



How Peer Assessment Develops the Higher-Order Thinking Skills Students Need Today



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INTRODUCTION

Preparing Students for the Road Ahead

For decades, many university- and college-level educators have relied on an antiquated model of passive instruction: Students would absorb prescribed readings on their own time; professors would lecture when the class gathered; assignments would be graded; tests, midterms and final exams would be written; and a final grade would determine a student's success or failure.

Times have changed, but education? Not so much.

For many students entering higher ed today, the classroom experience still mirrors that of their parents, while the world around them has changed immeasurably. Even as faculty scramble to find new ways to deliver their courses post-pandemic, many are still trying to replicate the “sage on the stage” classroom environment that has prevailed for close to two centuries, this time with a digital spin. It's not a winning formula for teaching students who will be expected to respond with the creative and critical thinking skills demanded by the new knowledge economy, an environment where decisions have been decentralized, management structures flattened and cross-functional team skills have been emphasized. In this new economic reality, students must arrive prepared to think critically, creatively and be able to make their own decisions if they're going to succeed (AACTE, 2010).

Unfortunately, many faculty—already drowning in the seemingly limitless demands of their job—fall back on the old pedagogical model



of stand-and-deliver lectures with an over-reliance on summative assessment. For students, that mix has long-lasting impacts: In exchange for concept mastery, they come to rely on rote memorization and surface-level understanding to achieve short-term success in a results-driven learning environment. Their passion for lifelong learning, problem-solving and creative thinking gets short-circuited. Their comprehension is [incomplete](#). They leave school unprepared for the intellectual challenges the modern world demands.

We already know that students [learn by doing](#), not by hearing or seeing. That's [active learning](#) and it's been well-established as an instructional approach that helps foster student learning and understanding. When students aren't actively engaged in the learning process, it's easy for them to tune out. [Research](#) compiled by Duke University shows that environments in which the professor is the primary transmitter of information aren't as effective in terms of students actually being able to retain information.



Collaborative learning techniques like peer assessment—where students evaluate their peers' work and have their work evaluated by peers—can help students cultivate their higher-order thinking skills through self-reflection and analysis. By evaluating their peers' work in ongoing, formative assignments, students enhance their own metacognition; and by personalizing the learning experience via peer interaction, students become motivated to continue learning.

The literature can vouch for its efficacy:

- Peer assessment can increase student involvement and maturity, lower the grading burden on staff, and enhance classroom discussion (Boud 1995).



- When assessing their own work, students will reflect on gaps in their understanding, a practice that makes them more resourceful, confident, and, ultimately, higher achievers (Zimmerman and Schunk 2001; Pintrich 1995; Pintrich and Zusho 2007).
- Peer assessment provides learning gains not seen with external evaluation (Dow et al. 2012).

By forcing students to learn about themselves by teaching and evaluating others, peer assessment can help them develop their most creative, evaluative and critical modes of thinking.

In an uncertain world, shouldn't that be the very goal of higher education?





CHAPTER ONE

You Get What You Measure

For most instructors, assessment is by far the most labor-intensive part of teaching. Assessment plans and rubrics must be prepped. Test questions have to be written. Every student needs a mark, personalized feedback and a roadmap for improvement. The larger the class, the more work for the instructor. Add in formative assessments like weekly assignments and exercises that precipitate subtle, ongoing tweaks to the syllabus and it's easy to see why many faculty opt to stick with what they know: An accumulation of easy-to-grade summative assessments that almost inevitably rely upon memorization and the most basic understanding of concepts—the lower orders of thinking outlined in [Bloom's Taxonomy](#).

"Summative assessment provides a safety net for instructors," says Matthew Numer, a professor in the School of Health and Human Performance at Dalhousie University. "When you have competition for your time, you're going to default to something that's already worked."

Unfortunately, that default is failing students.

Writing in [The Atlantic](#), Ben Orlin, a teacher and tutor in Oakland, California, outlines the core issue with focusing on lower-order thinking in assessment: "Memorization's defenders are right: It's a mistake to downplay factual knowledge, as if students could learn to reason critically without any information to reason about. But memorization's opponents are right, too: Memorized knowledge isn't half as useful as knowledge that's actually understood."



