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Onshape Case Study

Brigham Young University

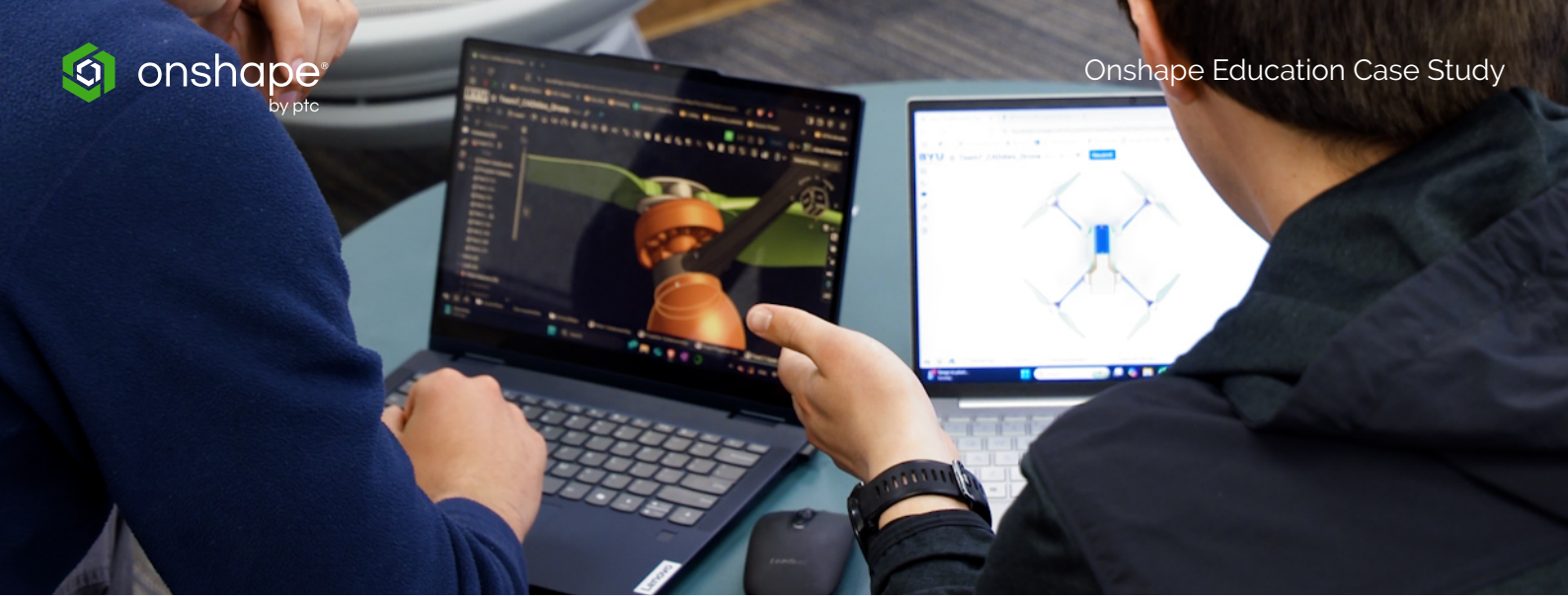
BYU

INDUSTRY: EDUCATION & UNIVERSITIES

The Challenge

Brigham Young University's Mechanical Engineering Department is committed to cultivating influential engineers who are technically skilled, creatively driven, and ready to innovate. Professor Chris Mattson, Professor of Mechanical Engineering and Director of the Design Exploration Research Lab at BYU, has spent decades studying how engineers make decisions and iterate toward better solutions. In the Fall semester of 2024, responding to a university initiative to expand online offerings, Dr. Mattson reimagined ME 272: Engineering Graphics, transforming it into a fully online course powered by [Onshape's cloud-native CAD platform](#).

Previously, ME 272 relied on desktop-based CAD software and in-person instruction, requiring students to use university-managed workstations. This setup created logistical barriers and limited flexibility. The transition to Onshape removed those constraints and unlocked new possibilities for teaching and learning.



