CLASSROOM PRACTICE CASE STUDY CP908 | SEPTEMBER 2009

HARD MATERIALS TECHNOLOGY | YEAR 10

SKATEBOARD HEAVEN

First-year teacher Alexia George's survey of what her students wanted to do for Materials Technology resulted in the class researching, designing and producing skateboards in teams of four. This case study highlights the challenges that both the teacher and students faced with unfamiliar subject matter, the significance of teamwork in producing a successful outcome, and the benefits of an industry mentor on motivational levels.

FOCUS POINTS INCLUDE:

- Research
- Motivation
- Industry mentorship
- Team planning and delegation
- Design and construction techniques
- Understanding the importance of each component in a production line

ADDITIONAL LINKS

www.cheapskates.co.nz
www.nelsoncreek.co.nz
www.youtube.com/watch?v=TSA9mokQcng&feature=related
www.diyskate.com/skateboard.html

THIS CASE STUDY:

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SKATEBOARD HEAVEN

Background

Kapiti College in Raumati Beach on the Kapiti Coast is a decile 9 co-educational school with 1,170 students in 2009. Technology is compulsory at Kapiti for Years 9-10, with Year 9 students studying Hard Materials, Food, and Textiles for a term each, then two half-terms for Graphics and Engineering. Year 10s then have the option to choose one of these core Technology areas to focus on for the year.

Teacher Alexia George is from the Wellington region and studied a conjoint BA/BTchng degree in Design Studies at Victory University. Originally Alexia wanted to be an art teacher but while studying made the change to Technology, a move she hasn't regretted. After finishing her degree, Alexia began teaching Visual Arts and Technology at Kapiti College in 2009.

Alexia's Year 10 Technology class comprised of 28 students, mostly boys, doing Hard Materials Technology for their second-term, an area the students had little experience of with any level of complexity.

Designing decorations for the skateboard covers

Pre-planning

Alexia's goal for the Term 2 Technology class was to create a unit that had the students truly involved in and excited about what they were doing. "It's very difficult to get the students to engage with something they don't put any value on, so I surveyed them, asking questions like 'Why do you choose to do Hard Materials?' and 'What would you like to make in Hard Materials class?'. There was an overwhelming response from the students that they wanted to make skateboards, so then I really started looking into it."

Alexia was excited by the idea of making skateboards, but this was an area she knew very little about so she had to quickly do a great deal of research before the term began.

"I had to learn a lot to begin with as I had no idea how a skateboard was made. I did a lot of internet searching, watched production videos, talked to people in the skateboard world in the Wellington area, and rang the manufacturer from Nelson Creek Skateboards in Greymouth to learn as much as I could about the process before leaping into it."

Alexia then made contact with the local Cheapskates' co-owner Dave Green, and found she had struck gold.

"Alexia emailed our shop and wanted to know if there was any possibility of us putting some input into her project," says Dave, "and I thought 'well I'm in Paraparaumu and I'm making skateboards and there's probably no one that knows more about it than me. Kapiti College is also my old school so I thought I'd do it myself rather than send someone.'"

After talking with Alexia, Dave decided to take on the role of mentor for the unit. With over 30 years' experience in all aspects of skateboarding – from competing in the early days of the sport through to becoming a joint owner of New Zealand's most recognised skateboarding brand – Dave would be an invaluable source of knowledge for both Alexia and her students.

Preparation was crucial to delivering the unit. "Being the first time for this unit, during its delivery we had to think on our feet and a lot of

our decisions were done on the spot. But I also did a heck of a lot of planning beforehand."

In her planning, Alexia focused on developing particular key competencies (relating to others, participating and thinking) and values (excellence, innovation, enquiry, curiosity and respect for themselves and others) and on encouraging experimentation, student initiative and self learning. Key to achieving this was to create a balance of individual and group learning.

Alexia decided to split the class into groups of four to five students and appoint a team leader, choosing people who she thought "could deal with the combination of personalities" and who would then allocate jobs to the others within the group. "Ensuring the leaders set each student with jobs would give each a sense of importance and a feeling of responsiblity for themselves and also to the group. I also asked that the students fed back to their teammates, explaining what they'd been working on."

Delivery

The unit began with a look at the history, trends and culture of skateboarding. Dave Green was introduced to the class and related his experience with the New Zealand skateboarding industry from its earliest days, putting the project into context, and showing the students how their projects could fit into the progression of skateboarding from its inception through to current boarding styles.