Students might very well be able to memorize the sentence “Hamlet kills Claudius,” Orlin writes, but that doesn’t necessarily mean they know who Hamlet or Claudius actually are, or, for that matter, what the word “kill” even means. Memorization may be the scaffolding that allows for critical thinking down the road, but without context it’s merely “a detour around all the action, a way of knowing without learning, of answering without understanding.”

To make memorized ideas stick, it’s critical that faculty help students make as many mental connections as possible to the ideas—linking them to other concepts, contextualizing them within their own lived experience—and access the stored memories repeatedly over time, ideally through formative assessments. When students [explain what they’ve learned](#) to other students—part of what happens in collaborative learning techniques like peer assessment—they help consolidate and strengthen connections to those memories while simultaneously engaging in active learning (Sekeres et al. 2016).

...faculty reliance on memory-centric summative assessments as a combination of pedagogical momentum, fear and scant support resources.

Until as recently as a decade ago, when information was not as readily available or easy to access as it is today, testing students on their memorization skills made sense. Without facts to recall rapidly, mastering critical thinking would be like trying to build a roof before the walls. But our access to information changed so suddenly that very few instructors truly realized how obsolete the practice of summative assessment has become.

By measuring students primarily on what they can remember, faculty who rely on standardized summative assessments to determine success or failure are doing a disservice to learners who will need to apply ideas creatively, not just regurgitate them.

Lucian Lucia, an associate professor in the Department of Forest Biomaterials at North Carolina State University, sees faculty reliance on



memory-centric summative assessments as a combination of pedagogical momentum, fear and scant support resources.

“I mean memorization is good to a certain degree, but it's gotta be supported with higher order skills,” he says. “So you memorize facts and then you're given a new set of conditions where you take those facts that you've memorized and apply them using creativity. But we just don't do that well. Some teachers are not as willing to work at it as we should be because we're afraid, or uncomfortable. We don't have the support, the resources. So it's just like a vicious circle.”



And while summative assessments aren't necessarily limited to rote memorization and a basic understanding of concepts (multiple choice questions, for example, can ask a student to process information, not simply remember it), designing a summative assessment that taps into students' higher-order thinking skills is a heavy lift.

“Most people are kind of unaware that there's probably three or four different levels [of higher-order thinking] that you can engage in a multiple choice question, if you're purposeful about it,” says Numer. “But it's a ton of work. If professors can see a very pragmatic way to create good questions that doesn't overwhelm them, then I think more would do it. I think that's the beauty of [Kritik](#).”

Technology has certainly made it easier for many professors to create the kind of fun, interactive activities that help facilitate peer learning and the cultivation of higher-order thinking skills at scale. But even the most tech-savvy professors need to be purposeful about how they design activities that create lifelong, self-motivated learners.

Ironically, for most professors, that forward-thinking methodology is grounded in a foundational pedagogical model that's over 60 years old: Bloom's taxonomy.





