



# CELT

# NEWSLETTER

Center for Enhanced Learning and Teaching

Fall 2005

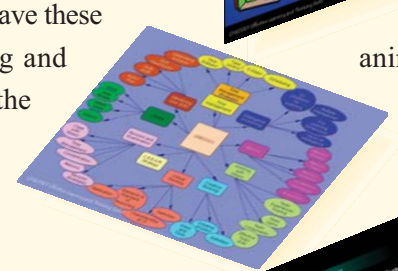
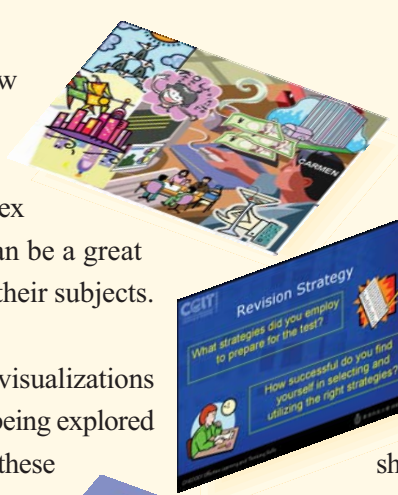
## Issue Theme: Enhancing Learning using Visualizations

Findings from education research show that visualization plays a crucial role in enhancing teaching and learning. If used appropriately, it facilitates learning of complex concepts and ideas. At the same time, it can be a great stimulator in arousing students' interest in their subjects.

What are some strategies for incorporating visualizations in enhancing teaching effectiveness that are being explored and exploited at UST? To what extent have these strategies proved to enhance teaching and facilitate learning? What are some of the practical tips offered by developers of these visualizations? What do our students think about them?

In this issue, we explore this topic – Visualizations in Teaching and Learning. We will look at some recent accomplishments of our faculty under the “Continuous Learning and Improvement Through Teaching

Innovation” Project (CLI). Innovations from the sub-projects under the “Visualization & Simulation” Category show our teaching staff’s awareness of bringing the benefits of visual elements into their courses to help their students learn (p2-3). We will also share insights and stories coming from CELT’s GNED course students (p4-5). They share their enjoyment gained from producing animation projects within these courses. These also say something about the potential power of visualizations from their perspective.



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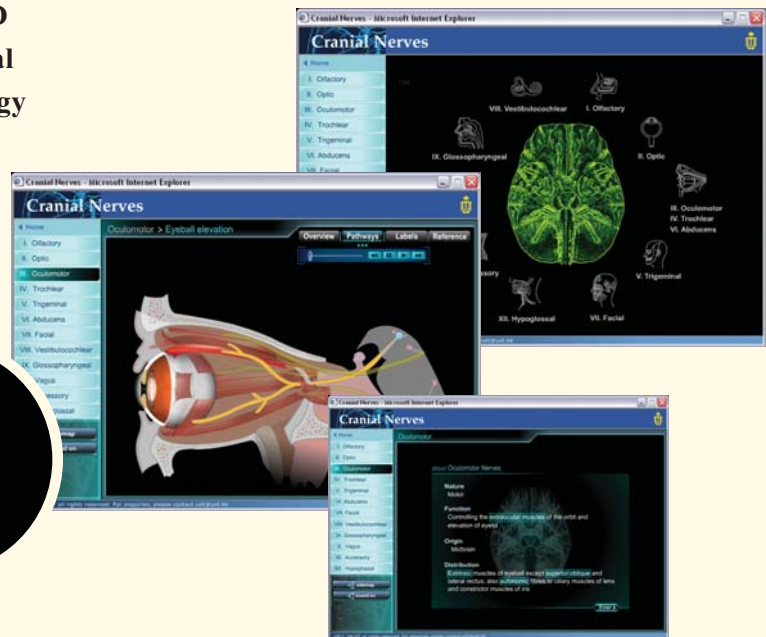
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# Faculty Teaching Innovations

## Introduction to Neurobiology: Interactive 3D Animation Prototype Development of Cranial Nerves, led by Prof Karl Tsim, Dept of Biology

With the use of vivid 3D animations, this project aims at helping students figure out the intricate structure and functional mapping of the 12 cranial nerves in the human body.

It is aimed at easing the difficulty they have in understanding the complex cranial nerves. In this project, CELT provided instructional development support and helped to develop the animations.



Feedback from the final report done at the end of the production is positive.

