

Doing The Math

Castle Point Learning Systems provides a course in introductory calculus

By: David Hutter

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A mastery of calculus opens the door to careers in science, technology, engineering, and mathematics, jobs that are high-paying, in demand and necessary for a growing state economy. Because so many different academic subjects require an understanding of calculus, colleges must devote scarce resources to teaching the introductory course.



Dan Kaminski

Enter Castle Point Learning Systems which provides a platform through which college students take calculus one.

Led by Chief Executive Officer Dan Kaminski, Hoboken-based Castle Point develops its own content. Homework is delivered through a platform called Gradarius. Using artificial intelligence, the platform provides feedback to students' problem-solving efforts, points out mistakes and offers guidance. Kaminski said his company sells the platform that includes the calculus one course on a subscription basis to dozens of universities around the U.S.

"Why spend time and real estate in the classroom for a fundamental calculus one course?" Kaminski asked. "There is no reason to do that because you can do it artificially. ... You study step by step calculus one. We actually understand what you are doing, what your mindset is, what your thoughts are, and how you tried to solve it. Then we stop you and showed what you have misunderstood in high school algebra and geometry. We teach you to study as though a tutor is sitting next to you."

He said the company "started at Stevens Institute of Technology [but] it is not part of Stevens," adding, "We are a company with our own intellectual property and our own employees. This is the ideal in education today." The company does, however, sell subscriptions directly to Stevens students, rather than the university.

A former banker, Kaminski is an Israeli citizen who served in the Israeli Air Force in the 1980s and 1990s.

He said Castle Point works with a nonprofit called Open Stacks, the biggest database of STEM content in the world not owned by textbook publishers. "We have signed an agreement with Open Stacks to use their content in STEM to create STEM courses and pay them royalties. You do not need publishers anymore or a textbook. There is no cost for students to buy books."

Stevens Institute of Technology has agreed to buy the Castle Point calculus course. In addition, the company is negotiating with Rutgers University and the New Jersey Institute of Technology, Kaminski said. Representatives of these universities declined to comment on negotiations. Outside of New Jersey, Castle Point is working with Arizona State University, Penn State University, the Ohio State University, the University of Chicago, and the University of Minnesota.

The course allows university professors of mathematics to do other academic assignments that generate revenue by writing academic books and papers and conducting research, Kaminski said.

"They benefit from not having to teach calculus one," Kaminski said.

Alexei Miasnikov is a distinguished professor in the department of mathematics at Stevens and the president of Castle Point Learning Systems. He developed the calculus course for Castle Point Learning Systems.

"The idea right now would be to outsource the routine of the professors," Miasnikov said. "Professors do a lot of routine when they are teaching and it is not necessary. We would like to outsource it to software. The routine, which is maybe 50 to 60 percent of their time, will be outsourced to computers. I think that is one advantage we are giving to professors. They can focus on something much more conceptual." A mastery of calculus opens career opportunities.

"Without calculus, people will not understand a lot of engineering and science courses," Miasnikov said. "It is the first abstract course. ... That is the course you think a lot of people will fail. It is not chemistry or physics. It is calculus. We started as a bunch of academics who created software."

Kaminski believes this technology is the future of teaching.

"Everything started four or five years ago at Stevens with Alexei and fellow founder Alex Myasnikov to help students succeed in calculus," Kaminski said. "They created software to help with homework. This was part of the innovation center at the Stevens Institute of Technology. ... The software helps professors. ... Two years ago this spun-off from the innovation center at Stevens."

Alex Myasnikov and Alexei Miasnikov are recipients of the New Jersey Inventors Hall of Fame Award for Advancement of Innovation & Process. Kaminski once served on the board of the innovation center at the Stevens Institute of Technology.