

The Hive – St Christophers Primary, Holsworthy

By Tony Boyd (Principal, St Christophers Primary, Holsworthy), Dominique Goode (Year 2 Teacher, St Christophers Primary, Holsworthy), Simon Crook (Founder, Crooked Science)

Sustainability, low energy costs and real world learning are all tied together in an innovative new portable classroom called the Hive. In the press release from ARENA who provide the Hive they refer to it this way: "Known as the 'Hivve', the portable classroom incorporates solar PV generation, real time energy metering, CO₂ metering, data capture and communications to actively manage energy demands and control indoor environment quality."

In 2017, St Christophers, Holsworthy faced the prospect of getting another stock-standard demountable classroom until the Principal, Tony Boyd, was approached to host a new type of sustainable portable building. And so the journey began!



The front of the HIVE classroom at St Christopher's Holsworthy

The Hive is a portable modular classroom designed to meet the needs of growing schools. However, it goes a number of steps beyond this. The building is not only made out of sustainably sourced materials such as plantation wood, but also has a roof covered in the latest solar panels. These panels, combined with state of the art insulation, mean that the Hive looks after all its own energy needs. In fact, in summer it not only generates enough energy to power its two efficient heat pump units, but can power an additional six similar classrooms! In a time of ever increasing power costs, this is a great saving for any school.

However, the Hive is not just a great piece of infrastructure; it is also a wonderful learning tool. The school has worked with Dr Simon Crook, founder of STEM education consultancy Crooked Science, to develop Science teaching units which utilise the data collected on the Hive. This includes energy generation and usage, temperatures inside and out, and air quality counts. The students at St Christophers are able to investigate the Hive's performance compared to standard demountable classrooms.



Behind the HIVE classroom, showing some of the technology

Students as young as Year 2 are accessing the Hive as part as their Science and Technology units. In Term 3, Year 2 are learning about the Earth's resources, and will visit the Hive to observe and compare the costing of the Hive versus those of a standard demountable classroom. They also plan to analyse the Hive's effectiveness at saving money for the school and as being an environmentally friendly resource. Miss Kristen Tomsen who teaches Year 2 said, "It was an opportunity for Year 6 students to become experts in the Hive as a resource and its sustainability to then share back with Year 2 in a reciprocal learning task."

Australian Renewable Energy Agency (ARENA) and the Federal Government have installed monitoring equipment not only in the

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Hive but in a nearby standard demountable classroom. The children have learnt about baseline data and standard usage, concepts important to any scientifically rigorous study. They have been able to draw data-informed conclusions about the effectiveness of air flow, insulation and energy generation. The Hive has become an effective real life laboratory, assisting children to learn about investigations in a scientific manner.



The iPad located within the classroom to monitor air quality and energy usage in real-time

Some neighbouring schools are also making use of the Hive as part of their learning. St Christophers, Holsworthy has begun a STEM program in 2018 for all students across K-6 which combines the disciplines of Science, Technology, Engineering and Mathematics. Students from All Saints College and its feeder schools, All Saints Catholic Primary and St Christophers were invited to take part in an enrichment opportunity this year for STEM. Twenty-five students from Years 5-9 participated in a thirteen-week program focusing on “Sustainability and its Benefits to the Environment”. Mrs Renee Makram and Ms Renee Anderson, both from All Saints Catholic College, Liverpool, explained, “As a major component of the STEM program students were required to design, build and test a model of a sustainable home. In correlation with this, the students accessed the Hive at St Christophers, Holsworthy to witness first hand an example of a sustainable classroom, and to view the technologies which allow the quantity of energy the building is producing to be monitored and tracked.”

Year 5 have also incorporated the Hive as a resource for a Term 2 Science and Technology Unit titled “My House Rules”. The 2018 Year 5 students at St Christophers were able to investigate

and analyse the Hive as a sustainable resource, and use this to design their own Hive using sustainable resources as part of their assessment for this unit. Mrs Jillian Ripepi, who teaches Year 5, said, “We looked at properties of materials for suitable and sustainable structures, and visited the Hive.” Mr Christopher Yallouris, who also teaches Year 5, said, “Year 5 used their knowledge from their Hive investigations to construct bridges using their learning about how design impacts the strength and longevity of a structure. Year 5 planned and built several bridges to test their ideas, and achieved some impressive results.”



The STEM teacher inside the classroom giving a coding lesson to the Year 6 students

Overall, the Hive has been a great initiative at St Christophers, Holsworthy. Not only has it provided an interesting and sustainable learning space, it has influenced the teaching and learning of the students, K-6, around many aspects of Science and Technology. With the advent of the New NSW Science and Technology K-6 Syllabus commencing in 2019, St Christophers is very well situated to make the learning experiences of the students most authentic by working in harmony and understanding of their own learning environment.