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TEACHING UNDERGRADUATES: KEY ISSUES TO CONSIDER

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TABLE OF CONTENTS

1. INTRODUCTION
by Jelena Belic

Undergraduate students who are about to start higher education are typically just out of secondary school, a learning environment that is significantly different from universities and colleges from a theoretical, didactical, and practical point of view. This implies that those starting undergraduate studies have secondary education as the main and often, the only foundation of their knowledge and learning strategies. Moreover, the upcoming student cohorts belong to what demographers call "Generation Z" whose needs, habits and thinking are very much different from those who belong to the previous generation of Millennials. Notwithstanding that generations themselves are inherently diverse and complex groups, research has shown considerable changes – both positive and negative – for those who are members of Generation Z. Whilst the political, social and economic context inevitably influence behavior, attitudes and lifestyle, the "always on" technological environment has caused dramatic shifts (Pew Research Center, 2019).

Taking into these perspectives, this document aims to provide guidance on key pedagogical issues and thus highlights salient teaching strategies that are grounded in research in learning sciences, particularly, in the field of teaching and learning in higher education. We start by general considerations concerning what makes teaching undergraduates different from graduate education and reflect on the issue of how to teach them how to learn. We then move to discuss core ideas about how to motivate them for learning. The most important learning goals that undergraduate studies could aim for are described next, which is then followed by a discussion of active learning strategies that are relevant when attaining these learning goals. We also reflect on the main purposes of assessment and describe how assessment may promote active student learning. The final section includes perspectives on mentoring undergraduates to promote their research skills.

Challenges of teaching undergraduates

When designing courses, the starting point in our thinking should be a thorough understanding of needs and learning habits of those that we are designing courses for. While each cohort of students has distinctive socio-demographic and precollege characteristics that need to be accounted for, there are some general features and experiences that are common to all undergraduates. Here we would like to briefly point to the undergraduates' experience of transitioning from secondary education, their learning strategies, and their propensity toward using digital technologies.

Transitioning from secondary school to college or university includes "tremendous intellectual, social, emotional and cultural adaptation and development" (Carnegie Mellon, 2002, p.1). This means that undergraduate students' intellectual development is intertwined with other aspects of their personal development. Some point to their psychological characteristics, such as being overwhelmed with the new environment, lacking self-discipline, and going back to Generation Z, preferring online over face-to-face communication. All of this is complicated by the fact that as the number of enrolled students keeps growing, there is a greater cultural diversity among them as well as diverse learning styles and needs (Stephen, 2009).

When it comes to their learning strategies, unde grads may share a set of assumptions about learning which are based on their secondary school experience. For instance, many think of learning as memorizing facts that are transferred from teachers to students (Carnegie Mellon, 2002). Their prior knowledge is often not substantive and is poorly organized. As Newman (2004) found, many novices are strategic learners who tailor their learning to meet the requirements of the assessment and get top grades (Stephen, 2009). They also suffer from the lack of self-discipline which often results in them disappearing from classes. For instance, according to the American Academy of Arts & Sciences, one of the greatest challenges the undergraduate institutions face are the students' completion rates – students either disappear from particular courses or quit the programs altogether (Commission on the Future of Undergraduate Education, 2017).

Undergraduates' assumptions and learning habits can nevertheless change. While we will talk about this in more detail in later sections, here we would like to make a general point. Research shows that undergraduates go through several stages of intellectual development during their studies (Donald, 2002). They start from a dualistic view according to which knowledge is about information which can be right or wrong, and they typically expect teachers to tell them the difference. In the next stage, undergraduates move to relativistic and multiplistic view where they take knowledge as uncertain and "opinionated". In the final stage, they can commit to those ideas that they find the most convincing based on evidence. It is also claimed that most undergraduate students reach the final stage only at the end of their studies (Perry, 1970, in Donald 2002).

Students currently entering undergraduate education are used to intensively utilizing digital technology and communicating on social media. According to the [Educause Center for Analysis and Research (ECAR)](#), undergrads are the "most important end-users" of information technology in higher education since they use their devices for educational purposes more than the previous generations

(2019, p.6; also Artino & Stephens, 2009).

Teaching undergrads how to learn

According to Ambrose et al. (2010), learning is "a process that leads to change [in knowledge, beliefs, behavior and attitudes], which occurs as a result of experience and increases the potential for improved performance and future learning" (p.3). Importantly, students' minds are not "blank slates", but students come to colleges with their pre-existing knowledge and experience, and new understanding and knowledge should fit, extend or supplement these pre-existing notions (Mezirow, 1991, in Fry et al., 2009). Learning is not something done to students, but something that students do themselves- learning results from how they interpret and respond to their experiences. The role of teachers is to facilitate this process by creating a good learning environment as well as assignments that help their students learn. Whether or not changes in their knowledge and beliefs will occur, depend to a great extent on what students do to learn.