CHAPTER TWO

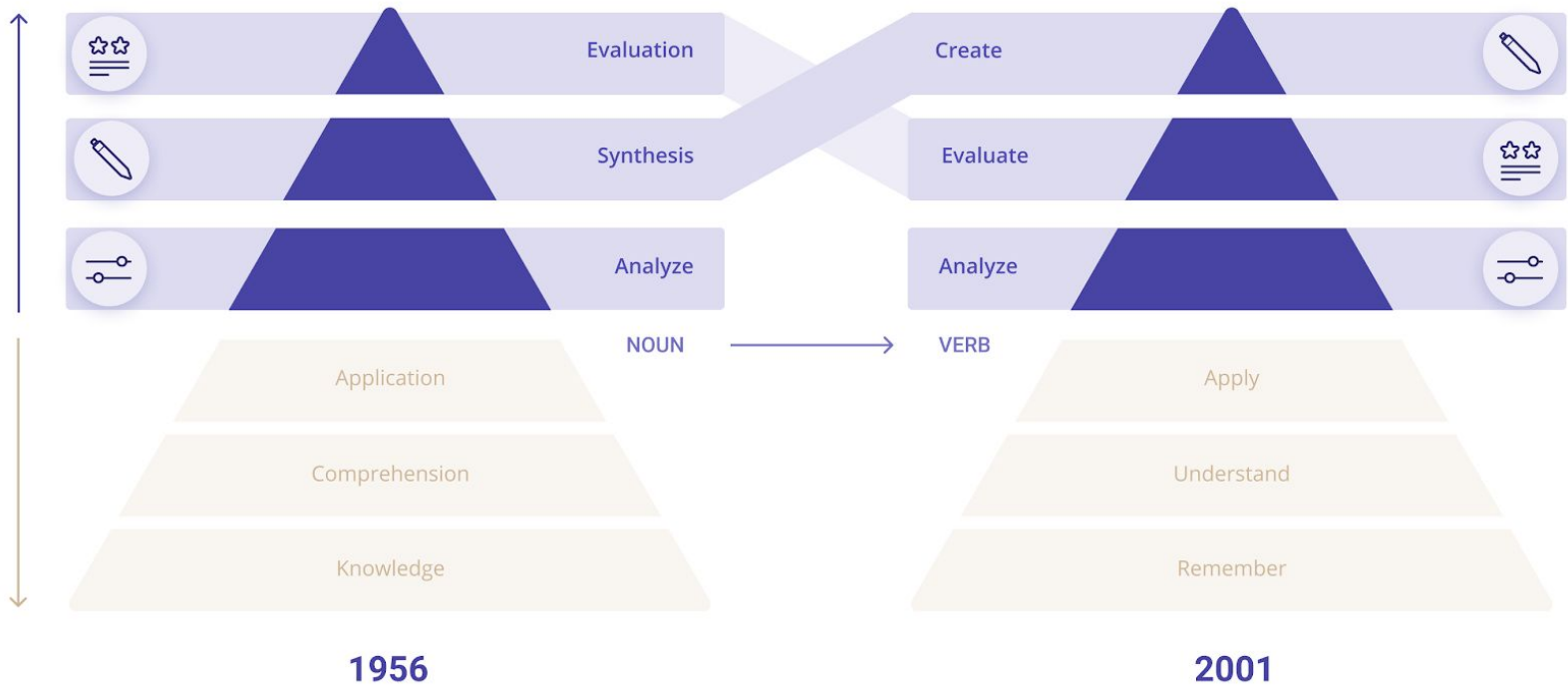
Help Your Students Bloom

When University of Chicago professor Benjamin Bloom and his collaborators penned the inaugural *Taxonomy of Educational Objectives* in 1956, the team presciently identified the orders of learning best suited to succeed in the modern world, and placed them atop an iconic six-level pyramid of educational attainment.

From basic knowledge to comprehension, application and analysis of ideas, Bloom's six orders of learning positioned critical and evaluative thinking skills at the summit of learning. Meanwhile, the qualities that describe the lowest orders of learning—remembering and understanding—form the backbone of most summative, high-stakes assessment.



Originally created as an assessment aid to help classify educational goals, Bloom's has become a foundational pedagogical model used for curriculum design, setting learning objectives and designing classroom activities.



“Bloom’s has always been important,” says Numer. “But now I think there’s a higher standard for us out there. I think professors today want to come in and deliver a good course and know that they’ve set out to do what they were trying to do. That isn’t always what necessarily happens, but if you’re purposeful about it, Bloom’s can help you understand whether the material is getting into students’ brains in a way that is changing their perspectives. If you get to that level, then they’ve done critical thinking.”

Bloom’s can also help both students elevate metacognition—the process of thinking about one’s own thinking. When students start thinking about metacognition, they’re better able to transfer what they’ve learned to new contexts and situations, a skill that’s increasingly in demand in today’s knowledge economy.

At the University of Connecticut, John Redden, an assistant professor in the department of physiology and neurobiology, uses Bloom’s



taxonomy in class to show his students what they need to know to succeed. “I tell them that they all know what a hammer is, what lumber is, what nails are—but that doesn’t mean they know how to build a house,” he told education writer Philip Preville in a 2018 interview. “And I tell them that by the end of this course, they ought to be able to build a house. That’s the goal they need to set for themselves: to be able to explain how all the parts come together and work together.”