Results

- Increased Flexibility:** Students can now access CAD tools anytime, anywhere, using any device with internet access so they can work when and where they're most productive.
- Enhanced Learning Outcomes:** The course emphasizes iterative design, creativity, and real-world problem solving. Students progress from basic modeling to advanced surfacing and collaborative design projects, including next-generation product development.
- Accelerated Feedback:** With Onshape's cloud-based platform and integrated analytics in the [Education Enterprise plan](#), instructors can monitor student progress in real time and provide immediate feedback. Assignments are graded within 24 hours using PTC's [CAD Checker app](#), dramatically improving the feedback loop.
- Improved Collaboration:** Students work together in shared documents, mirroring [professional engineering environments](#) and fostering teamwork.
- Positive Student Reception:** Learners appreciate the intuitive, cloud-native interface and the ability to iterate fearlessly without worrying about file management or data loss.



"In previous versions of the course, there was a perceived conflict between analysis and creativity, but design requires both—create, evaluate, iterate. The software we use has to support that."

– **Dr. Chris Mattson**, Professor of Mechanical Engineering, *BYU*

Designing the Future: How Onshape Transformed Engineering Graphics at BYU



Dr. Mattson mentors students through design iterations using shared document access and branching within Onshape

When Professor Chris Mattson took over ME 272: Engineering Graphics at Brigham Young University, he saw an opportunity to do more than just teach CAD. He envisioned a course that would ignite students' passion for mechanical design and innovation. With Onshape, that vision became a reality.

"Many of our students come into engineering because they want to invent something," Mattson explains. "But they're quickly immersed in calculus, thermodynamics, and material science. When they finally get to design, it has to be a great experience."

ME 272, once a traditional lecture-and-lab course using desktop CAD software, has evolved into a fully online, cloud-native experience. "We've taught two semesters now, a full academic year, and we've had virtually no problems with student connectivity, zero problems with licenses, almost no problems with hardware," Mattson says. "They've been able to work not only wherever they want, but whenever they want."

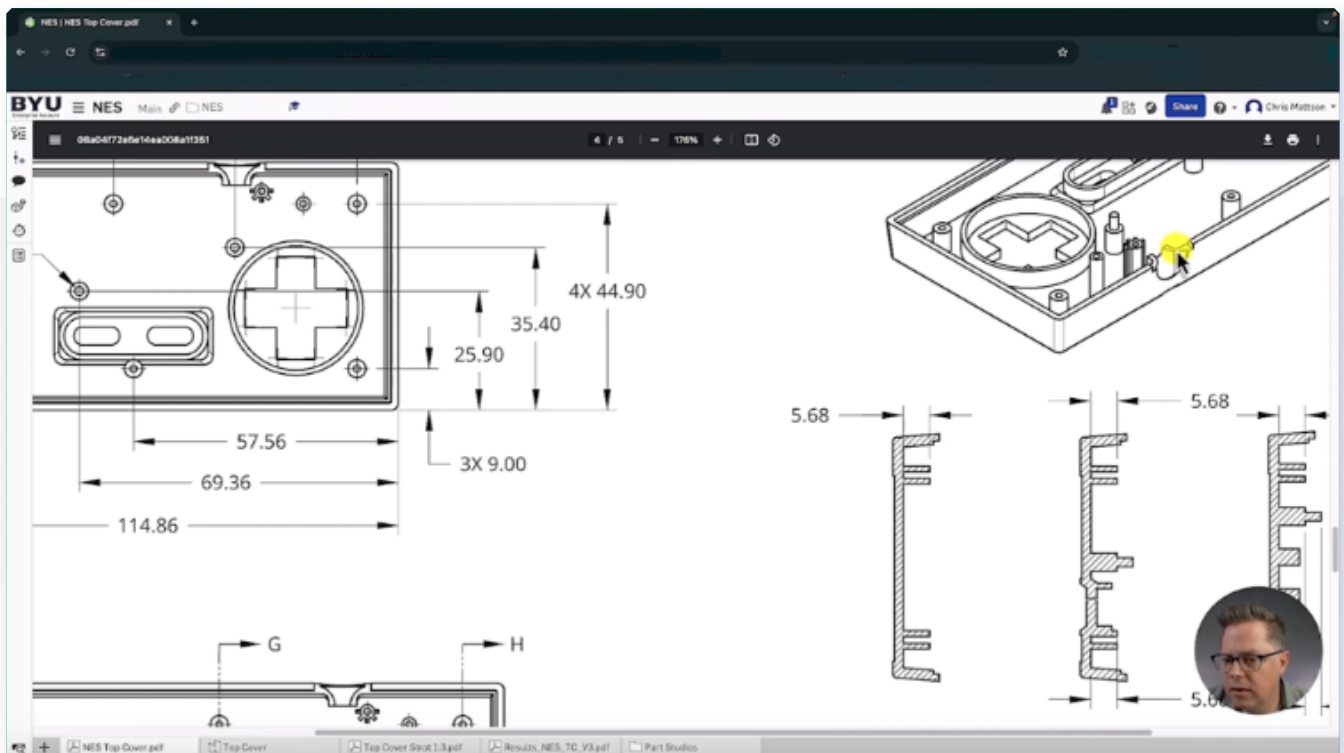
The shift to Onshape didn't just make logistics easier - it fundamentally changed how students learn. "Because Onshape is cloud-based, I can see all of their files all the time," Mattson notes. "I know whether they're active in their work or waiting until the last minute. I can go into their documents, see their history, and help them iterate toward better designs."