One of the biggest challenges of novices is to manage their own learning at the beginning of their undergraduate studies. They tend to be poor judges of their own knowledge and skills; they are unable to self-assess and consequently, they are often unable to plan how to complete their assignments (Ambrose et al., 2010). Moreover, they tend to interpret problem descriptions at surface-level and they have difficulty in distinguishing what is important from what is not important (Dominowski, 2001). Hence, to make sure that they have a good learning experience in undergraduate courses, the first thing instructors need to pay attention to is to help students develop their metacognitive skills, that is, to teach them how to learn. Students thus need to learn how to monitor and control their learning processes, and constantly reflect on whether their learning strategies are working (Ambrose et al., 2010; Artino & Stephens, 2009). In other words, novices should become what Ambrose et al. helpfully define as "self-directed learners". As we will see later, this competence is of the utmost importance in online learning environments where students are expected to bear even greater responsibility for their own learning (Artino & Stephens, 2009).

There are two general ways in which instructors can improve their students' "learning to learn" skills:

- By modelling their approaches to and practices of learning the subject matter and showing how they would do an assignment or what steps they would take to work out a problem;

- By carefully structuring (also eventually staging) their support for students through providing comprehensive and intensive guidelines early on and gradually

decreasing it over time. (See also Section on Mentoring undergraduate research.)

Ambrose et al. (2010) defined the cycle of self-directed learning as encompassing the following stages: students must learn to assess the demands of the assignment, evaluate their own strengths and weaknesses, plan how to complete the assignment, apply their strategies and monitor their progress, and adjust their strategies if needed (p. 193).

Instructors can be involved in each of the stages as follows:

• Assessing the task at hand: give explicit instructions for an assignment and explain why completing it is important; check whether students understood the instructions (e.g. ask them to share their plan for completing the assignment). Evaluating one's own strengths and weaknesses: give early, ungraded feedback; provide opportunities for students to self-assess their assignments by sharing with them the evaluative criteria as well as samples of previous assignments.

• Planning how to complete the assignment: give students a model of effective planning that includes milestones and deadlines; have students create their own plan; make the planning of the completion of the assignment a central goal of the assignment (i.e. evaluate the process, not the product).

• Applying strategies and monitoring performance: have students do self-assessment based on the evaluative criteria; ask students to reflect on their work and explain what they did and why; use peer review.

• Adjusting one's approach: design activities that require students to reflect on their performance (e.g. responding to what they learned from doing the project); create assignments that focus on strategizing rather than implementation (ask them to think through the way they would approach the problem, rather than how they would solve the problem).

If interested in how students learn through organizing their knowledge, Susan Ambrose, who conducted a webinar for CEU faculty in March 2020 talks about strategies and concrete practices in this short video.

2. STUDENT MOTIVATION AND ENGAGEMENT
by Margaryta Rymarenko

Students' motivation generates, directs, and sustains what they do to learn (Ambrose et al. 2010, p. 69). It can be influenced by a variety of factors, such as prior interest in the subject matter, prospect of gaining useful skills, expectations of progress (low or high), ability to stand up for a challenging task, the hunt for grades, the need to prove oneself in front of the instructor and peers, and many more (Ambrose et al., 2010; Lang, 2016; Svinicki & McKeachie, 2011). Students are usually driven by a combination of these factors. Knowing about them and tailoring classroom experiences to what draws students' focus and attention, enables instructors to engage their students in a meaningful learning experience.

Research on motivation of undergraduate students suggests the following "drivers" of motivation and strategies for supporting their engagement (cf. Ambrose et al. 2010, Lang 2016, Svinicki & McKeachie 2011; Darby & Lang 2019):

A sense of relevance – students are more motivated to learn if they understand how the new content and experiences fit their prior knowledge and is related to their background and interests.

- Get to know your students. You will be able to better tailor your instruction to the students' concerns and backgrounds, and your personal interest in them will inspire their personal loyalty to you.

- Keep some parts of your syllabus flexible to incorporate topics and issues that speak directly to students' interests and needs and include examples and/or case studies that speak to learners' background.

- Make the course personally relevant for students by allowing to choose among suggested topics for assignments and providing opportunities to contribute their background knowledge in course discussions. You might also encourage them to reflect on how the ideas discussed in the course challenge or change what they have known before.

- Sharing your own enthusiasm and research interests always makes a difference.

A sense of purpose and value – learners are more motivated to engage when they understand clearly the purpose and the value of what they are learning.

- Consider how the skills you teach help students to succeed in your course, chosen field of study, future career. For example, students can complain about

being graded for the quality of their writing and fail to recognize the importance of written communication skill in a wide range of professions.

• Consider the immediate value for students' current academic life, for instance, how will your course help them perform better in other courses, feel more confident and competent as learners, acquire skills they will need for completing their degree requirements, etc.

• Be explicit about the purpose of any learning activity in view of the above. Put the relevant language in your syllabus pointing to the rationale of why you incorporated certain topics in you course or selected particular assignments (e.g. "The next topic is something that we'll use again and again. It contains ideas that we'll use throughout the later sections of the course.")

• Provide authentic real-world tasks. Assign problems and tasks that allow students concretely and vividly see the relevance of otherwise abstract concepts and theories as well as expose them to the context and constraints of their future profession, such as case studies, scenarios, simulations, role plays.

• Provide opportunities to develop personal as well as professional skills. Beyond acquiring content knowledge and disciplinary skills, consider how your course can contribute to a broader set of personal skills and competences (so called "soft skills") that your students will need to develop. Further, undergraduate students are not only learning disciplinary skills, but also developing as individuals in managing emotions, communicating with different others, building inter-personal relationships, and developing autonomy and independence. Include in your course goals competences such as group work, intercultural communication, ability to respond to criticism, and activities to develop soft skills that contribute to students' personal development as young adults.