Practically speaking, many faculty use Bloom’s in three ways: to set learning outcomes, structure classroom activities and to assess progress.

“I tell them that they all know what a hammer is, what lumber is, what nails are—but that doesn’t mean they know how to build a house.”

In terms of setting learning outcomes, Bloom’s taxonomy helps instructors think clearly about what, exactly, students will learn in their class and which orders of learning they will use to help their students get there. When professors communicate those objectives upfront, students are given a clearer view of the path to their ultimate destination, making the incremental assignments along the way more meaningful. In Redden’s case, establishing weekly learning objectives “makes the conversations go better when the students are struggling. I can point to the objectives and identify the things they should be able to do. It helps students focus their studies.” With clear learning outcomes set and established with students, Bloom’s can then be used to plan homework and in-class or remote assignments that line up with whichever order of learning an instructor is trying to achieve. Finally, Bloom’s can be used to help faculty create assessment questions or assignments that reveal a student’s overall comprehension and mastery of a subject, tailored to the learning outcomes that have been established for the course.

How a professor opts to execute on their course objectives is another matter entirely, and something that will continue to evolve, especially as higher ed wrestles with learning tactics post-pandemic. For many, traditional summative assessments are no longer really possible in a remote environment where timed, monitored exams may be next to impossible to administer. In its place, some faculty have turned to



open-book online exams, asynchronous assignments, research projects and [‘epic finales’](#) that allow students to apply knowledge gleaned throughout the semester in a creative way.

For students, the shift away from high-stakes summative assessment could very well be a positive consequence of the global pandemic. Beyond forcing faculty to rethink how they’re assessing students in general, an increasingly remote learning environment is well-suited to the types of ongoing formative assessments that have been proven to help students access Bloom’s higher-order thinking skills.

As collaborative, low-stakes assignments become more commonplace, techniques like peer assessment may very well become the most impactful way to deliver the return on an education investment that today’s students require.



CHAPTER THREE



How Peer Assessment Impacts Professors and Students

Regardless of its well-established ability to develop self-reflection, resourcefulness and gains not seen with external evaluation (Pintrich 1995; Pintrich and Zusho 2007; Dow et al. 2012), peer assessment is still viewed with some skepticism by many faculty, who remain reticent to put it into practice.

“Part of why I don't think other colleagues pick up on peer assessment is that they know it's a tough sell to students,” says Alexander Gainer, an associate economics professor at the University of Alberta. It's more work than many students want to put in, he continues. At Dalhousie University, professor Matt Numer concurs, adding that many of his colleagues are also “scared that peer assessment will make them lose control of the class.”

When peer assessment provides the primary evaluative function, the instructor's role shifts to emphasize coaching, not grading.

Peer assessment *does* change the role of teachers in the classroom. In a 2013 Stanford University/Coursera paper entitled “Peer and Self



Assessment in Massive Online Classes,” researchers found that when peer assessment provides the primary evaluative function, the instructor’s role shifts to emphasize coaching, not grading. That’s why it’s important to establish “explicit grading criteria (especially in advance) [that] helps convey to students that grading is fair, consistent, and based on the quality of their work.”

The knock-on effect is that professors will end up spending more time articulating the grading criteria than doing the grading. To effectively scale peer assessment, “teachers should plan on revising rubrics as they come across unexpected types of strong and weak work. After revision, these rubrics can scale well for both students and other teachers to use.” (Kulkarni et al. 2013)

“You end up having to do more work on the front end to design good activities for students,” says Numer, “but then in many of my classes I’m just wandering around while they’re doing work. If I’m the one that’s in the classroom and bored because they are researching and doing whatever, that’s the end game. You should be teaching yourself out of a job.”

By actively engaging with their classmates and applying their own evaluative skills to feedback they’re delivering to their peers, students are developing lifelong critical thinking and creative skills.

That newly freed-up time affords professors the opportunity to do more personalized coaching, and to focus on the students who need their help the most.