That visibility has made Mattson a more effective mentor. He uses Onshape's [branching feature](#) to experiment with students' models without fear of overwriting their work. "I create a branch, call it 'Mattson,' and we mess up the model together. Then we delete the branch. It's seamless—and it teaches them to iterate fearlessly."

A TA's Perspective: Empowering Students and Mentors

Kaitlyn Bell, a recent BYU mechanical engineering graduate and TA for ME 272, experienced the course both as a student using traditional CAD and as a TA supporting students using Onshape. The difference was stark.

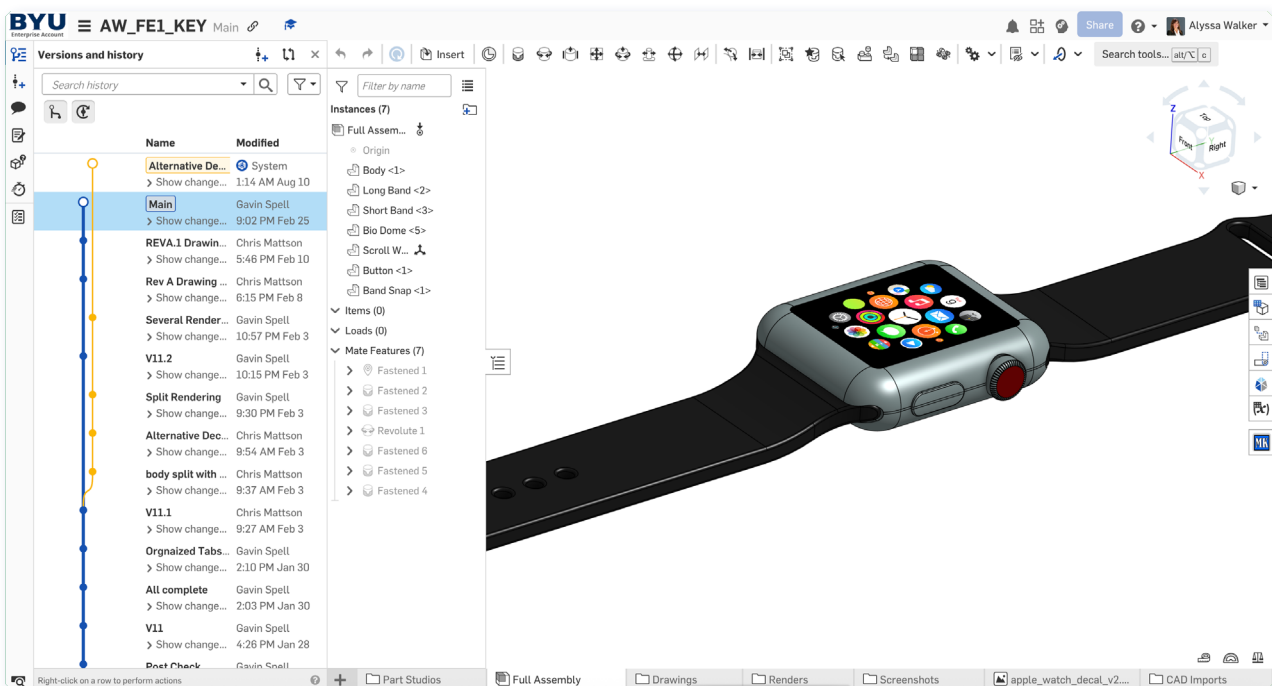
"When I took the course, I had to plan my whole day around the CAD lab schedule," she recalls. "Now, students can do CAD whenever and wherever they want. We have TAs available on Zoom all day, and questions can get answered instantly."