A sense of achievement – learners are more motivated to pursue goals and outcomes they believe they can successfully achieve.

• Pre-assess you students' prior knowledge and experience to set challenging yet attainable goals. You can think of having a not-for-grade or anonymous assessment activity in the beginning of the course to evaluate students' level of skills or ask them to fill-in a self-assessment quiz. Check here for more examples.

• Create assignments tailored at the appropriate level of challenge

that require students to invest efforts but that are still achievable. Early assessment can help determine these standards. It is also important that you provide students with a support structure on how to succeed on each assignment (e.g. detailed instructions with provisional deadlines, worksheets, classroom activities that train skills necessary to work on the assignment, timely feedback on how to improve, etc.).

• Create opportunities for early success. Having positive experience in the beginning boosts motivation to seek further progress. Undergraduate students will be even more sensitive to successes and failures, so starting with a positive experience will set them on a positive expectation of success. You can think of early-on that count for a smaller percent of the grade but help students to build-up a sense of competence and confidence they can succeed in your course. If big challenges come too early on, these might backfire.

• Educate students about how to approach success and failure. Many undergraduate students see intelligence as fixed, which can impact their beliefs about learning and dealing with failure. Rather than focusing on success and failure as positive and negative outcomes, help them see the value in constant improvement. This can be done by setting objective progress benchmarks (e.g. via rubric, or detailed course expectations in the syllabus) as well as by giving targeted formative feedback.

• Be free with praise and constructive in criticism. Being in a new university environment may contribute to personal insecurities and lack of confidence in students, especially coming from different educational systems. Being sensitive in how you provide feedback is essential to maintaining motivation for learning. Negative comments should pertain to particular performances, not the performer. Offer non-judgmental feedback on students' work, stress opportunities to improve, look for ways to stimulate advancement.

• Place appropriate emphasis on assessment and grading. Assessment tasks should be a means of showing what students have mastered, not what they have not. Avoid grading on the curve and give everyone the opportunity to achieve the highest standard and grades.

If interested in motivation and prior knowledge, Susan Ambrose, who conducted a webinar for CEU faculty in March 2020 talks about strategies and concrete practices in this short video.

Engaging students in an online course requires considering additional factors that directly impact motivation – student autonomy and interaction with other learners (Ko & Rossen, 2010; Darby & Lang, 2019).Online learning requires a high level of independence on the side of the students and the need to assume greater responsibility for learning progress in order to succeed. When students have a sense of control over their learning process, they find it more meaningful to engage in online activities. Likewise, it is important that they not only deliver contributions to an online course but also receive reaction to them from their peers and the instructor via various communication channels. To increase students' autonomy and to foster interactions in the learning community consider the following strategies:

- Provide opportunities for students to engage socially. Consider "icebreakers" and other "joint intellectual warm-up" strategies to counteract some of the social detachment felt in an online environment. When these strategies are used throughout a course (and not only at the beginning), the possibility to create social connectedness among students increases (Slagter van Tryona & Bishop, 2009).

- Build intentional learning communities. Set clear standards and structure for students to engage with one another through discussion boards, peer evaluation, and group work, including, for instance, the number of original and response contributions, their length, and deadlines (Palloff & Pratt, 2007).

- Let students' sign up for learning groups to function throughout the course based on a topic they want to delve into (you may have a list of suggested topics coordinated by a Graduate Teaching Assistant). Assign activities and tasks to be performed in collaboration with the group (click here for examples of online group activities). Provide support structures that help the learner's group to develop into an effective team (check for helpful guides here).

- Make students content co-creators in your course. Make use of the shared annotation tools to jointly engage students into analyzing course materials (syllabus, readings, case studies, lecture notes, etc.). Joint annotation can be turned into an engaging online discussion in-itself. Alternatively, you might want to encourage students to contribute their own content and resources to the course and comment on the resources shared by other students, using external shared bookmarking tools (e.g. Diigo) or CEU Moodle resources (Wiki, Blogs). Here is an example (video) of a course

design that engages students as co-creators.

• Use asynchronous online discussions to create different threads based on students' topics of interest. You might want to allow students to take turns and assume responsibility for leading and facilitating online discussion based on their topic of interest.

• Your engagement as an online instructor matters a lot. If you log-in to the course regularly, set the tone in the online discussions, comment on students' contributions, post audio or video instructions and/or feedback, it will model the engagement behaviors you require from your students. You may share these activities with your Graduate Teaching Assistant.