"The progress has been very good and faster than expected, and this speedy progress in the last year is mainly due to the effort provided by the staff of CELT. In addition, this teaching invention is being adopted by other lecturers of HKUST"

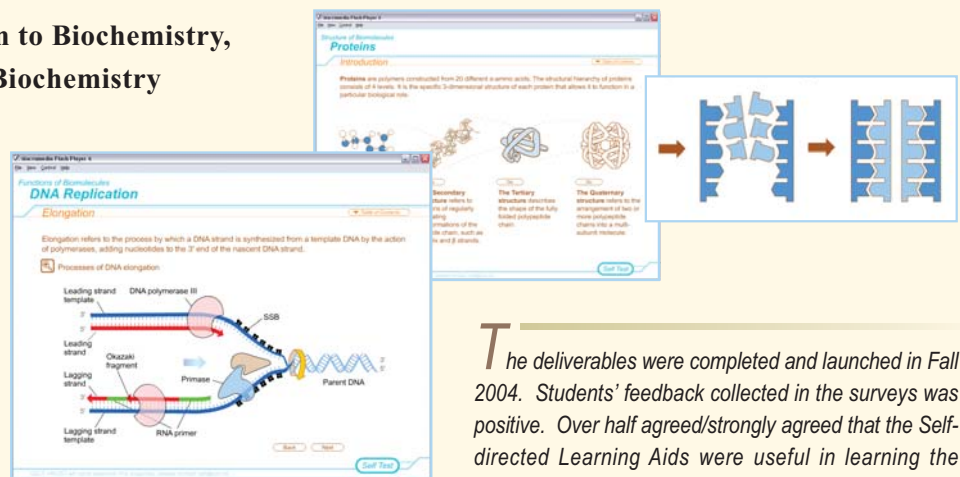
~ Prof Karl Tsim

"We can learn the neuroconnection of the 12 pairs of cranial nerves in a much easier way, and we also enjoy the graphic"

~ Student

## Online Approach to Introduction to Biochemistry, led by Prof Robert Ko, Dept of Biochemistry

One of the major aims of this project is to help students grasp abstract complex concepts effectively. Having Self-directed Learning Aids in graphical/animated formats, together with knowledge base, information dissemination structure, task-based quizzes in an online learning and teaching system is a strategy to achieve this. Throughout the project, CELT collaborated with the Department's project team on content production, mainly with developing animations and building interactive self-tests.



The deliverables were completed and launched in Fall 2004. Students' feedback collected in the surveys was positive. Over half agreed/strongly agreed that the Self-directed Learning Aids were useful in learning the biochemistry topics. Four-tenths rated that the aids were the most helpful online resource.

"Organise one's study better"

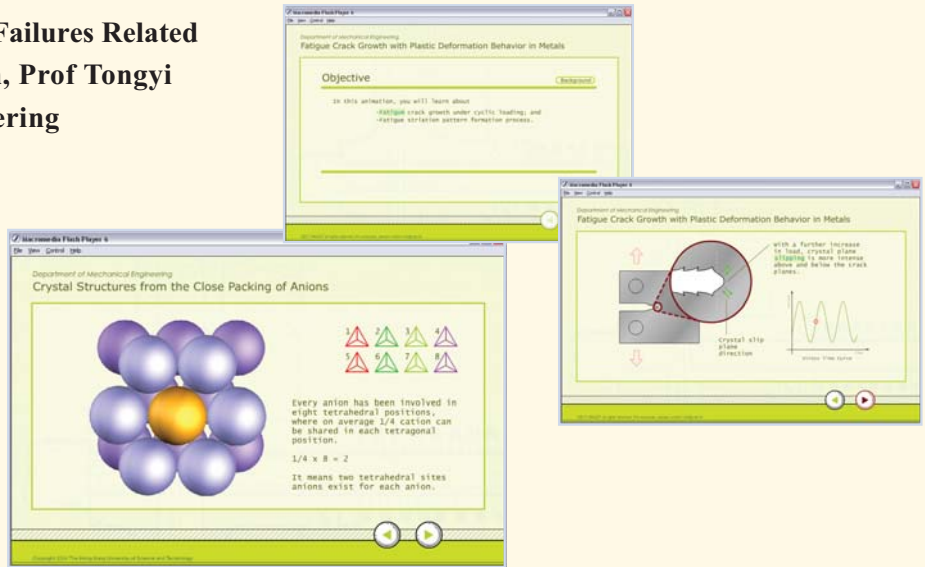
"Makes course material more interesting and stimulating to study"

~ Student



**Development of the Visualization and Simulation Models in Material Technology and Failures Related Courses, led by Prof Jang-Kyo Kim, Prof Tongyi Zhang, Dept of Mechanical Engineering**

In this project, the use of animations and videos plays an important role. Students can better understand the subject and its industrial applications. With the aim to stimulate students' self-learning ability, multimedia elements are put online for them to access from anywhere. CELT's support in the project included developing animations, providing assistance in video shooting and evaluation of project outcome.



