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# Using Video Case-Studies to Develop Proof Writing Skills

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# Background

- Our Project

  - six years

  - more than 40 edited videos

  - website

- Our Focus

  - student learning

  - faculty development

  - research

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# The Videos

Sample video

Statement given to students:

Let  $f$  and  $g$  be two real-valued functions with domain  $D$ . If  $f$  and  $g$  are bounded above, then  $h = f + g$  is bounded above.

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# Types of Discussion Questions

- How do you think the students came up with their idea?
  - What are the students thinking?
  - Have they made progress?
  - Do they have a proof?
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## Private Video

This is a private video. Do you have permission to watch it? If so please provide the correct password.

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# Outcomes--from student feedback

- Videos challenge students to articulate why a particular strategy works or doesn't.
  - Students can critique work of peers without criticizing classmates/friends.
  - Language used is that of peers; more understandable than other approaches
  - Students see it's ok to make mistakes; others struggle, too.
  - Students gain more experience seeing what to do when stuck, how to break a statement into smaller parts, how to use examples effectively.
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# Outcomes--from faculty perspective

- Videos add pedagogical variety.
  - Students develop a greater sense of confidence in their abilities.
  - Students are more likely to try multiple approaches to a proof.
  - Students are better able to understand the level of detail needed in a proof.
  - Faculty gain greater insight into students' thinking processes and a greater understanding of where their difficulties lie.
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# Quotes from Students

- “I've always found textbooks are really difficult... they take a long time, for me, to parse through the language, especially. The videos are nice because it's students. And they always speak in the same language. And that makes it really helpful.”
  - “To know these are smart kids, and they have been through the class, and to know that they struggled too... it's encouraging.”
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- “It helps with your thinking, and identifying which proof to use and why they are thinking that is the right kind of proof to use.”
  - “The videos are really interesting because they show another way to do a problem, they open you up to another way of doing it.”
  - “It’s not fair to pick a kid out of class and like, “Do this problem on the board right now, let’s see you go for it”. But to watch a video of someone doing it, it’s nice. It brings something to the class that you can’t get without embarrassing someone.”
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Interested in hearing more?

**MAA 2014 PREP Workshop**  
**Using Video Case Studies**  
**to Develop Students' Proof-writing Skills**  
**Connie Campbell, Jim Sandefur, Kay Somers**

**June 1-4, 2014**

**Millsaps College, Jackson, Mississippi**

**To register or learn more,  
visit [www.maa.org/PREP](http://www.maa.org/PREP)**