One of the Stanford researchers’ most remarkable results reported that students felt that assessing others’ work was “an extremely valuable learning activity.”

Peer assessment is a win-win for students and the professors who are bold enough to put it into practice: Students get to learn invaluable critical thinking skills by teaching others, while professors who surrender some of their traditional assessment tasks to students find



themselves with more time to work directly with students. The ideas that hold students and professors back from trying out peer assessment—fear of more work for students; loss of control for professors—are the very things that are solved by it.

For faculty looking to put peer assessment techniques into practice, there's a plethora of good reasons to start now. Here's six of them:

Students get faster feedback from more diverse sources

Finding time to deliver frequent, meaningful feedback is one of faculty's greatest challenges—it's often cited as one the main factors limiting students' opportunity to practice writing and get feedback on their work (Cho and Schunn 2007). With peer assessment, students can receive feedback on multiple assignments in a timely manner from a variety of perspectives—free from the power dynamics inherent in a teacher-student relationship—adding a diversity of viewpoints to their learning.

Student learning improves when they have to give feedback

When students are asked to provide constructive feedback via peer instruction, the act itself engages them in complex problem solving—they have to diagnose problems and suggest solutions, actions that are the hallmarks of higher-order thinking. Studies have shown that the act of delivering elaborate feedback that describes identifiable problems and proposed scaffolded solutions is the aspect of peer assessment that benefits student learning the most (Topping et al. 2013).

Active environments offer more opportunities to improve

The feedback process involved in peer assessment encourages active learning—students aren't simply being passive recipients of instructor feedback, they're producing and sharing it themselves (Liu and Carless 2006; Cartney 2010; Nicol 2011). And, since the feedback can be delivered more quickly, it offers students opportunities to improve their work through revision or by applying what they've learned to future assignments. The opportunity to apply what they've learned through



practice and quality feedback will positively impact student learning (Nicol and Macfarlane-Dick 2006).

Peer assessment improves metacognition and increases independence

Peer assessment can be an act of humility—by assessing the work of their peers, students glean a better understanding of their own work, honing their metacognitive capacity to recognize holes in their own understanding. Rather than overestimating or underestimating their own work, the act of peer assessment can train students to self-correct and become less dependent on feedback from instructors, making them more independent in their learning (Nicol, Thomson and Breslin 2014).

By comparing their work to their peers' students become self-reflective

Anytime a student is asked to assess the work of their peers, they're also actively comparing it to their own by referencing assignment guidelines and criteria, instructor expectations and perceptions of quality (Baker 2016; Nicol, Thomson and Breslin 2014). By becoming critical readers of others' writing, students are also developing a better understanding of how readers might interpret the work they produce themselves (Cho and Cho 2011; MacArthur 2010). The comparative process encourages self-improvement and clarity of purpose in writing.

Peer assessment helps develop the lifelong skills students will need to succeed

As preparation for life outside of school, peer assessment helps students develop the transferable skills they'll need to succeed. The process prepares them to be able to critically review and engage with the work of their peers, enables them to be able to deliver feedback in constructive, positive ways and to learn how to incorporate the feedback they receive from others into their own work without losing their cool. These are the very skills that are in demand in the knowledge economy—by honing them in an academic environment, students will be better prepared to function independently for the duration of their lives.





CHAPTER FOUR

Tactics for Putting Peer Assessment into Practice

As more classes move online in the wake of the pandemic, it's increasingly important for faculty to stay on top of student progress, performance and general well-being. Peer assessment allows for students and their peers to stay in close contact with instructors through regular assignments that provide feedback for improvement. In large online classes, peer assessment can create room for assignments where the creative output of students would otherwise be very difficult to grade with automation or to manage with additional teaching staff.

Getting it right is the key to success.

Formative assessment expert Heidi Andrade, an associate professor in the School of Education at the University at Albany, SUNY, has worked with schools across the U.S. to promote learning-centered assessment. As part of Arts Achieve, a large-scale arts assessment research project undertaken in 2010-2015 by Studio in a School and the New York City Department of Education's Office of Arts and Special Projects, Andrade created a [series of videos](#) on implementing formative and peer assessment in the classroom.