Screenshot of an online module from the updated ME 272 course leveraging Onshape

As a TA, Onshape's [version history](#) and document access features were game-changers. "Being a CAD TA is really difficult because there's not a right answer I can point students to," Bell explains. "But with Onshape, I can open their document, see their feature tree and version history, and understand their process, even when I'm not with them."

She also praised Onshape's collaborative tools: "We can all work on the same document, [leave comments](#), and keep everything in one place. It's super easy to track what's going on when working with multiple people on a project."



Students design next-generation consumer products while TAs are able to easily view their iterations using the versions and history panel

A Student's Experience: From First CAD to Confident Designer

For junior mechanical engineering student Dylan Conover, ME 272 was his first real exposure to CAD - and it left a lasting impression. "Onshape was the first time I had used a real CAD software," he says. "Looking back, I realize how spoiled I am. My classmates who use other CAD programs talk about problems I've never encountered."

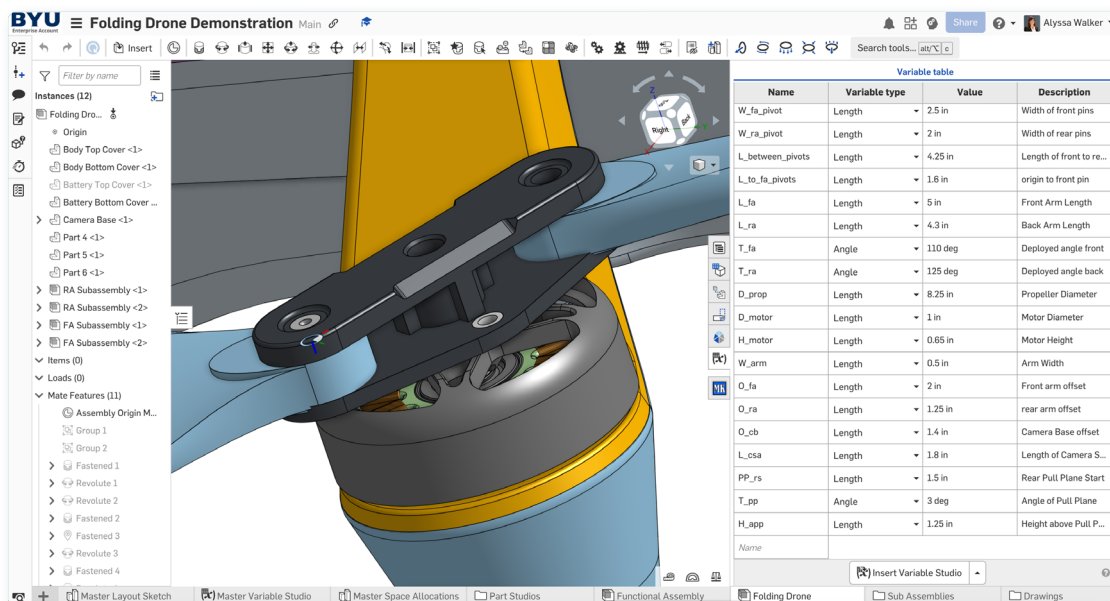
Conover quickly began using Onshape outside of class for research and club projects. “I do a lot of 3D printing and additive manufacturing research. I’ll model something in Onshape during a conversation with my advisor, make live changes, and iterate right there. It’s great for productivity.”

He also highlighted how Onshape supports fearless design: “With Onshape, CAD comes naturally. It’s just an extension of what you have in your mind. You can iterate quickly, and if something goes wrong, you just go back in your history or create a branch. It’s incredibly forgiving.”

A Culture of Innovation

The course structure itself reflects this emphasis on creativity and iteration. Students begin with foundational CAD skills, then move into increasingly complex projects, from modeling NES controllers to designing LEGO-based architectural models and next-generation consumer products. “By the end, they realize they’ve gone from knowing almost nothing to being able to do what they came to university to do: innovate,” Mattson says.

And the excitement is contagious. “I noticed a lot of students going above and beyond,” Bell adds. “They were using parameters and [configuration generators](#) to create things for clubs and personal use. They were excited to do CAD because it was so easy and fear-free.”



Assignments in ME 272 leveraged configuration variables within Onshape to allow students to explore many design variations



The Verdict

For educators considering the switch, Mattson is clear: “The licensing is easier. The collaboration is better. And with the Onshape Education Enterprise, I can [manage assignments](#), track engagement, and give timely feedback. It’s not just a CAD tool—it’s a teaching platform.”

As for the future? “More design, less time making software work,” Mattson says. “That’s what excites me.”