*“The student survey conducted in Fall 2004 shows positive feedback. Here are some comments:*

*“The project team was satisfied with the outcome as shown by the following comments.*

*“The animations were considered to be very well made and quite useful”*

*“The results satisfied the original requirements and criteria”*

*~ The Project Team*

*“Graphics were appropriate and clear”*

*“(The animations) helped one understand the lecture”*

*~ Students*

**Support Provided by CELT**



**CELT** can provide the following types of support for faculty and teaching staff with innovative projects:

- Project administration (project planning and task management)
- Instructional development (consultation on teaching approaches, needs analysis, advice on organization of course contents, storyboard design and content production)
- Application development (requirement analysis, application design, user interface design, program development, user testing and implementation support)
- Project evaluation (design of evaluation strategy, development of evaluation tools, data collection and analysis, holistic assessment of project outcomes)

# Visualizations in CELT's Courses

## Visualizations & Animations in CELT's Creative Media Courses

With the advancement in learning technologies, hardware and software, 3D computer visualization has been widely used by different disciplines to enhance teaching as well as to arouse students' interest. Using technology to enhance the quality of teaching and learning has always been one of the goals of HKUST. Besides providing instructional design support for faculty, CELT has developed and is running three Creative Media courses, the '3D Visualization and Animation', 'Multimedia Communication Skills for Internet Applications' and 'The Creative Process' under the series of General Education courses. These courses aim to develop students' aesthetic sense, knowledge and technical competence in exploiting the media and utilizing the tools for exploration of form, artistic expression, effective communication, and presentation.



### What do students think about these courses?

"...more practical..."

"...interactive..."

"...develop creativity..."

"I've learnt how to organize a story and the basic of cinema 4D"

"I am now able to create 3D animation by myself"

- Students



Students today are no longer satisfied with a simple didactic approach when they sit in classes. They come with a higher expectation of visual and audio quality of the teaching materials as they immerse themselves in a world of multi-media sensations. In addition, they expect to gain the most knowledge out of limited class time. With these considerations, classroom resources can be fully utilized to provide stimulation and variety to students. For instance, the use of PowerPoint slides can be further enhanced by adding more visualization effects such as animations. Experience has shown a number of reasons and benefits for both instructors and students on the use of visualization. Here are a few considerations to bear in mind when using visualization as a strategy in teaching.

### Reasons for using visualization

- Illuminates abstract and complex ideas and concepts
- Enhances students' creativity and involvement in class
- Promotes interactivity and communication among students and with instructors
- Helps students relate to real-world situations and current events easily
- Gears towards learner difference

### Benefits for instructors

- Helps deliver the learning points effectively and efficiently
- Makes planning creative and challenging at times but rewarding to see students enjoy and learn

### Benefits for students

- Increases understanding of the abstract concepts and ideas more easily
- Stimulates them to think creatively and critically
- Arouses their interest and initiative to discuss and ask questions
- Helps knowledge retention and recall

### Things to consider when using visualization

- Students' educational and cultural background including the class make-up, motivation, similarities and differences
- The connection with what the students already know and the knowledge being taught
- The level of understanding you want students to reach



#### What do students think about visualization in their learning?

- "sure the visualization can help me understand"*
- "I can understand the concepts more easily"*
- "demonstrate the complicated steps"*
- "trigger my thinking"*
- "can't be substituted by words"*
- "easier to remember"*
- "did a good a job in explaining the theory"*

- Students





# Disciplinary Online Teaching Resources

## Engineering Education

### **The National Engineering Education Delivery System (NEEDS), Digital Library for Engineering Education**

This digital library is designed for Engineering faculty and students of all ages with links to online learning materials in Engineering and related areas of Science and Math. It distinguishes itself from commercial web-based search engines by providing focused, value-added services to the community. Features such as user reviews, attachments, user registration and discussion tools will be added.

URL: <http://www.needs.org/needs/>



### **Computer Aids for Chemical Engineering (CACHE) Teaching Resource Center**

CACHE is a learning community made up of Chemical Engineering Faculty and students. As a key component of CACHE, this resource center provides substantial material on various topics for Chemical Engineering. It contains educational materials from faculty, such as syllabi for different courses, software, simulation, and text material.

URL: <http://www.che.utexas.edu/cache/trc.html>



## Business Education

### **Harvard Business Online for Educators: Teaching Resources**

The Harvard Business School website provides a list of updated cases used with success in undergraduate courses. Cases are organized by topics such as “Accounting and Control”, “Competitive Strategy”, “Entrepreneurship”, “Finance”, “Organizational Behaviour and Leadership”, and “Social Enterprise and Ethics”. Become a subscriber, select your areas of interest from “For Educator Alerts”, and receive free email updates that ‘highlight new course resources and services available to professors and teaching faculty’.

