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ISSUES OF GREEN MOTOR CYCLE DESIGN

This article looks at the issues of more environmentally sustainable motor cycle design. Motor cycle designers don't work in a vacuum. They are subject to the same influences and forces as the rest of the design community. Design, be it product design, architecture or software writing, is undergoing a revolution, fuelled by popular demand for sustainability. An important part of any designer's job is to design for changing customer expectation.

DISCUSSION POINTS INCLUDE:	ADDITIONAL SUPPORT MATERIAL
Characteristics of Technology • Social and cultural influences and impacts **Characteristics of technological outcomes** • Evaluation in terms of fitness for purpose	**YouTube video clips** • New motorbike Design: www.youtube.com/results?search_query=new+motorbike+design&search_type=&aq=2msx&oq=Motor+bike+design **Curriculum related activity:** • Questions to promote discussion on the values-laden and values dependent nature of design are on page 2.

ISSUES OF GREEN MOTOR CYCLE DESIGN

For more than 100 years, the internal combustion engine has ruled the highways and by-ways of the world. Now, as concerns about climate change and the cost of oil take centre stage, the search is on for alternative, cleaner, and cheaper options.

Fuel cells, bio-fuel, electric engines or hybrid systems, along with improvements to conventional engines, look set to change transportation. Exactly which technologies will emerge as winners is yet to be seen, but one thing is certain: the auto industry is about to undergo an extreme makeover.

In his capacity as senior Industrial and Transport Design lecturer at Massey University's Auckland School of Design Oliver Neuland encourages his students to create environmentally-friendly, sustainable energy-fuelled vehicles and transport systems. The challenge in doing so, he says, is to incorporate energy efficient methods whilst creating an aesthetically pleasing vehicle.

"Designers have to bear in mind that car buyers still want their vehicles to conform to certain aesthetic standards, no matter how clean and green their inner workings."

The challenge is even more difficult with motorcycles, Mr Neuland says: "The separation between body and inner technology is not so clear. For motorcyclists – who are even more emotionally attached to their machines – the mechanics are a core part of the beauty of their vehicle."

Mr Neuland knows. Besides two years (1996-97) spent at BMW's department of motorcycle design in Munich, he was a member of the design team which developed the Mastiff and Baghira models for German motorcycle

producer MZ motorcycles, and made clay models for BSA Bantam bike designs. In 2004 he organised one of the biggest ever international motorcycle design competitions in Munich, attracting 150 entries and backing from BMW, Yamaha,

Honda and Kawasaki. He is a passionate motorcyclist and, when time allows, gets out on the open road on his Triumph 900cc motorbike.

Motorcycles have been around almost as long as automobiles and it seems their time has come. They are enjoying a surge in popularity as more and more people recognise the advantages of using motorcycles for everyday commuting and transportation. Beside their light environmental footprint, their convenience, particularly in congested cities, the popularity of motorcycles is being driven by growing disenchantment with the environmental impact of automobiles and the rising costs of fuel.

The same clean technologies being developed for cars, will be applied to motorcycles. However, changing motorcycles to eco-friendly technology is a much bigger design challenge than applying the technology to automobiles, Mr Neuland says. The 'heart' of a "clean" engine beats differently and using one changes the proportions of a motorcycle dramatically.

In applying clean technologies, motorcycle designers have to grapple with many non-technical issues. Apart from their practical values, motorcycles embrace a number of intangible cultural and personal values: since the 1950s motorcycles have become powerful symbols of freedom of the open road and the spirit of rebelliousness. Mr Neuland says designers will not only need a sound knowledge and appreciation of the technical engineering realities, but have to find a way to accommodate the cultural values embodied in motorcycles.

Designers will also have to design for emotional values. Does a market exist for silent, odourless, vibration-free machines? Or does creating such a machine miss the essential point of riding a motorcycle in the first place? Designers design for the real world: to operate successfully they must develop a sense whether there is a market for their innovative designs. Given the fuel efficiency of motorcycles today, why, they may ask themselves, embrace the new technologies at all?

Values in green motorcycle design

Motorcycle designers don't operate in a vacuum. They are subject to the same influences and forces as the rest of the design community. Design, be it product design, architecture or software writing, is undergoing a revolution, fuelled by popular demand for sustainability. An important part of any designer's job is to design for changing customer expectations.

How to proceed? By grafting new technologies onto existing designs? Or by creating something entirely new from first principles? Is there any point in designing new motorcycles by simply adding green technology to existing designs or should designers seize the opportunity to radically change motorcycle design by coming up with completely new solutions? These new solutions may satisfy a previously unrecognised demand in the market or even create a demand that previously didn't exist. However they proceed, designers will also have to design for persuasion: they will have to must create products potential buyers clients find desirable.

Technological solutions to complex problems are rarely simple ones. Typically, new technologies must work with pre-existing technologies and fit into systems already in place or new technologies may combine with other technologies to form a new system. Population growth and suburban-style planning have led to traffic congestion and increased collisions. There is little use in developing clean motorcycles only to have their owners forced to operate them in unsafe conditions. To reduce dependence on the automobile, urban planners and traffic authorities have adopted a range of strategies, including encouraging the development of public transit and pedestrian-friendly communities. Designers may have to become involved in changing existing infrastructure to create safer operating environments for their products. And designers may have to become involved in political/legislative/educational initiatives to change attitudes of road users as well.

In *The New Zealand Curriculum (2007)*, values are described as 'deeply held beliefs about what is important or desirable. They are expressed in the ways that people think and act'.

The curriculum suggests that all schools should encourage students to value:

- excellence
- innovation, enquiry and curiosity
- diversity
- equity
- community and participation for the common good
- ecological sustainability including care for the environment
- integrity
- respect for themselves, others and human rights

Teachers are encouraged to develop learning experiences that provide students with opportunities to learn about values and develop value-related capabilities.

Learning about values refers to students learning about:

- their own and others values
- different kinds of values such as moral, social, cultural, aesthetic and economic values
- those values upon which New Zealand's cultural and institutional traditions are based.

Developing value-related capabilities refers to students developing the ability to:

- express their own values
- explore the values of others
- critically analyse values and actions based on them
- discuss disagreements that arise from differences in values, and negotiate solutions
- make ethical decisions and act on them

Discussion points

- **Statement:** "Motor cycles have been around almost as long as automobiles and it seems their time has come."
  Discussion topic: What evidence would support this statement?

- **Statement**: "An important part of any designers job is to design for changing customer expectations."
  Discussion topic: What are some of these changing expectations in relation to evolving motorcycle design?

- **Statement**: "In applying clean technologies, motorcycle designers will have to grapple with many non technical issues."
  Discussion topic: What 'non-technical issues' are identified in the article and how might they influence the ongoing development process.

- **Statement**: "However they proceed, designers will also have to design for persuasion: they will have to create products that potential buyers/clients find desirable."
  Discussion topic: 'Desirable' attributes and their prioritisation will vary depending on the moral, social, cultural, aesthetic and economic value set of the potential buyer/client. Discuss how competing values may significantly impact on the development process and the ultimate commercial viability of the end product.

Further examples showing how values education intentions can be embedded within technology learning experiences linked to each of the components of the technology strands can be found on the Technology and Values page of the Techlink curriculum support pages.