



# Building Collaboration in Engineering Courses

**Instructor Spotlight:**

**Leveraging Peer-to-Peer Learning to  
Enhance Engineering Communication**



**UNIVERSITY  
*of*  
VIRGINIA**

Adam Barnes, Senior Lecturer of Electrical and Computer Engineering at the University of Virginia (UVA), was unsatisfied with the mastery of teamwork skills in his courses. The American Board for Engineering and Technology Accreditation (ABET) underscores the need for engineers to proficiently 'communicate and collaborate' as they will in their careers after graduation. Previously most courses relied upon traditional group work, which was deemed 'good enough,' but left many students frustrated with the unbalanced efforts of their peers. Adam recognized the necessity for a more targeted strategy to elevate communication skills within his classes. Adam now utilizes Peerceptiv across three distinct courses within the engineering curriculum, marking a deliberate shift towards a more comprehensive and tailored approach to address communication challenges.

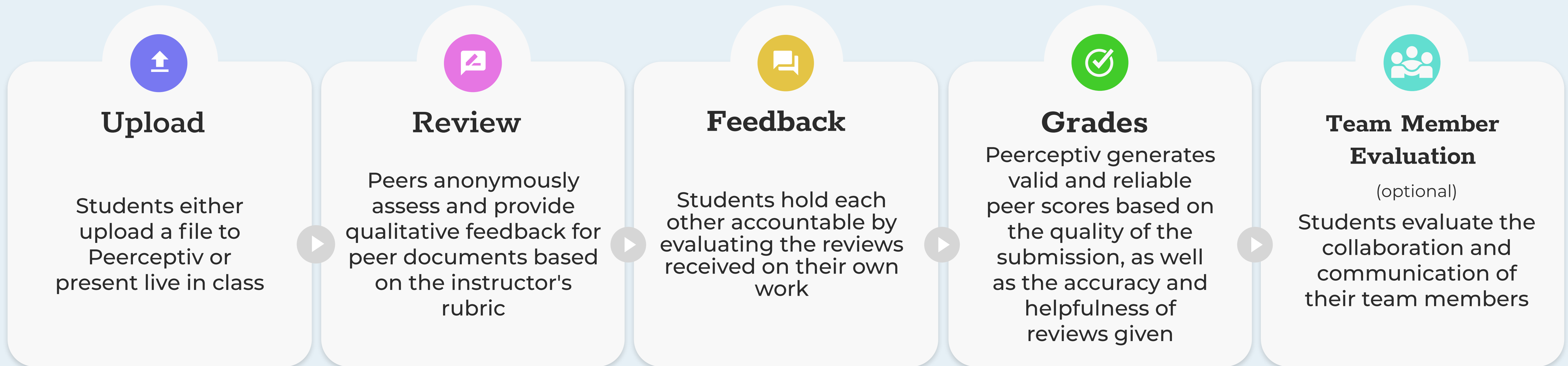


## **Adam Barnes**

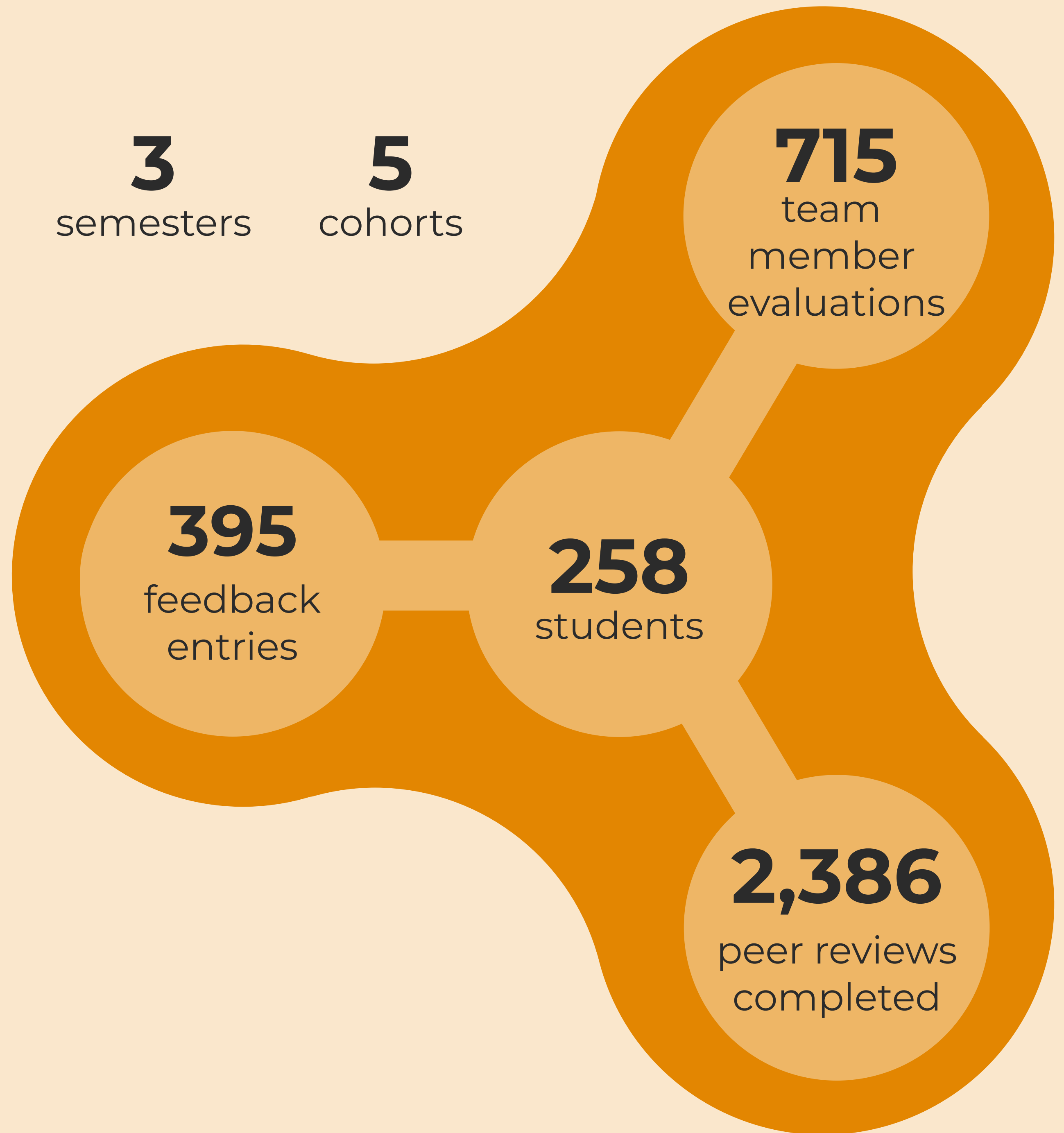
**Senior Lecturer, Electrical  
and Computer Engineering,  
University of Virginia**

M.S. Biology, Virginia Tech

