Exploring transformations of functions with TI-Nspire™ Navigator™

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Case Study

| Teacher	Cindy Hunt
Location	Davison Church of England High School for Girls, Worthing, England
Class	Year 11 students on a GCSE Higher examination course
Technology	TI-Nspire™ Navigator™

Setting

Davison Church of England High School for Girls is a state secondary school and I have been using the TI-Nspire™ handhelds with this class periodically since July 2007. In May 2009 I began to use TI-Nspire™ Navigator™ and in this I used the Screen Capture features.

The lesson

In this lesson I wanted the students to explore the effects of different transformations of linear and quadratic functions to enable them to make generalisations for themselves. We began with a new Graph and Geometry page and I gave the students lots of pairs of functions to draw and compare. For example how did $y = x^2$ compare with $y = (x+2)^2$?

We looked at the Screen Capture view as a class to discuss the similarities and differences between the resulting screens.
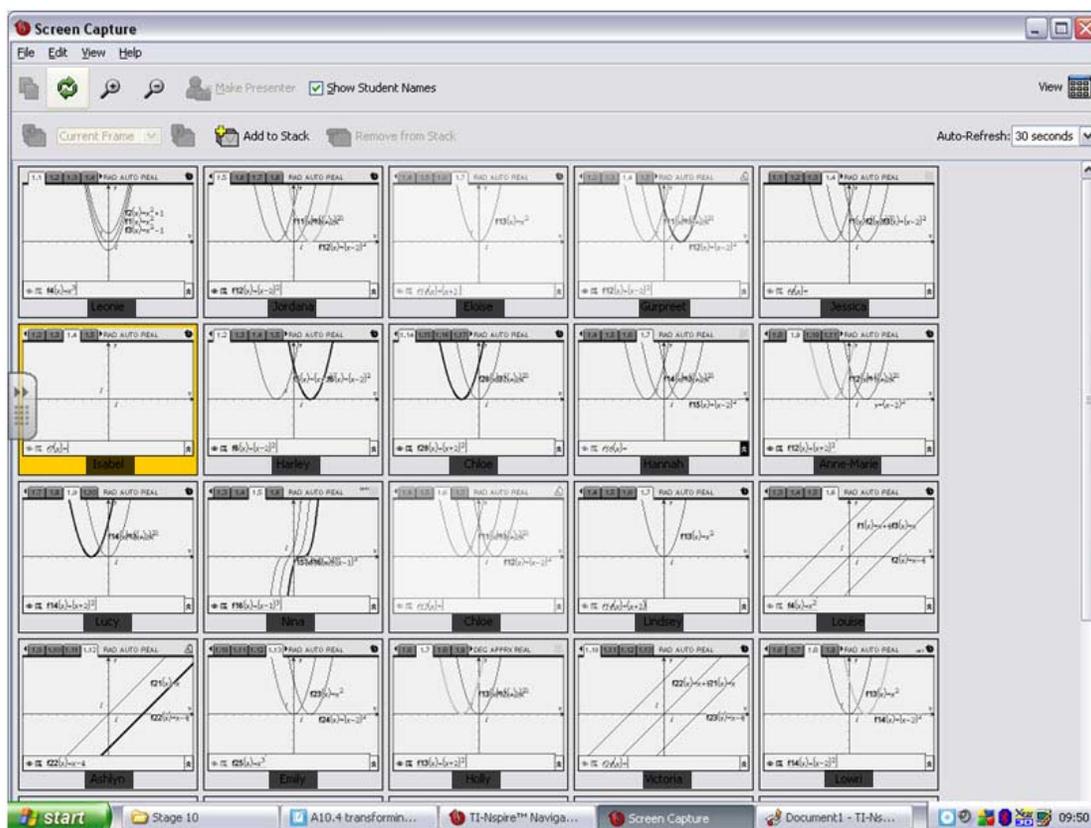
As there were over twenty pairs of functions that the students were comparing, I realised that it was difficult to direct the students to a particular screen to compare – I needed to think carefully about how I grouped and labelled the functions when devising the worksheet next time!. Hence some of the students' screens showed vertical translations and others showed horizontal translations!

Students' mathematical learning

The use of the Screen Capture view did allow the students to begin to make the obvious connections between the different types of transformations and the effect of these on the graphs. Most of the students were able to connect the vertical translation of functions by adding a constant to their existing knowledge of changing the value of c in linear functions of the form $y= mx + c$.

Conclusion

As this was one of the first lessons that I had designed that used TI-Nspire^{TM} Navigator^{TM} I realised that, as Screen Capture gave us the opportunity to discuss fewer TI-Nspire^{TM} screens in more detail, I did not need all of the students to work through many similar problems - it was actually much more memorable to look at screens that appeared different, but, because of an underlying mathematical concept had something similar about them. This meant that I could have let the students choose their own functions to transform in particular ways - something that I will try next time.