"Dave's talk about his history and involvement with skateboarding and everything about the culture that goes along with it had the students in awe. Dave had the experience and connections within the industry which made the whole thing much more real for the students. He also taught me and the class woodworking techniques we weren't aware of which proved invaluable later on."

Alexia believes that this introduction made all the difference to the attitude within the class and to the level of enthusiasm and participation.

The groups were then formed and a strategy for progression put in place, research began with the students using YouTube videos to study some of the production techniques for skateboards within the industry. Each student had specific research they were responsible for which they then had to report back to the group.

Work then began on the design, where group decisions were made on size, shape, and contour in accordance with the intended function of the board, with larger boards for cruising and smaller ones for tricks. At this point, the assigned students also started drawing up plans for the board graphics. With a basic design drawn up, the students had a visual guide as to what they wanted to do and could communicate this to the other groups, Alexia and Dave.

The groups then began to experiment with various materials, using different combinations to find the best result possible for weight, strength and ease of use. Once the groups had decided on the best combination of design and materials and showed that they were able to communicate this into a workable plan, construction began on the first prototype boards.

The first step in the construction process was to create moulds for the fundamental board shape. The students cut several pieces of MDF to the desired shapes. They found it challenging to 'get their heads around' the complex curvature that was needed to improve the structural strength of the boards, so multiple experiments were carried out until the students felt confident enough to press their first prototypes.

To make a typical skateboard body requires several layers of thin wood to be pressed together between a male and female mould of wood or concrete. Great pressure is needed to fix the shape of the mould into the board while dry – to make the board strong enough to take the punishment of everyday skateboarding, it was important that there were no gaps between each layer.

Alexia's highly innovative, easily affordable solution to the problem of bending the wood in a press to shape the curvature of the board – use a bottle-jack!

With no access to the high-pressure presses used in industry, the class needed to find a press that was affordable. In a stroke of inspiration, Alexia came up with the idea of using a common automotive bottle jack as a simple, affordable solution, easily providing the necessary pressure when used within a solid wood and steel frame.

The female mould was placed at the bottom of the makeshift press and three layers of 3mm plywood were then placed onto the mould, each coated with glue to form a firm bond. The male mould was then placed on top and the bottle jack then pressed the male mould down into the female mould, sandwiching the plywood layers in between. This was then left overnight, or sometimes longer, until the layers of plywood permanently took on the curves of the mould. While primitive in comparison to current industry technique this method gave the students a truly hands-on experience of making a board and seeing the process that goes into its creation.

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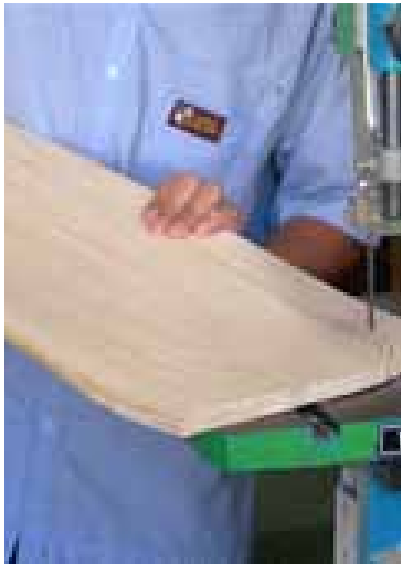
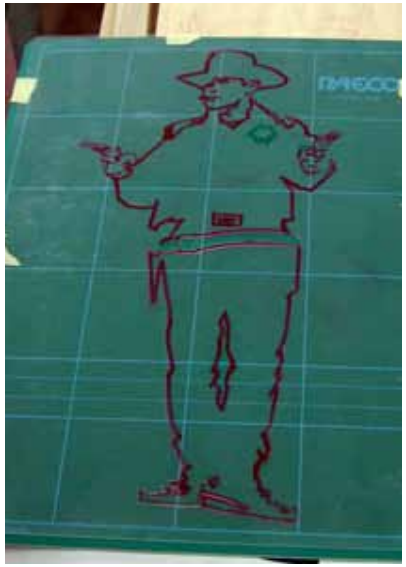


Cutting out the basic shape from the pre-curved board

Planing is followed by shaping using a spokeshave for finer details

After applying the designs and finishing, the wheels are finally attached

A completed board



The students also designed a carrier bag for their skateboards

In the first results that came out of the press, the 3mm plywood layers weren't sticking together properly – due to the inherent nature and strength of the material. In their search for an an alternative, the class managed to source 1mm wooden veneer used in the industry. This, while superior to the plywood in many ways, created problems of its own.

