



inclusive design education resource

tilting trike: a pedal vehicle for all abilities



Ben Wilson

Research Associate:

Ben Wilson / RCA Design Products

Research partner:

Whizz-Kidz

Year of completion: 2002

introduction

A project to research and develop a new pedal-powered tricycle for children that can be quickly adapted to the needs of those without lower body strength. How can young people with limited mobility be given inclusive 'street' vehicles that enable them to play in the street on the same terms with able-bodied children?

next: challenge >>

inclusive design education resource

tilting trike: a pedal vehicle for all abilities

challenge

For all children, regardless of their ability, exercise is necessary to maintain physical health. Cycling is a good form of exercise as it is fun and can be performed anywhere from country lanes to city parks. Cycling, skateboarding and micro-scooters also carry a whole culture of their own – one that is perceived to be desirable and fashionable by all children and teenagers.

Young people with limited mobility deserve pedal vehicles with the same level of design innovation and ‘street’ credibility as everyone else. But unfortunately many trikes for kids without lower body strength are contraptions that either shout ‘special needs’ and stigmatise their users or are uncomfortable and too inhibiting to use.

The challenge is to explore ways in which the same vehicle can be used by children of all abilities by designing it in such a way that it can be readily customised to be hand-driven or pedal powered. Can the visual aesthetic of contemporary, inspiring machines from the extreme sports culture be incorporated successfully into the design?

next: research partner >>



Innovative bicycle design by Ben Wilson: cycling culture is highly visible



First prototype of Wilson's Tilting Trike is tested by young user



the helen hamlyn
research centre



inclusive design education resource

tilting trike: a pedal vehicle for all abilities

research partner

Whizz-Kidz is a national children's charity with a very simple goal - to give disabled children and young people independent mobility. Whizz-Kidz was set up in 1990 to address the growing demand and urgent need for specialised mobility equipment to give disabled children and young people the mobility and independence able-bodied children take for granted.



The charity provides a broad range of mobility equipment that is not available through the National Health Service, including powered, manual and sports wheelchairs, specially-adapted tricycles, bicycles, buggies and walking aids. By providing customised wheelchairs, tricycles and other specialised mobility equipment, Whizz-Kidz improves the quality of life of disabled children across the UK and literally lets children be children.

Whizz-Kidz is also raising awareness of the issues regarding mobility equipment that affect disabled children and their families in order to improve the quality and equality of the service provided by statutory services and to increase provision of mobility equipment for children under 18 years.

next: methodology >>

inclusive design education resource

tilting trike: a pedal vehicle for all abilities

methodology

The project began with an in-depth analysis of existing tricycles and vehicles for children with disabilities. Most seemed to be styled as disability objects rather than desirable products. An in-depth web search and product audit yielded some inspirational material from the extreme sports culture.

Research into existing trikes and trike technology took place including visits to both manufacturers and individuals in the field. Throughout the project, various mobility and disability experts were visited and different manufacturers consulted.

Short-term user consultation took place with groups of disabled children to direct and shape the project at critical points. Exhibitions, lectures and meetings with children and teenagers from Whizz-Kidz helped this process.

Long term user testing took place on two levels. A prototype was developed over a year with an eight year old boy with reduced ability in his lower limbs and a further prototype was road tested for optimum configuration of the 'tilt-to-steer' mechanism by designer Ben Wilson, himself and active figure in skateboarding, cycling and biking. These two approaches were brought together in the final design prototypes.

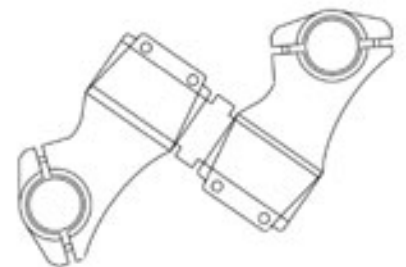
next: results >>



Wilson shifts his body weight to test the steering mechanism



The project studied different engineering geometries



Dry-joint clamp: easy assembly

inclusive design education resource

tilting trike: a pedal vehicle for all abilities

results

Two final tricycle prototypes resulted from the project, one in aluminium and the other in stainless steel. One was configured to demonstrate hand power and the other for pedal power yet both used the same frame and the same 'tilt-to-steer' mechanism that enables the user to steer by redistributing their body weight.

The drivetrain can be configured for hand-power or pedal-power, the changeover being easily performed by undoing clamps and changing the configuration. The whole vehicle is held together by 'dry joint' clamps – there is no welding needed.

The prototypes sport a bare metal finish to give a modern feel that reflects current street culture. The silver metal tubing with the blue anodised clamps and oversize wheels give a rugged impression that takes styling cues from mountain bikes. The low stance and aggressive sweep are combined with steeply raked back wheels to visually reflect vehicles usually found in extreme sports.

As the design is entirely modular, it is envisaged that the trike could be readily customised to individual disabilities. It could also be adjustable to accommodate the change in height and size of children as they grow up. . A short video was made in collaboration with filmmakers, The Light Surgeons, showing two brothers of different abilities having fun on the Tilting Trike – one hand-peddalling, the other using his feet.

next: issues >>



Two brothers test the Tilting Trike, one pedalling by hand, the other by foot

inclusive design education resource

tilting trike: a pedal vehicle for all abilities

issues

The health implications of this project are important as children with disabilities will be actively encouraged to exercise outside with a street vehicle that will be the envy of their able-bodied friends. Riding the trike also exercises the whole upper body and using the trike can be exhilarating, even to the point of being a little dangerous – most disabled children hated being ‘overprotected’ by design.

More importantly this type of trike could break some important new ground within the inclusive design field. By sporting a drive with both hand power and pedal power capabilities, children with disabilities can compete equally against those with full mobility for the first time.

The research revealed children with limited mobility to be as varied, diverse and interesting a group as able-bodied children with the same imagination and desires. How can design include their needs in way that is innovative and avoids a dry medical approach?

next: projects >>



Young people with reduced mobility want to play on equal terms with other children



Extreme sports: an inspiration for design for disability?



inclusive design education resource

tilting trike: a pedal vehicle for all abilities

projects

brief 1

- 1/ Take a product that has currently got an unappealing medical image – eg wrist splint, leg caliper, orthopaedic shoe etc.
- 2/ Study aspects of street /youth culture and graphics.
- 3/ Redesign the medical product to give it a contemporary ‘street cred’ image without reducing its functional effectiveness.

brief 2

- 1/ Take a contemporary youth-culture mobility product eg skateboard, mini scooter, mountain bike etc.
- 2/ Redesign the mobility product for the needs of a young person with a) poor balance b) limb loss c) low strength d) a visual impairment.

brief 3

- 1/ Choose a product or service or environment you believe to be genuinely inclusive in design.
- 2/ Make a short video in which people of different abilities are shown using and enjoying the same product/service/environment on equal terms.

brief

- 1/ Look at the development of Ben Wilson’s Tilting Trike.
- 2/ Create a press or poster advertising campaign aimed at promoting the new vehicle and encouraging a new sport.
- 3/ Create a press or poster advertising campaign which promotes the work of Whizz-Kidz in ensuring young people with disabilities enjoy greater mobility and independence.