According to Andrade, there are three main criteria for effectively implementing formative assessment:

- Clarifying criteria for performance
- Ensuring students receive useful, timely feedback



- Following up that feedback with opportunities to revise and improve upon their work

[Research](#) shows that formative assessment, when effectively implemented, “can effectively double the speed of student learning” (William, 2007).

“If we’re just giving students grades or scores, that doesn’t count as assessment that promotes learning,” says Andrade. “What counts as assessment that promotes learning is when students get feedback on their strengths and weaknesses, guidance on how to improve their own work and an opportunity to work on the improvement.”

For most faculty, that’s a pipe dream. Delivering personalized feedback in a class of 50 (or worse, a class of 400) is next to impossible. But that’s where peer assessment can come into play.

“The teacher is not the sole source of quality feedback in the room...”

“The teacher is not the sole source of quality feedback in the room,” says Andrade. “Under the right conditions, students can be useful sources of feedback for themselves and for each other.”

For peer assessment to work, says Andrade, strong criteria and descriptive levels of quality, or rubrics, are foundational.

“For me, the most important purpose of rubrics is to support students in thinking about the quality of their own and each others’ work and guiding revision.” The criteria guide the critique, which needs to be constructive, seeking clarification and should lead to suggestions that will improve the work.

“You cannot give good feedback on a piece of work that you don’t understand,” says Andrade. “You have to ask questions of clarification that can’t be thinly-veiled critiques.”

Rubrics, [according to Andrade](#), can improve student performance, as well as monitor it; help students become more thoughtful judges of the quality of their own and others’ work; reduce the amount of time teachers spend evaluating student work; and finally, they’re easy to use and explain what is expected of students.



Every class and every discipline has different types of assignments that can be effective forms of peer assessment. And while there's no single solution for any course, there's a wide variety of assignments that are well-suited to peer assessment. Here's seven ideas that might be helpful if you're looking to implement peer assessment in your class:

- **Practical work**

Let your students experiment with practical skills under the watchful eye of their peers. Often, the feedback they receive is more candid and valuable than what they might get from a tutor, whose presence might actually inhibit a student's ability to perform in the first place. It's more natural and likely to generate more useful feedback in something like a lab report when the ideas are coming from a group of peers.

- **Reports**

There's good and bad practice in writing lab reports and doing case analysis—when students hear about it from their peers it helps them become more aware of how important coherence, structure and layout can be on the final product.

- **STEM problem sets**

A quick and easy assessment strategy, looking for correct answers in peer work—like performing code reviews in engineering, etc.—opens a window into where their peers went wrong/right in their thinking. By seeing the errors others have made by evaluating their logic, notation and problem solving skills, students can pinpoint trouble spots to avoid in future.

- **Presentations and peer instruction**

Let your students know what to look for in their peers' presentations: Are they presuming too much knowledge? Are they talking too much and not engaging the room? Is their argument logical? Armed with the right guidelines they'll be able to make sound judgements on the work of their peers and gain insights in how they might improve their own work.

- **Questions**

Harness the power of your student's curiosity—assign them the task of creating questions about the lecture that are shared with the rest of the class. Not only will their peers have the chance to improve their own understanding by answering the question,



they can evaluate the quality and usefulness of it, providing feedback for improvement.

- **Essay plans**

Before they share the final paper, get your students to share their essay outlines too. By reviewing how others plan their content and structure their arguments before actually writing an essay, this kind of scaffolding assignment allows students to share a wide variety of ideas for improvement in a short period of time and to apply the lessons learned to their own essay writing in future. When it comes time to evaluate the final submission, students can see how their peers' thinking evolved from the original plan, giving them insight into the quality of feedback that was provided—and how it was applied—along the way.

