



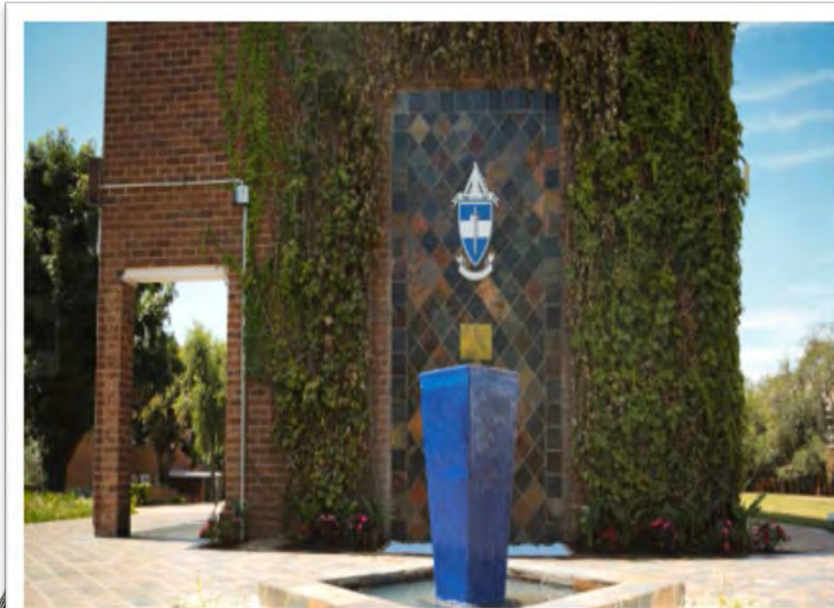
ST ALBAN'S COLLEGE

IBSC ACTION RESEARCH 2015

Making three-dimensional shapes enhances problem-solving skills
in Grade 8 boys

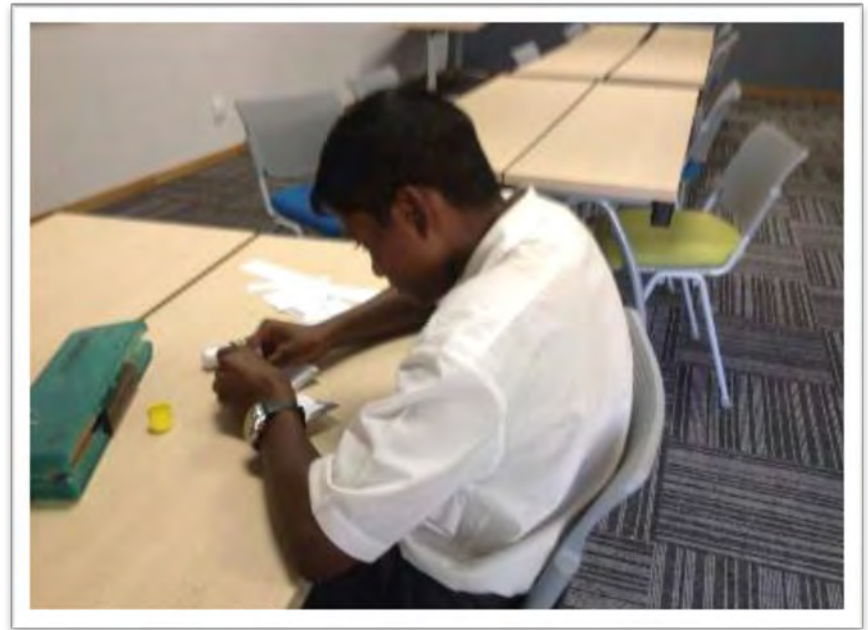
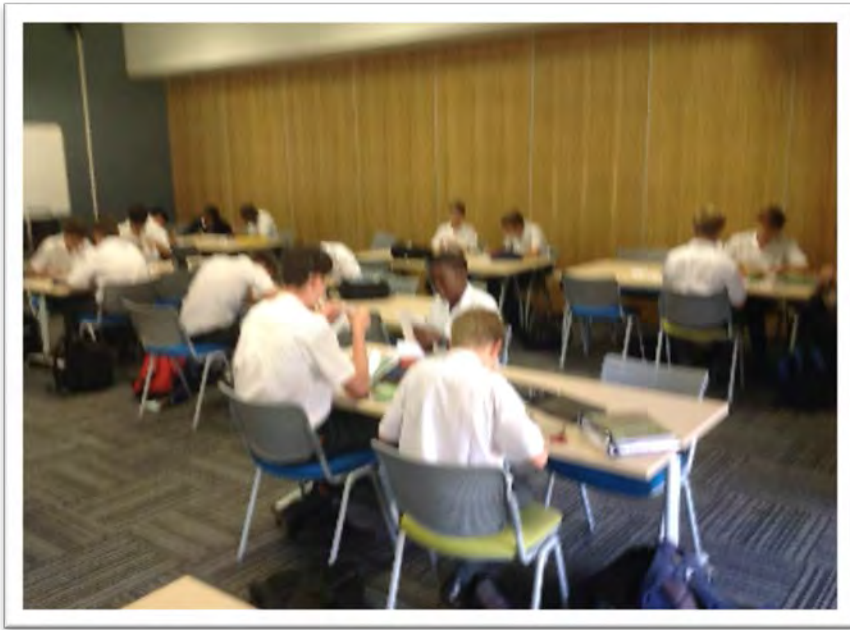
Introduction

