

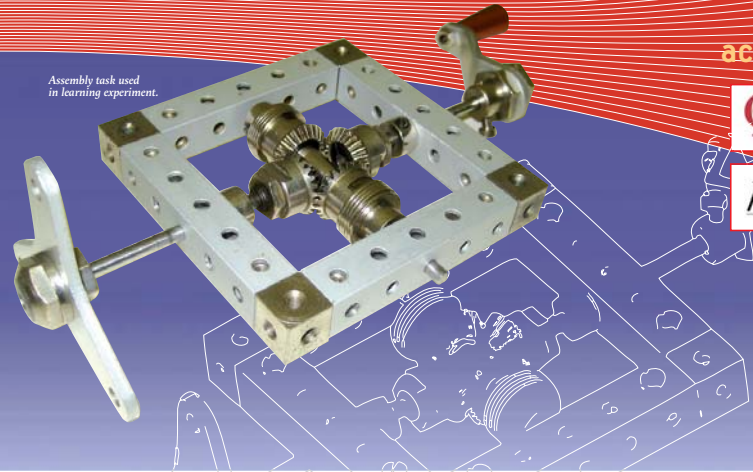


Applied



Animation development.

By Nick Lerner



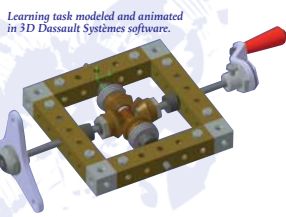
Assembly task used in learning experiment.

# The Nuts and Bolts of Cognition

Improving industrial learning and the processes that govern it is being undertaken by a team of engineering and psychology academics together with software industry application specialists using Dassault Systèmes technology.

**IN A FIX**  
Queens University in Belfast, Northern Ireland, has been conducting research into cognition using animated instructions based on Dassault Systèmes CATIA and DELMIA DPM softwares and it plans to use 3D VIA to extend its work in this area.

Cognition is defined as the mental faculty or process of acquiring knowledge by the use of reasoning, intuition or perception, and at Queens University the schools of Engineering and Psychology have been collaborating to understand more about learning in a bid to improve industrial productivity.



Learning task modelled and animated in 3D Dassault Systèmes software.

Gareth Watson, a PhD student at the University explained the work that he has been conducting. "We have been looking at the psychology behind learning and discerning the human factors that influence the use of work instructions. We ran a series of experiments where groups of people had to perform complex engineering assembly tasks using different kinds of instructions; written, static diagrams and animated 3D models."

Gareth continued, "As expected animation teaches people fastest static images second and written instructions third. Animation is 37% quicker to learn by than written instruction and 16% quicker than static images. Quality is also improved."

## LESSONS LEARNED

The ease with which the 3D models were built and animated made experiments quick to set up using industry standard Dassault Systèmes V5 PLM software. Since the University has strong contacts with UK industry, genuine aerospace and automotive assemblies were used so that the study's CATIA based methodology can be brought to these industries as well as others that the depart-

ment of Mechanics and Aerospace works with. Joe Butterfield, a Research Fellow at that Department said, "We have proved the case for this value added extension in the utilisation of CATIA 3D digital models, used in conjunction with DELMIA, as tools for training industrial assembly and its management. Further, since an assembly task is also governed by how well it has been optimised planners can use this methodology to design better and more efficient assembly strategies."

## LEARNING MENTOR

The Dassault Systèmes Value Added Reseller that supports Queen's University with CATIA, DELMIA and 3D VIA, is Applied PLM Solutions. Applied's Director of Operations, Sue Clark detailed her company's work, "We provide the university with software training and because we have close connections with the automotive and aerospace industries we are able to ensure that the university maintains its systems and practices to current industry standards."

Sue continued, "It is important for the university to demonstrate potential return on investment when its work is transferred to a commercial environment and Applied is instrumental in this using its broad based industry knowledge. Our most recent work with the university has been

in cognition and learning where we have helped them to apply Dassault Systèmes software to training systems and documentation. This software produces better work instructions and adds real value to the academic work of the university."

## GOOD DEGREE OF IMPROVEMENT

"The need for language independent instructions for technical publications and methods is growing, particularly in aerospace where industry globalisation and the portable nature of aeroplanes means that engineers of various nationalities need to access complete and up to date work instructions." Said Sue, "Dassault Systèmes software offers engineers of any level, and non

engineering staff alike, the ability to interact with complex instructions and perform high level work with increased productivity benefits. Further, by allowing access to CATIA models using this methodology, the intelligence that has been built into the model can be passed to others in the productivity chain. This also adds considerable value to a firms intellectual property by passing knowledge through the business in ways that immediately benefit productivity."

## MINDFUL OF CLARITY

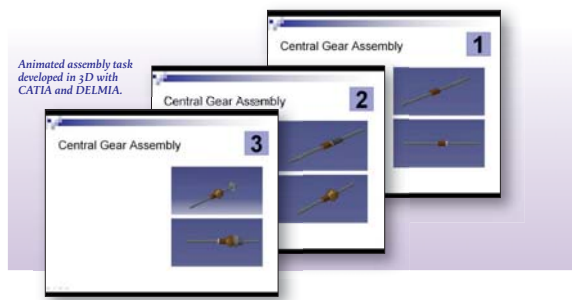
Cathy Craig Senior Lecturer in Perception at Queen's University's School of Psychology has been involved with several industrial cognition

projects and commented, "Dassault Systèmes software allows the benefits that have been developed by very skilled people to be understood by others and used to improve production and maintenance output.

"This work has implications not only in industry but in activities such as sport where trainers can observe situations from another person's perspective using avatars. This work feeds back into industry and helps us to understand through visual feedback and mental models how production processes and their organisation can be improved."

## GRADUATION DAY

Cathy concluded, "Applied has helped us to develop highly beneficial methodologies using Dassault Systèmes industry standard software. This crosses language barriers by avoiding linguistic misunderstandings and delivers faster learning using better processes and ultimately a more controlled and productive industrial environment" •



Animated assembly task developed in 3D with CATIA and DELMIA.

For more information:  
www.nitc.qub.ac.uk  
www.appliedgroup.com