- **Team-based learning**

Break your class up into diverse groups of 5-7 students who will be working together during class time (whether that's online or in-person). Before each class, students are asked to prepare by doing a set of readings, which they're quickly evaluated on at the start of class to gauge comprehension. Spend the remainder of the class working in groups on problems or challenges that allow the student teams to apply and extend what they've learned in the pre-class readings. Groups must arrive at a consensus solution to the problem they've been tasked with and present it to the class for discussion and feedback. A version of the [flipped classroom](#), the kind of interactive engagement methods used in [team-based learning](#) have been shown to result in learning gains almost [two standard deviations higher](#) than those observed in traditional courses.





CHAPTER FIVE

Case Studies

How three innovative profs put peer assessment to work in their course

Learning by Teaching With Presentations



Matthew Numer

Associate Professor and Division Head, Health Promotion

School of Health and Human Performance
Dalhousie University

At Dalhousie University, Matthew Numer teaches a highly provocative undergraduate course on human sexuality to almost 500 students. Numer loves to engage his students in the learning, and, sometimes, he enlists them to do the teaching and assessing themselves.

“I teach health promotion theory,” he says. “Students fear the word theory and they just don't want to engage with it at all. They just think that it's going to be terrible, so I challenged them to do presentations on it and to assess their peers.”

Students were instructed to make their presentations engaging, a factor that their peers would be considering during their evaluation.



“I said, ‘If you just stand up here and talk, you will fail. It's a bad way to deliver information. I try not to do it as your instructor.’ ”

The first couple of presentations didn't go swimmingly. Students arrived underprepared and didn't spend time engaging their audience, says Numer. The feedback from their peers, on the other hand, not only provided the lacklustre presenters with ideas for improvement, it also inspired the remainder of the class to think more carefully about the assignment's objectives and criteria and to raise the bar when it was their turn to present. The presentations that followed the guinea pigs, says Numer, took the exercise to a whole new level.

“You're not only teaching, you're getting evaluated on your teaching,” says Numer. To be successful, his students would have to tap into their higher-order thinking skills and concept mastery. “Teaching the subject is way up there at the top of the triangle. You have to take your understanding step further.”

Numer's students did just that.

“You're not only teaching, you're getting
evaluated on your teaching”



Asking Questions to Improve Metacognition



Alex Gainer

Associate Lecturer
Faculty of Arts, Department of Economics
University of Alberta

Alex Gainer, an associate professor at the University of Alberta, teaches a lot of first and second-year Economics courses to students who might need a little incentive to stay interested in the material. To help foster their curiosity about the discipline, and to help develop their critical thinking skills, Gainer uses [Kritik](#), an online peer-to-peer interactive learning platform, to probe and develop their understanding.

Every week, Gainer's students are asked to come up with a question related to the material discussed in the previous week's class. Their questions from the first step in Kritik's three-part peer evaluation flow, which starts with the creation of a text, followed by evaluation of peers' work and ends with the dissemination of compiled feedback.

"I always thought that questions were a good form of assessment," says Gainer, "and I really like the idea of students evaluating each other."

After students have created the questions in Kritik, they evaluate the work of five of their peers on a rubric that includes criteria such as content quality, spelling and punctuation, research and citations, among others. With evaluation as a weekly practice in Gainer's course, students get regular, repeat experience with the practice, developing analytical and critical skills that can become lifelong assets.

"Kritik is great for developing critical thinking—those higher order skills on Bloom's taxonomy," says Gainer. "But I also just really liked how Kritik involves some social interaction—it's teaching them soft skills, people skills."



It's also proven to be a great way for his students to model their understanding on that of their peers—by assessing the work of others, they come to understand what they don't actually know, thereby improving their metacognitive skills.

"I tell my students, 'Whatever career you go into, it's likely going to involve you evaluating people, managing people, giving them constructive feedback.' So evaluating their peers gets them using their higher order cognitive skills, but it's also such a good soft skill to be able to offer critical feedback in a way that doesn't make people angry. Like, if you can master that, you've figured out a lot."

"Whatever career you go into, it's likely going to involve you evaluating people, managing people, giving them constructive feedback."



Developing Critical Thinking Skills Through Debate



Lucian Lucia

Associate Professor
Department of Forest Biomaterials
North Carolina State University

When Lucian Lucia, an associate professor in the Departments of Forest Biomaterials and Chemistry at North Carolina State University, teaches the highly popular interdisciplinary class “From Papyrus to Plasma Screens: Paper in Society,” he leaves a lot of the teaching to the students.