3. LEARNING GOALS AND SKILLS AT UNDERGRADUATE LEVEL

by Gorana Misic

As you begin to design your courses, by taking into consideration your students' prior knowledge, motivations and, as much as it is possible, their educational background, you will be thinking about what type of work you want them to do to demonstrate they are learning in your course. In other words, you will think about what students will have to know, what skills they should acquire, and what types of activities they should be able to do. Taxonomies of learning thus help to define and describe the type of work you want your students to engage in. Bloom's Taxonomy is a classification of different goals and skills that instructors may set for their students. Originally proposed by the educational psychologist Benjamin Bloom in 1956 and later re-evaluated and updated (cf. Anderson et al., 2001; Krathwohl, 2002), this taxonomy includes the following six levels of learning:

- **Remembering** (i.e. students are able to retrieve, recognize, recall, list, recite, outline, define, name, match, quote, identify, label);

- **Understanding** (i.e. students are able to classify, summarize, compare, explain, describe, paraphrase, restate, give original examples of, contrast, interpret, discuss);

- **Applying** (i.e. students are able to implement, calculate, predict, apply, solve, illustrate, use, demonstrate, determine, model, perform, present);

- **Analyzing** (i.e. students are able to differentiate, organize, attribute, classify, break down, categorize, analyze, diagram, illustrate, criticize, simplify, associate);

- **Evaluating** (i.e. students are able to: critique, choose, support, relate, determine, defend, judge, grade, compare, contrast, argue, justify, support, convince, select, evaluate);

- **Creating** (i.e. students are able to design, produce, formulate, build, invent, create, compose, generate, derive, modify, develop).

This taxonomy is a useful tool to help instructors to develop learning goals because it explains the process of learning, e.g. before you can understand a concept, you must remember it; to be able to apply a concept, you must first understand it, etc. Having a clear set of learning goals helps instructors to plan, design and deliver appropriate instruction, learning activities and assessment tasks, as well as to ensure that the learning activities and assessment are aligned with the learning goals.

A statement of a learning goal contains a verb (an action) and an object (usually a noun). Whereas the verb generally refers to actions related to the intended cognitive process, the object generally describes the knowledge students are expected to acquire. To put this in the context of undergraduate studies, in a Bachelor of Arts course, for instance, it is expected that the students should develop the following core knowledge, skills and competences:

- **Core knowledge**: discipline-specific inquiry skills; students will be able to apply disciplinary concepts and theories appropriately.

- **Intellectual and practical skills:** students will be skilled in critical thinking, and in generating creative solutions to problems. They will be able to:

  » use qualitative and quantitative reasoning to develop a clear understanding of the problem being studied;
  » apply ethical reasoning in developing solutions;
  » collect and analyze evidence, and make informed evaluations;
  » acquire, analyze, and evaluate information from multiple sources.

- **Communication skills**: students will be able to prepare, effectively communicate and deliver oral and written presentations using appropriate language and technologies, tailored to the audience.

- **Collaboration skills:** students will be able to work actively and effectively as part of a team to answer questions and solve problems, grapple effectively with differences and diversity, and resolve conflict that occurs in collaborative efforts.

- **Civic engagement:** students will be able to identify and address issues of public concern, have knowledge and skills to be activecitizens. They will be able to develop personal and social responsibility.

4. ACTIVE LEARNING STRATEGIES
by Gorana Misic

Learning is not a spectator sport. Students do not learn much just sitting in classes listening to teachers, memorizing pre-packaged assignments, and spitting out answers. They must talk about what they are learning, write reflectively about it, relate to past experiences, and apply it to their daily lives. They must make what they learn part of themselves.
(Chickering &Ehrmann, 1996)

Students learn differently. They learn by seeing and hearing, reflecting and acting, reasoning logically and intuitively, analyzing and visualizing individually and together with others. Hence, teaching strategies should combine verbal (e.g. engaging in a discussion) and visual explanations (e.g. handout or diagram), and give students opportunities for active learning and reflection (e.g. case analysis, research project). Active learning is an umbrella term that encompasses teaching strategies that aim to increase student engagement and ownership of learning, and to develop higher order thinking skills, attitudes, and values. The aim is thus to advance students' knowledge and skills, rather than to transmit information. Active learning strategies require students to do something that requires higher-order thinking, such as to write, discuss, analyze, evaluate, etc. (cf. Bonwell & Eison, 1991; Roberts, 2016). Research shows that through active learning approaches students learn more effectively than through traditional lectures and transmission approaches across disciplines. As found, students remember more content if the lecture includes brief activities and questions that require analysis and integration. It is also claimed that problem-based learning is likely to positively influence students' study habits, enhance their critical thinking and problem-solving skills, and that the collaborative and cooperative learning environment enhances academic achievement, retention, and interpersonal skills (Ambrose et al., 2010; Brame, 2016; Michael, 2006; Prince, 2004).

Below is a list of some of the most common active learning strategies [1] that aim to develop skills of analysis, problem-solving, and critical thinking; and transfer of theory to application; to enhance collaborative skills and academic oral skills.

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1   See also See also UC Berkeley Active Learning Strategies, Center for Educational Innovation - Active Learning.

ACTIVE LEARNING STRATEGIES	
Group activities	• Case-based learning, simulations, scenario analysis • Debates • Socratic questioning • Group teaching or peer teaching • Guided analysis of problem sets • Guided close reading • Buzz groups • Jigsaw
Partner activities	• Think-pair-share • Turn and talk • Role playing
Individual activities	• Application cards • One-minute paper • Freewriting • Muddiest point • One-sentence summaries • Direct paraphrasing • A problem-oriented presentation
Visual organizing activities	• Guided visual analysis or visual modelling • Brainstorming and concept maps • Defining features matrix • Pro and con grid • Strip sequence.

Find below a selected set of these active learning strategies is described in more detail:

Application cards

After students have read or heard about an important principle, generalization, theory, or procedure, the instructor hands out an index card and asks students to write down at least one possible, real-world application for what they have just learned (cf. Valentine & Freeman, 2000).