At the core of Barnes' transformative approach is Peerceptiv, a research-proven tool designed to ease authentic assessment at scale. Founded on over 15 years of research at the University of Pittsburgh Learning Research and Development Center, Peerceptiv is a dynamic peer learning platform that facilitates peer review, peer assessment, and team member evaluation.



Adam initially implemented Peerceptiv only in an introductory course, where the emphasis was on refining communication skills through the evaluation of lab reports. This data-driven approach allowed for a targeted focus on foundational concepts and communication skills crucial for engineering students. Adam then expanded the integration to two additional courses- a course featuring both lab reports and presentations, and another one exclusively focused on in-class presentations.

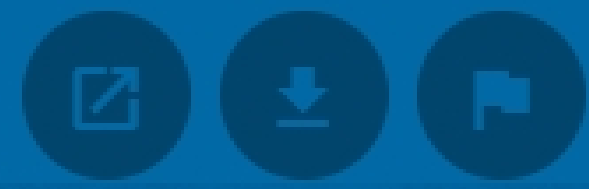


**"In reading what their peers write, they get a feel for what good communication is and what isn't—what's clear and what's not. They also get an idea of how other people approach the problem and how other people communicate that information.**

**That helps them see other options and think about what they've done themselves. Then, of course, there's the Feedback part that makes them review the comments they've received and closes that loop."**

Peer review allows students to learn from their peers by examining various examples and approaches to problem-solving. The feedback step in the peer review process serves to close the communication loop, enhancing overall comprehension and skill development.