"The veneer was so thin that it actually bubbled because we didn't have full area surface contact," Alexia said. "We had to do a little problem-solving then decide what changes we would make to our jigs to make it work or we would have had to revert back to the plywood."

Repeated trialling eventually solved the problem and a second batch of prototype boards began to come out of the press.

A paper pattern, similar to a dressmaker's, was then placed onto the board and traced around to get the basic board shape. This was then taken to the band saw where a rough cut was done leaving a margin of a few millimetres for error and for the finer finishing work that was to follow.

At this stage Alexia noticed the atmosphere of the class change – the students began to engage in a way they hadn't at the start of the unit.

"When they saw the skateboards beginning to look like skateboards, they really started to realise that they had done something special. In those final weeks, where the pressure was on and they had to do a lot of problem solving as the boards started popping out, that's when I really saw them animated."

On Dave's advice, final shaping was done with a spokeshave. When each member of the team was happy, final sanding prepared the surfaces for the Graphics students to go to work on putting each team's final signature touch to the boards. In preparation for final testing, trucks and wheels were then screwed to the bottoms of the boards and grip tape stuck on the top.

On the final day of the project, the class made an excursion to the local skate park to test and show off their final outcomes – and to take part in a friendly competition where Dave and Alexia appraised each board's look and performance. The project was officially ended with a final awards ceremony.

Certificates were awarded for the best graphic design, most dedicated team leader and most effective board shape. The best overall team was awarded the grand prize of four sets of new skateboard trucks courtesy of Dave Green and Cheapskates.

The winning team showed the right combination of all the elements – dedication, teamwork and innovation at all stages of the unit, along with unconventional design and good performance on the day.

"All the boards had merit, but the winning team's board was one of the best finished and had quite an innovative design – they listened and executed things well and came up with some points of difference."

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Outcomes

While Alexia and Dave both agree that more time was necessary for the unit to reach its full potential, by the end of the project some very effective boards were produced – outcomes that each team could be justly proudly of.

The skills and knowledge gained through the production process were invaluable, ranging from practical woodworking and the use of specialised equipment for skateboard manufacture, through to more intangible life skills such as communication and teamwork.

The students gained an inside knowledge of skateboard production from the initial ideas stage right through to the finished product. Much of this knowledge has further implications, with many of the students seeing the potential to apply many of the techniques – such as mould-making and laminating – into the creation of future products in Technology.

Alexia believes teamwork, communication and perseverance an essential part of any creative process. Throughout this project, the groups developed excellent teamwork skills which proved crucial to the successful final outcome and, by the end, had learnt a lot about themselves and each other she says.

"The students had to develop a special thinking and an ability to communicate their ideas, not just into material, but to be able to communicate them with their peers, myself and Dave. There were visual communication skills as well, drawing the views of the skateboards that they wanted to do to see how it was really going to look."

"There were ups and downs with the relationships in the groups and they actually went through some pretty hard times together and many of those relationships were strained, especially when they were trying to negotiate, but you also saw the students experience this joint feeling of achievement. Even though they'd already spent time together in term one I think that having to voice their opinions, and listen to other people's, helped them learn more about themselves and each other and they are definitely closer for it."

While the College's Technology department is relatively well established, the scope and approach of the skateboard project pushed the boundaries of what the school had done before in Hard Materials. However, Alexia is happy to report that the response to the unit was very positive from all areas of the school, even at the initial stages when she ran her original idea past the Principal and the Technology HOD.

"They were both really happy to see the enthusiasm from me as a teacher to be putting in the effort and trying to engage the students in this way and they were excited to have something like this happening at their school. I went into this project knowing that as long as it was going to be good for the kids and would engage their interest I would have the support of the school."

Dave Green has also thoroughly enjoyed being involved in the unit, enjoying working with the students and going through the process with them. "I thought the project was really good because the students made something they were actually interested in and that they would get use out of, and it's a contemporary part of youth culture at the moment which does come and go and they were right involved at the pointy end making it themselves so it really got their attention. I think every single one of them that I talked to really enjoyed it and the good thing is there were girls and boys in there getting into it."

Most importantly, the feedback from the students has been overwhelmingly positive, fulfilling Alexia's initial brief of providing a unit that they would become truly engaged with.

