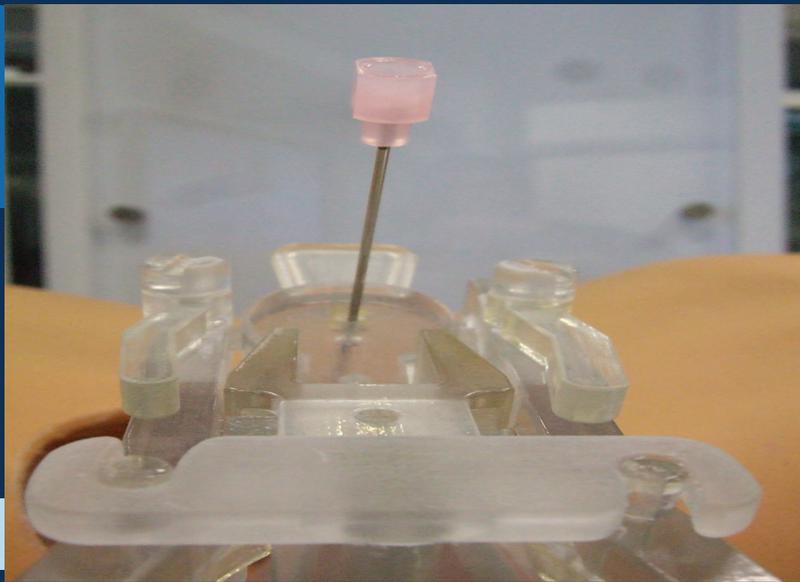# INNOVATING WITH CONFIDENCE

Educators use 3D printing to support industry for proof-of-concept

"We can now design and think beyond the limitations of traditional manufacturing methods."

— Wenwei Wang
Institute of Technical Education

ITE slashed costs in half, like for this injection device functional prototype printed in VeroClear.

Strengthening a country's workforce is a demanding mission. To train the country's competitive workers of tomorrow, Singapore's Institute of Technical Education (ITE) is adopting cutting-edge technologies into its curriculum, as well as supporting the industry with advanced processes such as 3D printing.

Singapore's Ministry of Education established ITE in 1992 as a post-secondary education institution to provide technical education and occupational skills training for adult learners. ITE's Technology Development Centre (TDC) at ITE College Central began in 2009 to support the industry in applied research and development through more focused and technical skill training. TDC aims to develop projects with industry leaders while providing opportunities for staff capability development.

TDC leaders invested in 3D printing in early 2012, when it became clear that the technology could improve its commercial product design process.

According to Wenwei Wang, TDC engineer of ITE College Central, before the 3D printer, the program built simple prototypes in-house but outsourced complex ones. "We were looking for a way to build complex prototypes in-house to quicken the design process so that we can move further ahead with product designing for the industry," said Wang.

Half the Cost in Half a Day
With careful evaluation, TDC chose a Stratasys® 3D Printer. The printer uses PolyJet™ technology, which jets layers of liquid photopolymer onto a build tray and instantly cures them with UV light. The 3D printer's ability to jet layer thicknesses as fine as 16 microns and create very smooth surfaces help make highly accurate models.
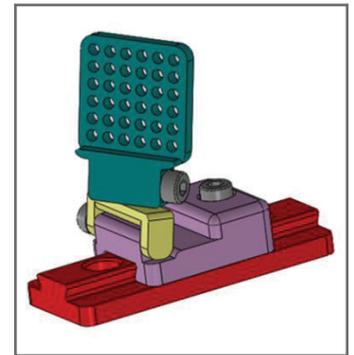
A CAD model of the linear guidance device.

The 3D printed functional prototype of the linear guidance device.
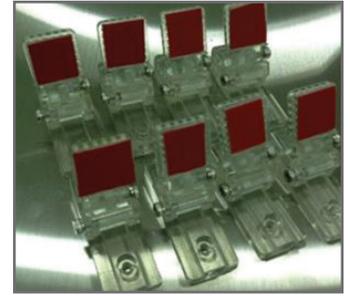
Stratasys
FOR A 3D WORLD™

Compared to traditional CNC machining, engineers found that it costs about half as much to print a model. They also found that 3D printing is incredibly fast too: Traditional turnaround time for outsourced projects took about a month, but with the 3D printer, "We can get a working prototype in half a day," said Wang.

Traditionally, industry partners require revisions at the prototyping stage. But with the 3D printer, Wang and his team revised the design in-house three times, checking that it pivoted properly and conformed to tolerances, before showing it to the client. On the fourth iteration, "it fit perfectly and worked beautifully," said Wang. TDC presented it to its partner and gained immediate approval.

"Guesswork and experience used to play a part in how a prototype turned out," said Wang. "With the Objet 3D Printer, we can simply print out the prototype to check if it works, so no more guessing for us."

Imaginative Designs

Though harder to quantify, a new mindset may be the most impressive benefit to engineers. "We can even make very imaginative designs and think beyond the limitations of traditional manufacturing methods to implement the required solutions," said Wang.

A low-volume production run of the linear guidance device.

For more information about Stratasys systems, materials and applications, call **888.480.3548** or visit **www.stratasys.com**