## Project Content

Use the questions below to provide helpful feedback about this project. Make sure to identify strengths and explain how specific aspects of the project could be improved.

- What was effective about how this project presented the content?
- Was the content focused and relevant to the class material?
- What do you wish had been clearer or developed more fully?
- Did the project make you curious or want to know more about the topic?

### Project Content Comment #1 \*

Please answer the prompt listed above.

In courses with presentations, Adam uses Live Presentations to manage peer feedback. Students in the audience provide real-time, rubric-based feedback to presenters, alleviating the anxiety associated with potentially harsh instructor grading. The availability of rubrics beforehand aids in preparation and fosters a deeper understanding of the scoring criteria.





"Live Presentations is a tight, interactive way to have the students review presentations. It gives them that rubric to look at which tells them what they're judging people on, so they know what they'll be judged on. It makes them pay attention, so they're not working on their phones or something like that during the presentation and they get to do those reviews. It's also giving the students a lot more feedback than they might get otherwise and it's all consolidated in one spot."

Adam's rubric breaks down assessment into technical and soft skills, establishing a standardized method for evaluation and eliminating score inconsistencies between TAs on subjective tasks. TAs still assess technical skills in lab reports using the objective standards in Adam's rubric. By aligning TA and peer feedback with the criteria outlined in Adam's rubric, students gain a better grasp of the expected objectives, promoting a more comprehensive understanding of the subject matter and refining their analytical and critical thinking skills.

**I tell all my classes before we start introducing communication topics, "You're getting a degree from an accredited university, so [your potential employer] is going to assume you know the technical stuff. What they're more interested in, then, is these more soft skills- teamwork and communication."**







Adam requires students to complete a Team Member Evaluation (TME) after any group work, holding them accountable for collaboration skills. Adam can supervise teams from a macro level and provide individualized guidance when needed. Peerceptiv gives students the ability to flag team issues, allowing for a proactive approach. Adam can address issues that students might be reluctant to bring up, ultimately fostering a more constructive and effective teamwork experience.

For Adam and his students, Team Member Evaluation streamlines what was formerly a clunky process. Adam benefits from the platform's ability to efficiently evaluate teamwork online, providing a scalable and organized solution that aligns with accreditation standards. The elimination of paperwork, easy assignment setup, and course replication streamline administrative tasks. Meanwhile, students gain invaluable instruction on communication and assessment techniques. Peerceptiv's two-way street approach to peer feedback cultivates a dynamic learning environment, fostering improvement in the quality of group submissions over the course and allowing students to actively engage in the evolution of their skills.



