

## **TSG 34: Comparing our very different contributions**

*Variational Tasks in Dynamic Geometry Environment*

Arthur Lee, Allen Leung

*Polygons. Triangles and capes. Designing a one day team task for senior High School*

Aad Goddijn

Surprising how different two design stories can be, even if they have geometry of polygons as a common mathematical subject!

I appreciated in Allen and Arthur's contribution the use of a DGE to construct a web-based diagnosis and learning tool for dynamic geometry.

I think it is interesting to see how students are able to bring by dragging a certain condition in a dynamic figure to the light. The results of the research inspired my thinking about geometry. For instance the examples where there is an overview of the points chosen by the students (figure 1 to 4 for instance) made quite clear that there is a slight preference for the line which is most nearby to horizontal in the figure, which I find natural for students doing geometry, even if the geometry is presented in a purely mathematical way with no direct connection to physical situations. The documentation about angle ACP in figure 6 is illuminating. Answers around 30 and around 53 degree are in the majority. But values have sharp peaks in the graphs, a sign that students share with certainty the answers. The 53-degree answer is most likely an outcome of misunderstanding of the task itself.

Observations like those two by myself became possible because of this clever research design!

I also appreciate that there is room for teacher contributions to the task design, which is apparent from the second example.

My contribution did not focus on student reactions to a design, but only on the design process itself and on the way it is influenced by a special setting which combines a national competition with part of the students portfolio for the final school examination. As the task in this setting should be a novel one, at least for students and teachers, part of the design work is about finding something 'new' and about the way it is fine-tuned into an assignment which can be sent to a great number of students without great risk of complete failure.

This is why we liked also to work in close cooperation with some experienced teachers. Our team is a mixed one of educators and mathematicians and I stress the mix of mathematical and didactical activity in the design process.

It is easy to make a long list of the differences between the two contributions, but in my opinion that's in away quite beside the point. Vast differences are in the situations (diagnostics versus open task), students (junior highschool versus senior), mathematical content (basic geometry versus more advanced) and medium (webbased versus paper and pencil work). Those different goals and circumstances determine almost totally the way the designs are executed. I appreciate both designs on their own grounds and believe that, if there is anything like a theory of design, it should mainly be a series of local theories for restricted parts of the educational design work and with maybe only a lightweight umbrella which connects things only loosely.

May be a statement to debate about in the TSG?

Aad