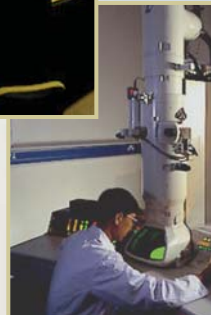
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### **Great Ideas for Teaching Marketing**

South-Western Marketing Resource Center provides numerous resources for teaching Marketing from tertiary educators. A pool of lesson plans, project ideas, teaching tools and interactive activities are found under various topics including “Retailing and Channels”, “Promotion and Communications”, “Marketing Planning and Segmentation”, and “Simulations and Games”. “Teaching Tips” in particular provides creative teaching and learning strategies.

URL: <http://www.swlearning.com/marketing/gitm/gitm.html>





## Science Education

### Mathcentre – for the Help You Need to Support Your Course

Plenty resources can be used and adapted from this online Mathematics center for both students and staff including “*Leaflet*”, “*Teach-yourself Booklet*” and “*Revision booklets*”. “*Guides and Case Studies*” is a special feature where insights and experiences in launching projects are shared amongst different universities. You will find practical recommendations and considerations for adapting these projects. A wide range of online ‘video tutorials’ covering various topics are also available.

URL: <http://www.mathcentre.ac.uk/>

### Physical Sciences Centre Resources

The center aims at ‘enhancing the student experience in Chemistry, Physics and Astronomy within the university sector’ and provides updated information under “*Publications*”, “*Resources*”, “*Events*”, and “*Networking*”. Features such as “*Newsletter*”, “*Briefing Papers*”, “*Primer*” and “*Practice Guides*” give practical advice in teaching and learning Physical Sciences, and offer insights on issues including student assessment, employability and PBL adaptations. A collection of books, web and software reviews can also be found in “*Journals*” and “*Review*”.

URL: <http://www.physsci.heacademy.ac.uk/Resources/Resources.aspx>

## Humanities and Social Science Education

### Social Science Information Gateway (SOSIG)

SOSIG aims to provide a trusted source of selected, high quality Internet information for researchers and practitioners in Social Sciences, Business and Law. In its recent ‘Social Science Week’ event, from 20-24 June 2005, a number of experts looked at how the Internet has altered their working practices and the impacts this has had on their research and teaching. A number of articles with responses are posted onto a Web Log and listed under daily topics such as “*Learning and Teaching*”, “*Research Methods*”, “*Assess to Data*” and “*e-Social Science*”.

URL: <http://www.sosig.ac.uk/socsciweek/>

### The Humbul Humanities Hub (Humbul)

Humbul provides online access of its catalogue of evaluated online resources in the Humanities. One of its major features is the “*Virtual Training Suite*” which comprises a set of ‘teach yourself’ tutorials, delivered over the Web, each of which offers Internet information skills training in a particular subject area, enables the user to Tour, Discover, Review and Reflect, and take less than an hour each to complete. Under “*Humbul Topics*”, some of its record of Internet resources that share a particular relevance are chosen by invited guests and gathered together.

URL: <http://www.humbul.ac.uk/>



The 2004-05 Teaching Assistant (TA) Training Program concluded in May. Over 300 Year-1 TAs participated in the training and 75% of them completed all their required sessions. It was rewarding for both the TAs and for CELT staff as the majority (over 94%) of the TAs found the training effective and helpful for performing their duties.

The 2005-06 training program commenced on Aug 22 with the Mass Orientation Session in LTB where new Year-1 TAs were welcomed by Prof TC Pong and Dr Mole, AVPAA, and CELT staff. TAs also met with their TA Coordinators, senior TAs, and faculty during the Induction Program. Details of the program can be found at <http://celt.ust.hk/ta/news.htm>.

### **Want to be an effective TA? Here are some tips from your experienced peers:**

- Clarify important matters such as the policy for submitting homework and attending tutorials
- Be punctual and prepare well for tutorials
- Understand the lab material before the lab session
- Return homework to students promptly
- Allow additional appointments beyond TA office hours
- Offer your help proactively
- Build a homepage for your course
- Keep examination papers secure
- Be consistent in marking and grading
- Set up regular meetings with your supervisors

## Recent Events Highlights

- **New call for proposals for funded Teaching and Learning Innovation Projects:** Faculty and instructors are now invited to submit teaching development proposals for the Continuous Learning and Improvement (CLI) project. Deadline for proposal submission is **30 September 2005**. For details, please visit <http://celt.ust.hk/cli/>
- **TA Induction Programme:** As a continuous support to the TA community, the TA Induction Programme was held from **22 to 26 Aug, 2005**. For details, please go to <http://celt.ust.hk/ta/index.html>