Making three-dimensional shapes enhances problem-solving skills in Grade 8 boys
St Alban’s College is situated in the east of Pretoria, South Africa. It was established in 1962. Approximately 550 students. Half of the students (boys) live on campus.
Participants

- The research group consisted of 25 boys of age 14 (Grade 8)
- The boys were of mixed mathematical ability
Focus

- Learning about surface area and volume of 3D shapes.

Cuboid

Pentagonal Prism
Action

- Permission was obtained from parents to allow boys to be part of this research.
- Boys completed a pre-survey questionnaire to determine their understanding of surface area and volume of 3D shapes. (SurveyMonkey)
- Actual construction of 3D objects from paper and cardboard in groups of three.
- Interviews with the boys were conducted during the building process.
Action

- The shapes that were built were initially simple and were developed into more complex 3D shapes.
- Boys were asked to create a self-assessment that their peers could make use of.
- At the end of the making process, the boys completed a group online assessment. (Maths Buddy programme)
- Lastly, a post-survey questionnaire was completed. (SurveyMonkey)
Boys making
Boys making
Boys making
Boys’ voices

“This is why it’s called surface area and not just area”

“Now I know why volume only applies to a 3D shape”

“Why can’t we do more of this kind of thing in high school because we used to do a lot of this in primary school?”
The challenge

- Boys were required to complete a Grade 10 assessment based on surface area and volume of 3D shape. (Maths Buddy)
Conclusions

- Throughout the making process, the boys’ understanding of 3D shapes increased.
- The making of the shapes consolidated the abstract maths that was involved.
- However, there was still room for improvement in their understanding of surface area and volume.
- The Maths Buddy assessment indicated that the boys’ problem-solving skills had improved due to the concrete process involved in making the shapes.