“We have this sort of Lincoln-Douglas debate,” says Lucia, who asks groups of students to argue the pros and cons of an issue in front of the class of 150. “You take a topic and argue for a side. The class then gives them feedback and a genuine assessment of how they felt the argument was delivered. Then we have a vote about which side students agree with. That was really important to me because I feel like in today's society we don't do that enough.”

Student assessments are guided by rubrics provided by NC State's Th!nk Program, an initiative designed to cultivate students' higher order skills in critical and creative thinking. Manually grading the anonymized assessments and providing individualized feedback proved cumbersome for Lucia. And while the class remains immensely popular, the majority of students weren't really able to make deep, cohesive arguments.

“I think it's that this creative, critical kind of thinking is not something that's been fostered long enough. And unfortunately we tend to live in epochs, you know, so it's like we're still getting out of the former epoch where everything was summative.”



For Lucia, who now uses [Kritik](#) to foster critical thinking through peer assessments in his classes, nurturing constructive feedback between peers makes it all worth the effort.

“If we're going to wean students away from being fearful about giving honest, critical evaluations, they're going to have to tell each other what they think—not vindictively or spitefully—but honestly,” says Lucia. “If we want to change the way society is, we have no other choice.”

“If we're going to wean students away from being fearful about giving honest, critical evaluations, they're going to have to tell each other what they think—not vindictively or spitefully—but honestly.”





CONCLUSION

Making the Changes That Really Matter

For students looking to succeed in our dynamic world, the ability to think critically and creatively now trumps the simple accumulation of information that for decades has been the measure of summative success in higher ed.

What was once an industrial economy based on manufacturing and repetitive work has shifted to a service-based economy driven by knowledge, information, creativity and innovation. Technological advances have fundamentally reshaped the ways in which people work, as has the COVID-19 crisis. Decisions have been decentralized, management structures flattened, cross-functional team skills have been emphasized. To succeed, students must arrive prepared to think critically, creatively and be able to make their own decisions (AACTE, 2010).

Faculty who recognize this have already undertaken the hard work of developing students' higher-order thinking skills, as defined by Bloom's taxonomy. For many, that means rethinking their assessment techniques and, in some cases, surrendering some of the teaching to their students.

But by involving students in their own learning and fostering metacognition through collaborative practices like peer assessment, faculty are doing more than simply helping students learn course material. They're helping to produce the critical, creative thinkers we need to succeed in uncertain times.

And that's the work that really matters.



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ABOUT

Kritik



Mohsen Shahini, PhD

Co-Founder and Chief Executive Officer
Kritik

Mohsen Shahini co-founded Kritik in 2019 after building up Top Hat, an education software as the leading co-founder. His past experience managing Top Hat has allowed their product to become a market leader in student engagement software. Working in the industry of educational technology for 10+ years, Mohsen is an active speaker in the higher education and startup community. Mohsen's current vision is to improve classroom innovation in higher education.

Kritik is an online peer-to-peer interactive learning platform designed for professors to engage students in a twenty-first-century way.

Students can make online submissions for assigned activities and be evaluated based on rubrics designed to help students emulate a professor-standard grading process. Students will also receive constructive written feedback from their peers.



When you assess your peer's work, you receive a grading score for critical thinking based on the fairness of your evaluation and a feedback score on the effectiveness of your written comment. The grading score and feedback score are known together as the Kritik score. They are calculated and adjusted automatically by Kritik's scoring system. Instructors and TAs maintain full visibility into the peer review process and have the ability to provide comments and ultimately finalize activities.

Through a gamified experience, Kritik allows students to develop higher-order thinking skills from creating assignments as well as analyzing and evaluating peer submissions. In addition, students will develop the skills necessary to deliver feedback to their peers through our feedback-on-feedback system.

Visit kritik.io to find out more.





Transforming Students into Critical Thinkers

Kritik is the only peer-to-peer solution designed to enhance students' higher order and critical thinking skills



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