Brainstorming, mind maps, freewriting

Students are asked to generate ideas on a certain topic which encourages them

to draw upon their prior knowledge, understanding, and experiences. To facilitate brainstorming, the instructors can ask for associations related to a certain idea or concept (e.g. what comes to your mind when we say "freedom"?), use a visual, or give a prompt (e.g. present a problem or a puzzle and ask students to contribute identifying the causes, consequences, or solutions). In freewriting exercises, students develop their thinking on an instructor-supplied prompt, for example: "What is society?"

Case studies, scenarios

Case studies help students apply knowledge to the real-world situations. The aim is to use one's theoretical knowledge, apply it to the "real" life situation and develop problem-solving skills. A good case study tells a story, raises a thought-provoking or controversial issue, requires a dilemma to be solved, has elements of conflict, lacks an obvious or clear-cut right answer, encourages students to think and take a position, demands a decision (cf. Kreber, 2001). Instructors should give a task or guidance on how to work with the case (e.g. identify a problem, analyze the solution, propose a recommendation or a course of action, etc.)

Close reading

Close reading requires careful gathering of data (observations) and careful thinking about what the data means or explains. Students are asked to read, reread, and annotate a text. While reading, they focus on the structure, what the author has to say, what the words mean, whether there are any patterns, cultural references, rhetorical features, etc. This is followed by interpretation of observations such as what the structure of the text tells us, or what the author's purpose is. This exercise can help students in learning how to read critically, as well as how to justify their claims with specific evidence.

Concept maps

Concept maps can help students visualize connections and relationships between the concepts and ideas. Such visualizations also help students to organize and structure their thoughts, and build better understanding of events, concepts, procedures, or processes. Concept maps can be used to visualize knowledge, analyze complex problems, identify solutions, explain how complex concepts are related, etc. (cf. Daley, Durning, & Torre, 2016; Novak & Canas, 2008).

Debates

Debates help students develop critical thinking and argumentative/logical reasoning skills, and foster teamwork and communication skills. Students need to develop arguments, present competing viewpoints and defend them. Debate can

be an effective strategy for challenging students' initial assumptions on an issue, especially if they are assigned to argue for a position different from their original views (cf. Bellon, 2000; Budesheim& Lundquist, 1999; Jagger, 2013; Vo & Morris, 2006). To have a fruitful debate, instructors should choose an open question or a complex issue with (at least) two sides that can be supported with evidence. Instructors should also end the debate with a debriefing – to assess and discuss the arguments made by both teams.

Discussions

Students are more likely to remember something they have analyzed, summarized, explained or questioned. They pay more attention and think actively when they discuss the new material. To facilitate an engaging discussion oriented towards student learning, instructors should reflect on their own practices to become aware of and aim to avoid some of the most common non-facilitative teaching behaviors (cf. Nappel, 1994):

- Insufficient wait time (i.e. students need time for information processing, so instructors should not answer their own questions but rather wait out, rephrase questions, add further information on the question, etc.);

- Rapid reward (e.g. rapid acceptance of the right answer by saying "good" or "right");

- Programmed answer (i.e. questions that do not invite students to share different or their own views and understandings, such as: Is this what the author meant? or What happens when we add these observations- do we get skewed results?);

- Non-specific feedback questions (e.g. Does anyone want to say something about this? or Who doesn't understand this?);

- Teacher's ego-stroking and classroom climate (i.e. when it seems that there is just one or a very particular answer to the question or a prompt: From what you have heard, what is the most important characteristic of a concept X?);

- Fixation at the low-level questioning (i.e. questions that require recalling memorized information, a one-word or short phrase answers such as: What is the definition of X concept? When was X introduced?).

To maintain the momentum of the discussion and keep it focused and going, several types of questions are useful (see more in Brookfield & Preskil, 2005; Svinicki & McKeachie, 2011):

- Questions that ask for more evidence (e.g. How do you know that? What evidence is that based on?)

- Questions that ask for clarification (e.g. Can you give an example of that? Can you explain what you mean by that?)

- Open questions (e.g. give a prompt and ask Can you give an example of this? Why do you think this is happening? In your understanding, why do you think this is the case?)

- Linking or extension questions (e.g. How does your comment support/challenge what we heard earlier? How does this add to what has been said so far?)

- Hypothetical questions (e.g. What might have happened if...? If this was not the case, what could have...?

- Cause- and effect questions (e.g. What is likely to be the effect of...? How would X affect the Y today?)

- Summary and synthesis questions (e.g. What are the two most important things from our discussion so far? What remains unresolved? What is the key concept that best captures our discussion today?)

Group and Collaborative work

Research shows that cooperation leads to higher achievement and greater productivity, more supportive and committed relationships, greater psychological health, and social competence and self-esteem (Johnson & Johnson, 2009). Through group activities and peer learning, students are actively involved in the learning process and exposed to diverse perspectives, which contributes to the development of critical thinking skills (for more on benefits of collaborative learning see Laal & Ghodsi, 2012). Below are a few ideas on how to engage students in a group work. For more ideas check Brookfield and Preskil (2016).

Buzz groups

Students are divided in small groups to discuss and collaboratively respond to a task, a question or a set of questions provided by the instructor.