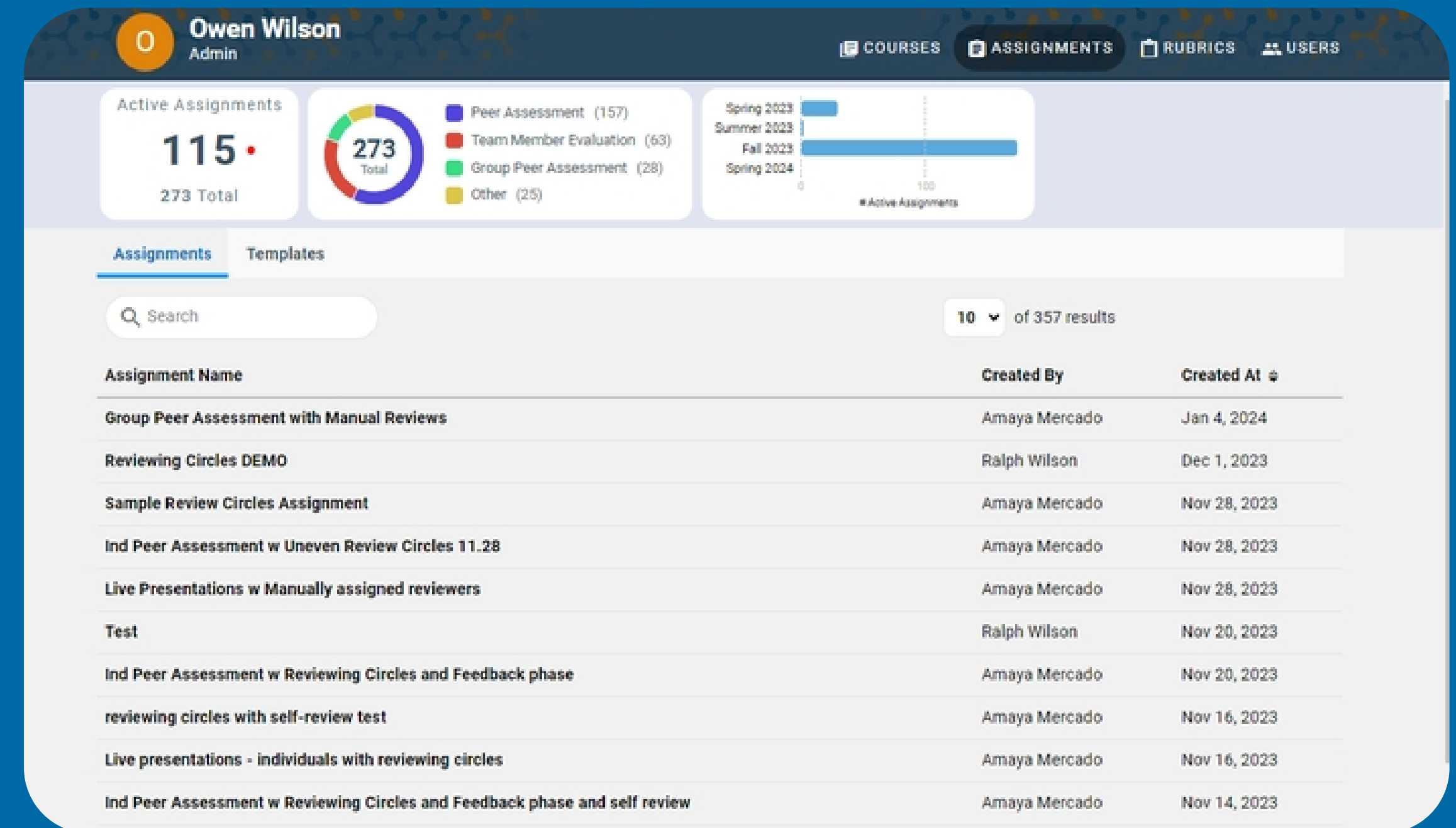
"More so than me, the students are totally online. That is how they operate, that's where their brains are, so for them, Peerceptiv works really well. Peer review, in general, provides additional benefit for the students, in that they're reading their peer's work, but for me, it's the **scalability.**"

Adam's introductory course is now one of the standard courses in the curriculum. Leveraging the Administrator Dashboard allows Adam and UVA to track student performance on key communication metrics across cohorts and courses. This unique 360-degree view provides valuable insights for accreditation.



"We essentially sat down as a department and said, "Alright, here are the ABET requirements we have to meet. These are the courses that have to address them. That professor does not necessarily have to use Peerceptiv to address those ABET requirements, but I don't know a better way to do it. If they want to do it another way, that is totally up to them. They've just got to do it. **I think that, especially given the size of introductory courses, another way would be too challenging.**"  
(laughs) That's all I have to say."

"We can use Peerceptiv data directly for our accreditation and say, 'Look this is how the students were rated, this is how they scored. This is what we consider the threshold of acceptable. This is the percentage of students that made it to that threshold and the ones that didn't.' That allows us to close the loop. If that was not acceptable, why not? What do we need to do better? Go back and maybe address that more in the course. Or what sections are they falling short on? We can look at those metrics and say 'Where do we need to make that improvement?' Again, from an accreditation standpoint, it's really important to be able to assess each [aspect of communication] and assign a number to it."



## **Embrace Peerceptiv in Engineering Education**

Peerceptiv has emerged as a pivotal tool in advancing engineering communication and assessment techniques, bringing notable benefits to both instructors and students. Instructors, like Adam, have experienced increased efficiency in grading, reduced administrative workload, and a streamlined process for managing assignments in large classes. The platform's scalability and alignment with accreditation standards ensure it is a valuable asset in preparing students for success in the engineering field.

- Increased grading efficiency**
- Reduced administrative workload**
- Streamlined assignment management in large classes**
- Scalability and alignment with accreditation standards**



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