"During the class the general atmosphere was excitement and enthusiasm and the kids thoroughly enjoyed it. When I see them at school they often tell me 'I went skating on my board on the weekend, and it was choice!' It's that kind of feedback that lets me know they're still proud of what they've done and that the project was a success. "

The successful outcomes of the project have reinforced Alexia's confidence in her approach to Hard Materials, allaying initial fears that it would be too labour intensive.

"It's tempting to think this could be more difficult for a teacher than a more conventional approach where the students are given a list of instructions to follow. But I think that the results have proven that it's not so difficult and that it's enjoyable for the teacher and the students. If you can create an environment where the kids can go away, learn something that you didn't know and then teach that to you, then I think you're winning, for yourself and for the students."

What next?

Given the successful outcomes and positive response from all involved in the project, Alexia says she would 'absolutely do it again', though with some key changes. This was Alexia's first year of teaching and obviously the first time doing a project of this nature, so it was a just as new an experience for her as for her students. And while some experiments paid off, others provided valuable lessons on how to approach the unit differently in future.

"One thing I would definitely do next time would be to reduce the group sizes to pairs or threes. There were roughly five people in each group and dealing with such a number of different personalities was one of the most difficult and frustrating parts of the project for the students and they found it really hard to find common ground. I also wouldn't worry about using industry materials so much and encourage more flexibility, allowing cheaper, heavier and easier to obtain materials to be used."

Due to the scope of the project, Alexia would also like to have a little more time for it, possibly using some of the first term of practical for planning and design of the skateboards and leaving a full ten weeks for construction, with the possible inclusion of the design and construction of a skateboard ramp to tie the whole unit together.

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Enterprise Links

Dave Green has been involved in skateboarding for over 31 years and knows the industry inside and out. His interest in the sport began as a competitive skateboarder, and he then moved into manufacturing – first one-off's in his father's garage – before becoming one of the four joint owners of the Cheapskate's franchise, New Zealand's most recognisable skate and snowboarding shop.

When those in industry work with schools, there are often benefits on both sides. For Alexia the advantage of working with Dave was obvious – he could share years of experience within every aspect of the skateboard industry. Dave could give her and the class his knowledge of the different aspects of skateboard production, the changes within the industry over time and a knowledge of the market. Alexia also believes that Dave added 'an element of cool' to the unit, which she says was crucial in gaining the interest, passion and respect of the students.

"Dave's mentorship couldn't have been more important to this unit. I didn't know much about skateboards before I started looking into the unit, whereas he had the experience and the connections so it was a really great partnership because we were able to work together and come to the best way of doing things for us and the students. And although the kids would have enjoyed making skateboards without Dave's input, his involvement made it all seem more real and more important."

From Dave's perspective, he respected Alexia's passion and enthusiasm for getting a relatively unconventional and challenging project off the ground with great results. "Alexia was really enthusiastic about what she was doing and had the ability and perseverance to make it happen. She put in a lot of time and research and came up with something that was very contemporary that the whole class got behind. So I give her full marks for doing that as the students and I really got something out of it."

Dave feels that his personal history coupled with his connection to a widely recognised brand played a huge part in gaining the trust and respect of the students over the course of the unit. "I think I contributed a certain level of credibility – because they recognised our brand, because I was a skateboarder and because 30 years ago I was exactly where they are now, including being in that exact room, doing exactly what I was doing with them. And I had made the finished product and I knew that it would work and that they'd be happy with it," Dave says.

Dave shows Alexia the use of a spokeshave

Dave feels that the project benefitted him in ways both professional and personal. "It was good getting in amongst the younger generation of people interested in the sport – it's something that you don't get a chance to immerse yourself in that much. I mean I see young kids and I sell them skateboards, but I've never really been immersed in a group of 30 of them, so I found the whole experience really rewarding. These kids are the future of our country here, so I feel that contributing like this is a way of getting behind them and giving encouragement where you can. I would recommend it to other businesses, as it's a way you can put something back."


Dave examining the finished skateboards.

With the project proving itself to be of value to both parties and manageable with the time and resources available the next consideration is whether this relationship can be realistically sustainable. When taking into account the positive response to the unit (from those both directly and indirectly involved) and the successful outcomes it produced, Alexia is confident that the project has a future and Dave green agrees.

"My feeling was that Alexia and I both really enjoyed it and if the opportunity arises again for me to be involved again then I'll definitely be there because I'm all the better from doing it last time."

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