Jigsaw (peer learning/teaching)

In this approach, groups of students work together to become "experts" on one topic or part of new material. Each expert group specializes in their topic, after which the class rearranges, to form new groups that have one member from each expert team. Students then take turns teaching each other the material on which they are experts. Here, it is important to have clear instructions for the group

work, as well as to monitor the progress and interaction.

Think-Pair-Share

Students think about a question individually, then discuss and compare their answers with the person next to them. Following this, the answers are shared in a panel discussion or two pairs of students can pair up to compare and discuss answers. This process gives an opportunity to students to first think individually, and then analyze and clarify their response collaboratively. It helps students organize prior knowledge and encourages students to articulate and examine newly acquired information.

Turn and talk

This is a quicker version of think-pair-share. The instructor poses a higher-order thinking question and ask students to talk about it with a neighbor for 1-2 minutes before asking pairs to share out their thinking to the whole group.

Interactive lectures

Undergraduates can typically absorb two or three new ideas per session. Ten to twenty minutes into the lecture students lose focus. In a 50-minute lecture, students are attentive for some 40% of the time. In the first ten minutes of a lecture retention of the material is around 70%, and in the last it drops to around 20%. (cf. Bonwell & Eison, 1991; Filene, 2009; Lang, 2008). Interactive lectures help students to absorb information and increase retention through articulation of views. Interaction helps open students' receptivity and keeps them engaged (cf. Exley & Dennick, 2009). To increase student learning and attention, instructors should design their lectures in shorter logical blocks: around the most important questions, or around two main ideas or issues with an activity in between. Instructors can make quick interventions in their lectures to make them more interactive, such as asking a question that can be answered individually or first discussed in groups/pairs, using technology to collect answers and reactions (e.g. online polls, clickers or similar), introducing different types of materials (visual, audio, video) or short vignettes and examples to discuss, introducing the pause procedure or retrieval practice.

> **The pause procedure:**
>
> Pause for a few minutes every 15-20 minutes and encourage students to discuss and rework notes, individually or in pairs, then encourage them to ask questions. This gives them an opportunity to consider their understanding of the lecture, share their understandings and get clarifications from the peers and instructor.

Retrieval practice:

Pause for a few minutes every 15-20 minutes and ask students to write everything they can remember from the lecture so far. This practice helps students to retrieve information from memory, which improves long term memory, ability to learn what follows, and application of the learned material.

One-minute papers

In one-minute papers, the students are asked to reflect on their learning at the end of the session. The questions for this exercise should be open-ended to encourage reflection and feedback on the subject matter.

Possible prompts for a one-minute paper include:

• The muddiest point of today's class/ What confused me the most today/ What I would like to have clarified?

• What I wish had been discussed during today's class?

• What is the most important thing you learned today?

• Summarize today's lecture in one sentence.

• Describe the connection between todays concept and your experience / give a real-life example of the issue discussed.

Simulations, role plays

Simulations promote critical thinking and application of knowledge in complex or ambiguous situations. Students can better connect theory and practice, but also improve contextual learning and gain a deeper understanding of an issue at stake. Simulations often trigger emotional responses, which enhances student engagement and attention, and promotes long term retention.

Students take up roles in a setting with multiple stakeholders and perspectives. The context mimics real world complexities and has a problem to which students must respond and make a collaborative decision. During a simulation, students don't only learn the information, but have to use it in a particular context and in relation to actions of other stakeholders in the game. However, a crucial learning moment happens after the simulation – through reflection on learning and debrief. During debrief, the instructor can focus the discussion around four Es: events (what happened), emotions, empathy (seeing different viewpoints), and explanations (analysis, motives behind actions, connection to the real world and theory). In other words, students should learn what was happening in the other groups and how their colleagues made decisions, discuss the positions of different

groups, and link the experience to real world and relevant theoretical concepts. The debriefing is an opportunity for the instructor to reiterate key points in the process (cf. Petranek, Corey, & Black, 1992; Shaw, 2010).

Strip sequence

The instructor gives students the steps in a process on strips of paper that are shuffled, then asks them to work together to reconstruct the proper sequence. This activity helps students to apply what they have learned and strengthens their logical thinking skills. It can also be an activity for sharing initial ideas and making predictions about processes they still don't know - to identify unclear or difficult points in the process, or misconceptions and confusions. The instructor should ask about students' judgement and reasoning.

5.   PROMOTING LEARNING THROUGH ASSESSMENT
by Margaryta Rymarenko

Even the most motivated of them will invest their efforts and time to learn and train skills and qualities on which they know they will be assessed. The challenge of an instructor is, therefore, to design the assessment structure of a course in a way that closely reflects the learning goals, so that by completing the assessment activities students are progressing towards these learning priorities. Assessment is, thus, not only something that comes at the end of the course (summative assessment), but also something happening throughout the course (formative assessment). The primary aim of such an assessment is to scaffold student learning towards the desirable outcomes and it is known as assessment for learning (AfL). Research has shown that if assessment is embedded in the course design through structured and well-chunked learning activities, students can learn at approximately double the rate (Black & Wiliam, 2001). "Thinking like an assessor" thus enables instructors to choose the most relevant and varied classroom activities and assignments that tackle various learning patterns and allow students multiple opportunity to reach the learning outcomes (Wiggins & McTinge, 2005).

