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Need help with class? YouTube videos await

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MIAMI - When University of Central Florida junior Nicole Nissim got stumped in trigonometry, she checked out what was showing on YouTube.

Nissim typically scours the video-sharing Web site for clips of bands and comedy skits. But this time she wasn't there to procrastinate on her homework. It turned out YouTube was also full of math videos. After watching a couple, the psychology major says, she finally understood trig equations and how to make graphs.

"I was able to watch them at my own pace and if I didn't get a concept, I could easily rewind it," Nissim says. "It was a lot clearer once I watched the video."

YouTube is perhaps best known for its cavalcade of homemade performances and TV clips, but many people like Nissim are turning to it for free tutoring in math, science and other complicated subjects.

Math videos won't rival the millions of hits garnered by laughing babies, but a YouTube tutorial on calculus integrals has been watched almost 50,000 times in the past year. Others on angular velocity and harmonic motion have gotten more than 10,000 views each.

The videos are appealing for several reasons, says Kim Gregson, an Ithaca College professor of new media. Students come to the videos when they're ready to study and fully awake — not always the case for 8 a.m. calculus classes. And they can watch the videos as many times as they need until they understand.

Viewer comments reflect that. On tutorials posted to YouTube by the not-for-profit Khan Academy, for example, reactions include: "Now why couldn't my calc instructor explain it that simply?" and "I was just about to leave my physics course. You saved me." One viewer went as far as to declare to the man behind the videos: "You are god of mathematics!!!"

What's creator Salman Khan's trick? Keeping it simple, he says. He takes a laid-back approach, focuses on a single concept and keeps the videos to a digestible 10 minutes. He says he purposely did not create clips featuring himself standing at a whiteboard. He wanted something more akin to sitting next to



Nicole Nissim is seen on campus at the University of Central Florida in Orlando, Fla., Wednesday, Dec. 10, 2008. Nicole found videos on the YouTube web site to help her with trigonometry equations in a math class. YouTube is perhaps best known for its cavalcade of homemade performances and TV clips, but many teens and young adults like Nissim are turning to it as well for free tutoring in math, science and other complicated subjects. (AP Photo/John Raoux)

someone and working out a problem on a sheet of paper. He uses the low-tech Microsoft Paint sketching software, with a black background and brightly colored lines and equations as he works through his explanations.

"If you're watching a guy do a problem (while) thinking out loud, I think people find that more valuable and not as daunting," says Khan, a California hedge fund manager by day and math geek by night.

Educated at Harvard and the Massachusetts Institute of Technology, Khan developed his tutoring hobby when a younger cousin was having trouble with sixth-grade math. As word of his knack for teaching spread among relatives and family friends, Khan got tired of explaining the same things over and over, so he created videos and posted them on YouTube. He formed the Khan Academy, currently a one-man show, with the long-term goal of starting a school that uses technology to customize learning for students.

Khan's video clips have developed a following far beyond that immediate circle of relatives and friends, and now he gets dozens of e-mails a week from around the world — including requests for videos on specific topics and help solving particular problems. He now claims about 600 videos on subjects spanning math, physics and even the tanking economy.

Khan says the heartfelt feedback

motivates him to keep churning out the clips, which he works on for about three hours a night.

University of Miami education professor **Walter Secada**, who specializes in how math is taught, praises Khan's personable style. But while Secada says the Khan videos he reviewed are accurate, he's concerned about how Khan uses an example to define a term, rather than defining the term more generally. Secada says he can envision some students becoming confused when having to apply a concept to a different example.

"It may seem like a small point but it lays a foundation for later problems," Secada says. "That's the strength and the weakness of this. In an eight-minute video, you can only do so much."

YouTube's potential for instruction is one reason Internet search leader Google Inc. bought the video site for \$1.76 billion two years ago. Google founders Sergey Brin and Larry Page realized that certain search requests could be better fulfilled with how-to videos than with written explanations. But they didn't have a good way of filling that need until YouTube landed in their laps. Now Google includes YouTube videos when it delivers search results.

Not all tutoring videos on YouTube are created equal, however.

Central Florida sophomore Jacqueline Boehme found that out quickly when perusing biology clips. Some had poor video quality and were blurry or too small.

"There are definitely some that are better than others, so it's always useful to look at a few," says Boehme, who has looked up videos that explain processes like protein synthesis. Boehme says the 3-D representations have helped her conceptualize what she's learning in class.

Secada would like to see math faculty incorporate some videos in their teaching, or recommend clips that have been vetted. He cautions students not to depend solely on what they find online.

"There's a point at which kids do need to double-check with their textbook" and professor, Secada says. "Before you need to quote this in your test, you need to look at this and check if it's right."

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