the teacher and student and, in some cultures, would also present the perfect environment for corruption. More useful information is likely to be exchanged if students receive their grades first and see the teacher for a discussion later, after they have had time to think (Henderson 2007: 137-138).

However, sometimes an individual teacher cannot change an established practice of announcing marks at their institution. To prevent a heated argument over a mark, it is again advisable to make the assessment criteria as clear as possible at the outset. Teachers should, moreover, keep in mind that they should not change an individual student's mark because student requests it, even if they are not completely confident that the grade is correct. That individual marks cannot be changed is a good argument to be communicated to students. If the instructor decides that one student's grade should be changed, all the other grades on the course need to be reassessed, too. This is feasible but only if all the grades on the course were low (Henderson 2007: 138).

Offering individualized feedback that goes beyond a narrow subject

What students often value most in assessment is when the teacher offers comments that particularly address their work and explain why the teacher finds certain aspects of the assignment successful (Cowan 2006: 73). This does not mean that the teacher should not comment on mistakes. However, when starting with praise for good points, the teacher can encour-

age students to build up their future work on already developed knowledge and skills. In addition, hearing first about the positive aspects of one's own work usually makes people more receptive to critique.

Gibbs and Habeshaw (1992: 116) recommend a few more ways to help students better understand an instructor's comments and apply them in further assignments. These include asking questions that require reflection, formulating a brief summary of judgement on the assignment, and providing a couple of general suggestions for future work as well as follow up work and a list of references to consult, and possibly even offering help with any specific problems. Students should also be given the opportunity to discuss the assignment and the teacher's remarks. All in all, assessment should give students a guide as to what a quality outcome is (Prosser and Trigwell 1999: 135).

If teachers provide feedback to student work in this way, they can contribute towards students understanding their strengths and weaknesses, both in absolute and relative terms, i.e. in comparison with their peers. Well-formulated individualized feedback can, moreover, boost students' enthusiasm for future study of the topic. This way teachers can help students to choose their future career path.

Aligning assessment to outcomes and activities

Whatever assessment strategy is used, students will be powerfully influenced by the assessment system they are working within. The design of assignments and, especially, the criteria used in allocating marks, have a dramatic effect on student learning (Gibbs 1992: 17, Brown 2004). Learning aims may be formulated in whatever fine way, but if students are not engaged in an appropriate number and variety of learning activities to attain these outcomes, students can then hardly make any notable progress. Even more importantly, if students expect to be assessed on how well they remember the facts from the curriculum, they will rarely spend time trying to apply subject concepts or reflect on their learning. The assessment determines what and how students learn more than the curriculum does. As Biggs and Tang (2007: 169) underline: "Students learn what they *think* they will be tested on."

Therefore, while designing and conducting assessment, teachers should remember the principle of constructive alignment, i.e. to design learning so that all outcomes are reflected in the course activities and assignments (Biggs and Tang 2007; for more see the chapter 5 in this kit). Although it may well be important to find out whether a student can remember some essential facts, it is generally preferable to assess these matters as part of the measurement of broader, more integrative concepts and skills. This is mainly because the separate assessment of basic skills and knowledge, unless it is made clear that it comprises a relatively unimportant part of the assessment, makes students focus on these activities rather than on more complex ones that are related, for example, to understanding (Ramsden 1991: 189).

Another risk connected to assessment is that too much assessed work leads to superficial approaches. Clear indication of priorities in what has to be learned, and why it has to be learned, stimulates a deep approach to learning. This also speaks for careful choice of assessment tasks (Ramsden 1991: 188). When choosing the tasks effectively, teachers usually design one assessment to address several outcomes as one assessment task per learning outcome can easily lead to an overload of assessment for the students. Also, one desired outcome may be addressed by more than one assessment task. For example, an analytic paper and a presentation may both document the outcome of 'analyse,' which helps to see each task as a source of evidence of a student's achievement. Finally, the time dedicated by students to work on their assignments and by teachers to assess those assignments should reflect the relative importance of the intended outcomes (Biggs and Tang 2007).

5. Checklist

- ☐ Am I using the measurement or the standards model of assessment?
- ☐ Am I assessing students analytically, holistically or by combining both approaches?
- ☐ Do assessment tasks in my course aim at assessing declarative or functioning knowledge?
- ☐ Are students assessed using a several assessment methods? Can students choose from a variety of assessment methods?
- ☐ Have I explained all assessed tasks and the grading system in detail? Do students appear to understand the expectations and criteria?
- ☐ Have students had an opportunity to contribute to designing the assessment methods for their course?
- ☐ Am I assessing students formatively first?
- ☐ Am I also offering individualized feedback?
- ☐ When will students learn the results of their assessment?
- ☐ Is all assessment aligned to course outcomes and activities?

6. Useful resources

Boud, David, Falchikov, Nancy, eds. (2007): *Rethinking Assessment in Higher Education: Learning for the Longer Term.* Abingdon: Routledge.

Below are listed some authors who have written powerful works on assessment in higher education:
Sally Brown
Chris Rust
Phil Race

Teaching portal (Political Science): http://teaching.eurea.sk/activities/publications

7. Conferences in the field

Higher Education learning outcomes assessment related conferences and events
www.assessmentconferences.com

International Assessment in Higher Education Conference
https://aheconference.com

8. References

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Szabó, Mátyás (1995). Student-Centered Course Design. An Experienced Teacher's View. In Gregušová, G. ed. (2005): *How to Teach Political Science. The Experience of First-time University Teachers Volume 2.* EpsNet Teaching Political Science Series No. 2, Budapest: epsNet, 25-33: http://teaching.eurea.sk/files/volume2.pdf