Instructors aiming to see what their students bring to their courses, that is, to diagnose students' knowledge, strengths, weaknesses, skills, they may decide to use informal pre-assessment task early in their course. Informal (diagnostic) pre-assessment aims at finding out the level of students' prior knowledge and skills at the very beginning or even before the start of a course. Pre-assessment gives necessary evidence for an instructor to better tailor activities in the course to students' level as well as set up challenging, yet achievable learning goals.

• You might ask students to fill-in a self-assessment quiz and to learn what skills they have previously learned/practiced and how confident they are in exercising them (e.g. writing academic essays, participating in group projects, working with digital libraries and databases). Since students are coming from various education systems, they might have diverse learning histories and levels, so discovering early on their learning background will help you manage more efficiently expectations about successful learning in your course.

• You can also ask students to complete a not-for-grade baseline assessment task to check for their skill level (for example, you might ask them to write a short reflection on the reading based on your guiding questions, which may help you diagnose how well they can comprehend

academic texts, detect key arguments and reason with them). Click [here](#) for more examples of diagnostic assessment activities.

•   Alternatively, you may want to schedule brief informal consultations with your students in small groups or individually to get to know them personally and to gain better understanding of their personalities, backgrounds, motivations, and expectations. This is something you can continue practicing throughout the semester to see how the students are experiencing your course (cf. Bain, 2004).

Assessment for learning

Assessment for Learning (AfL) represent in-class and out-of-class activities and assignments combined with feedback that gradually scaffold learning progress towards the desirable learning goals and are useful for both learners and teachers to detect the progress in learning (Black, Harrison, Lee, Marshall, & Wiliam, 2004; William 2011). Creating AfL activities starts with clarification of the expected outcomes of learning in terms of kinds of reasoning abilities, content elements, analytical, evaluative or critical thinking abilities, and discussion skills students should demonstrate to earn certain grades. Based on the goals, appropriate assignment tasks are created for the students to practice targeted skills and competencies with clear standards of success, while feedback targets ways of improvement. The primary goal of this approach is "to help students learn to think about their own thinking so they can use standards of the discipline or profession to recognize shortcomings and correct their reasoning as they go" (Bain, 2004, p. 160). Below are some examples of Assessment for Learning.

Graphic representation of concepts

Graphic representation of concepts can be used both as a method of teaching and a method of assessment. Concept mapping helps to assess how well students can understand and evaluate conceptual relationships discussed in undergraduate (or even graduate) courses (Svinicki & McKeachie, 2011, p. 76-77). It can be used by students throughout the semester to document the development of their thinking about relationships between the concepts and key terms of a course and to develop their own knowledge structures. It can also be used by the instructor to evaluate how well students are grasping the key frameworks of the discipline (e.g. level of complexity, types of relationships, controversies, etc.). In addition, the activity can be modified to serve as a content for group discussion or presentations/reflections. It can also be facilitated by using [online platforms](#).

Student journals, research papers, annotated bibliographies

The crucial element to keep in mind about written assignments is to distinguish between low-stakes and high-stakes writing. High-stakes written assignments are normally required in undergraduate (and graduate) courses (e.g. essays, research papers, journals) as a form of summative (end of course) assessment. However, they will go much better and result in more learning if instructors consider sequencing them through low-stakes writing tasks as an embedded formative assessment. The purpose of low-stakes writing is to help students to think and understand better what they learn and is usually graded informally or assigned a small percentage of course grade (Svinicki & McKeachie, 2011).

Examples of low-stakes writing are an in-class 5-10 minutes paper at the start of the session to help students recall the home reading and collect their thoughts about it; or an end of the session short reflection about the discussions in the class. Alternatively, many teachers ask students to keep regular learning journals/blogs with regular (e.g. weekly) entries where students reflect about the course materials, lectures, and discussions. The goal is to help students process what they study and connect it to their prior experiences, thoughts, and feelings (Svinicki & McKeachie, 2011). These journals also serve as important source of evidence for an instructor about how well students are coping with the course, what are their possible difficulties and whether anything should be modified in terms of teaching.

Written assignments can also be designed and assessed as a sequence of stages towards the completion of the high-stake written assignment for the course. In this case an explicit step-by-step guideline is provided to students in terms of how they should approach completing each stage, what kinds of writing is expected of them to demonstrate at each stage (linked to the learning goals) as well as within what timeframes they should be able to complete each step of the assignment to receive feedback. Look at the example here on how you can scaffold a high-stake written assignment for students as a sequence of small written entries throughout the course.

Assessing oral and written discussions

Setting guidelines and evaluation criteria of good discussion is one of the ways to increase the quality of the discussion itself as well as to help students learn skills of communication in discussion. The helpful quality criteria for discussion could be:

- whether a contribution was a direct response to instructor's question

or an unsolicited comment or question;

- did the contribution move the discussion on track or diverted it;

- did the contribution make references to previous discussions, course materials or linked to what anybody else had said in the discussion;

- whether a contribution was supported by evidence or merely voiced opinion, emotional reaction (based on Brown, Bull, &Pendlebury 2005).

These criteria should be communicated to students and the instructor can model or highlight good contributions to set examples. One way to conduct assessment in oral discussions would be to assign a Graduate Teaching Assistant to help track the quality of discussion by individual contributors and then provide informal feedback and recommendations to students on how they can improve their discussion skills.