- 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



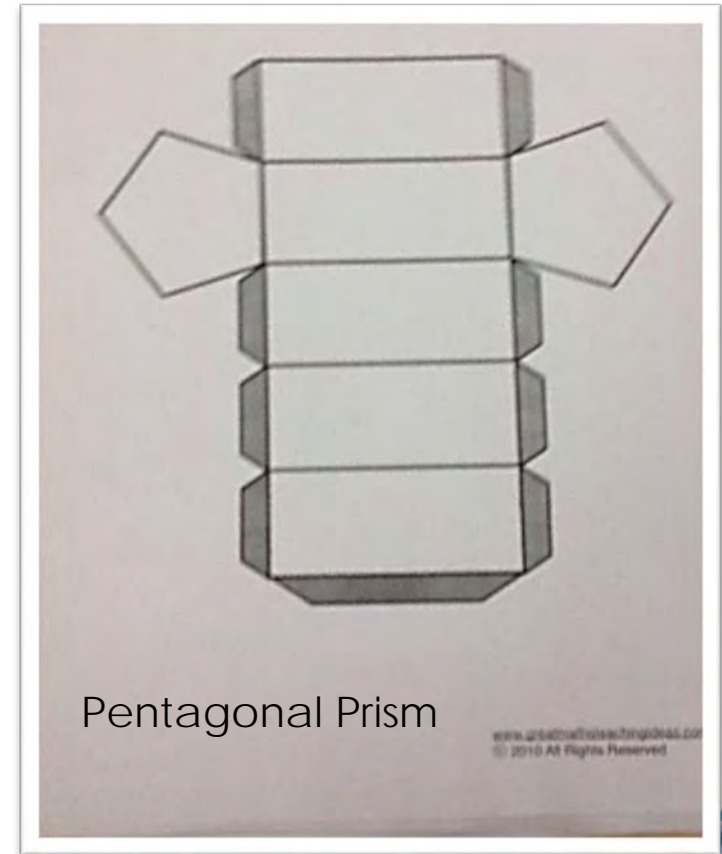
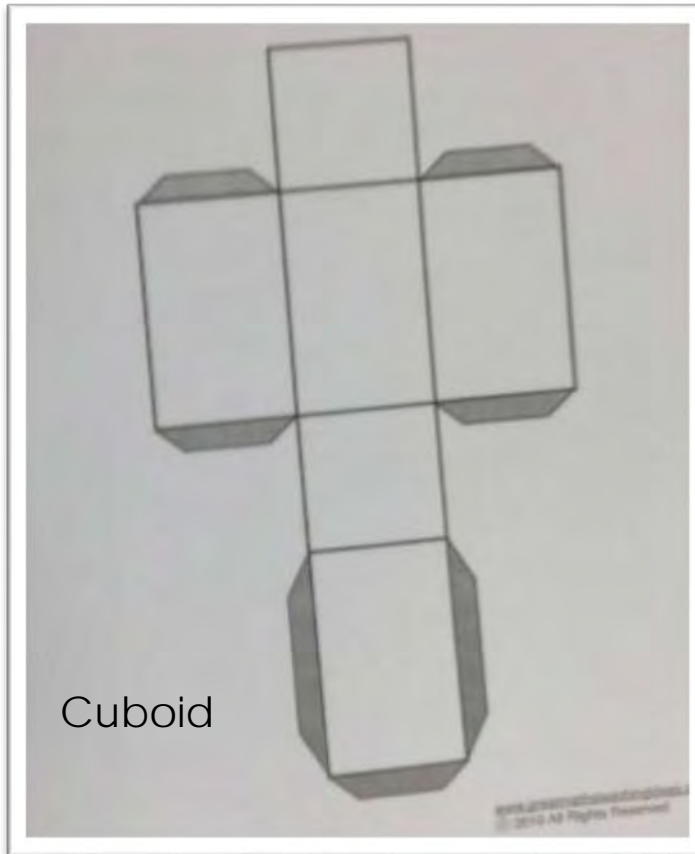
Participants

- 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.



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

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

"This is why it's called surface area and not just area"

"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)



The screenshot shows the MathsBuddy website homepage. At the top, the logo "MathsBuddy" is displayed in white on a purple gradient background, with the tagline "Specialist Support in Primary Mathematics" below it. To the right of the logo, the contact information "t: 075 2654 69" and "e: info@mathsbuddy.co.uk" is visible. Below the header is a navigation menu with buttons for "HOME", "ABOUT US", "TESTIMONIALS", "TUITION", "FAQ", and "CONTACT US". The main content area features a "WELCOME TO MATHSBUDDY" heading with a star icon. To the left of the text is a yellow toy car. To the right is a green bag with a white handle, surrounded by several circular icons containing multiplication problems: 4×3 , 2×12 , 30×2 , 7×2 , 30×3 , 2×2 , and 4×3 . Below the heading, the text reads: "Welcome to MathsBuddy. MathsBuddy was set up to help parents support their children and to help teachers use different methods that will lead to a better understanding of maths and increased confidence. MathsBuddy can help you in the following ways:" followed by a list of services: "provide tuition for students", "sell specially selected games that are used by MathsBuddy to increase children's understanding of maths", "offer training to parents and parent groups", and "offer staff training in schools". At the bottom left of the main content area, there is a "Visit Our Shop" link with a small shopping cart icon.



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.