An alternative can be to ask students self-evaluate discussion as a whole-activity experience by asking them to write briefly about what they learned, how their thinking changed, or how the discussion relates to other course materials. You can also ask the students to reflect on the quality of the discussion by reflecting on the kinds of contributions that were helpful, digressions, involvement of colleagues, etc. (Discussions, Eberly Center, Carnegie Mellon University).

Similar or additional criteria might be established for written (online) discussions to highlight quality expectations as well as target communicative skills and competences that students should develop and demonstrate. A good way of setting these criteria as well as ensuring transparent evaluation would be to use rubrics or scoring guides. Here is an example of detailed online discussion rubric.

Exams and tests

Exams and tests are still frequently used assessment methods in undergraduate (and graduate) classrooms even though they are usually perceived by students as a form of assessment causing mostly distress, which is often referred to as test anxiety. Due to performance pressure, students may be inclined to think that testing requires them to memorize and re-produce certain types of information. Yet, if tests and exam questions are crafted to reveal thinking processes or require application of knowledge, they encourage different learning styles of students and lead to a better knowledge processing and retention (Svinicki & McKeachie, 2011, p. 75).

Tests in the form of quizzes can also be used as a type of formative assessment throughout the course to help instructors evaluate whether the students are getting the basics and to detect gaps in understanding. This purpose of testing

should be explicitly communicated to students, so they also see testing as a valuable source of information on how they are coping with the course and on which topics or competences they might need improvement.

Grading

Well-designed assessment tasks are a means of showing whether students have mastered course material. Accordingly, grading practices should be based on the progress students have made towards achieving the learning goals. Important aspects to remember about grading are the following (adopted from Teaching Guides, Vanderbilt University Center for Teaching):

• It is important to avoid grading on the curve and give everyone the opportunity to achieve the highest standard and grades – this will motivate all students to do better.

• Don't rely solely on one or two assessment methods to assign grades. Varied assessment will give you richer and more reliable evidence of student performance.

• Be explicit and clear about the requirements for students' performance to qualify for certain grade. This will ensure that you actually evaluate knowledge and skills that you target in the learning goals, and will ensure transparency in assessment. An effective way to organize your criteria towards grades is to provide students with a rubric. Here you can find useful examples of academic skills rubrics.

• Use different grading scales for different assignments.

• Limit your comments or notations to those that your students can use for further learning or improvement. Rubrics can also be helpful to help you guide students towards higher performance.

• Spend more time on guiding students in the process of doing work than on grading it.

6. MENTORING UNDERGRADUATE RESEARCH
by Helga Dorner

Mentoring is a key component of university teaching in general, as it impacts degree completion (Lovitts, 2008), self-efficacy (Paglis, Green, & Bauer, 2006) and satisfaction with the learning experience (Gardner, 2009). Mentors' functions are synthesized into three broader areas in higher education: educational (academic program planning, informal/formal teaching moments), professional (sponsorship, research advising and productivity) and psychosocial development (support, role modelling) (Hayes & Koro-Ljungberg, 2011; Kumar & Johnson, 2017).

In undergraduate education, too, providing research experience for students in all disciplines has been prominently used as an efficient active learning strategy (Walkington, 2015). The Council on Undergraduate Research defines undergraduate research as: "An inquiry or investigation conducted by an undergraduate student that makes an original intellectual or creative contribution to the discipline.[2] "According to the Association of American Colleges & Universities undergraduate research aims "to involve students with actively contested questions, empirical observation, cutting-edge technologies, and the sense of excitement that comes from working to answer important questions" (Kuh, 2008). It thus emphasizes research-teaching linkages by 1) developing students' appreciation of disciplinary research, 2) using teaching strategies that simulate research processes and assignments which involve elements of the research process, and 3) bringing research data into the curriculum for students to manipulate (Anderson & Priest, 2014; Walkington, 2015). Whilst the undergraduate research experience was found to develop research skills and critical thinking (Kilgo, Ezell Sheets, & Pascarella, 2015), the mentoring relationship, that is, the experience of 'being mentored' played out as the most important factor in the process (Ishiyama, 2001).

Some salient practices of undergraduate mentoring[3] are as follows:

- Strategic pre-planning to support students' varying needs and abilities during research process (e.g. set achievable timelines, Invest time early in the process for project selection and planning).

- Setting clear and well-scaffolded expectations (e.g. outline your expectations in learning contracts or syllabi, attend to fluctuating needs of students at different points in the process, gradually give students more independence).

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2   Council of Undergraduate Research.
3   The Center for Engaged Learning: Salient Practices of Undergraduate Research Mentors

- Teaching the technical skills, methods, and techniques of conducting research in the discipline.

- Balancing rigorous expectations with appropriate emotional support (e.g. adapt your emphasis to suit student needs).

- Building community among groups of students or a research team.

- Increasing student ownership over time.

- Dedicating time to one-on-one mentoring.

- Encouraging students to disseminate their findings (e.g. blogs, video logs, podcasts, (online) conferences, competitions, simulations, exhibitions, poster presentations, publication in undergraduate research journals).

A useful list of references about mentoring undergraduate research in online or hybrid contexts is available [here.](here)

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