
For Technology Enhanced Cognitive Scaffolding: An innovative method for effective teaching of Pathology in a rural medical school

BACKGROUND AND OVERVIEW:

Being a sole academic pathologist in a rural medical school creates both challenges and opportunities for the development of innovative, technological approaches to learning and teaching. I came to Australia in 2005, as the only full time Pathologist in the James Cook University School of Medicine and Dentistry (SMD). On my first day in class, I had the sudden awareness of challenges ahead, when I saw over 90 enthusiastic students sitting eagerly to learn Pathology, How am I going to teach them individually pathology knowledge, practical skills, specimens, microscopy, assessment, and support them, alone....?

Pathology is an essential pre-clinical foundation of medicine and prepares students for clinical practice. This complex subject requires extensive theoretical knowledge, laboratory and microscopy skills and is traditionally delivered by a team of pathologists, technical and support staff. Before my arrival in SMD, pathology was taught in block mode during weekends by a visiting pathologist an evidence of severity of situation in pathology. As a result, students received only limited pathology teaching. Also this problem is recently compounded by increasing student numbers. Taking our own example, At JCU-SMD the annual intake has doubled over the previous 5 years. All of which led to significant problems with the delivery of the Pathology curriculum. Interestingly this is not just a local problem, but universal in medical schools nationally and internationally. Most medical schools have reduced basic science teaching.

CRITERION 1: APPROACHES TO THE SUPPORT OF LEARNING AND TEACHING THAT INFLUENCE, MOTIVATE AND INSPIRE STUDENTS TO LEARN

Since 2005, I have been stimulated to develop and implement innovative techniques to improve teaching. This work is summarised in five innovative approaches to the support of learning and teaching that influence, motivate and inspire students to effectively learn Pathology.

Innovation 1: A New Integrated Curriculum: Change from a traditional curriculum to the new "Integrated Clinical Pathology Curriculum" based on the principles of "Work Integrated Learning (WIL)" using "Clinical-Pathology-Case studies" (CPC). These transform Pathology from a book-based, complex and dry subject into clinically-relevant learning. These case studies assist students to understand and apply pathology knowledge to the clinical reasoning required for the patient cases. I delivered all the CPC materials, lectures, podcasts and other study aids online to allow flexible access across multiple sites.

Having contemporised the pathology curriculum, I began thinking of improving other areas; especially practical skills teaching and methods to assess and support students, drawing on my MBA studies in educational leadership.

Innovation 2: – Video Broadcasting: Large student numbers precluded teaching practical skills with pathology specimens in small groups, so I replaced this traditional approach with video

conducted in succession or in cycles, expressed in terms of expected student cognition. Collaborative learning is known to be a powerful tool for gaining both understanding and deeper knowledge levels.

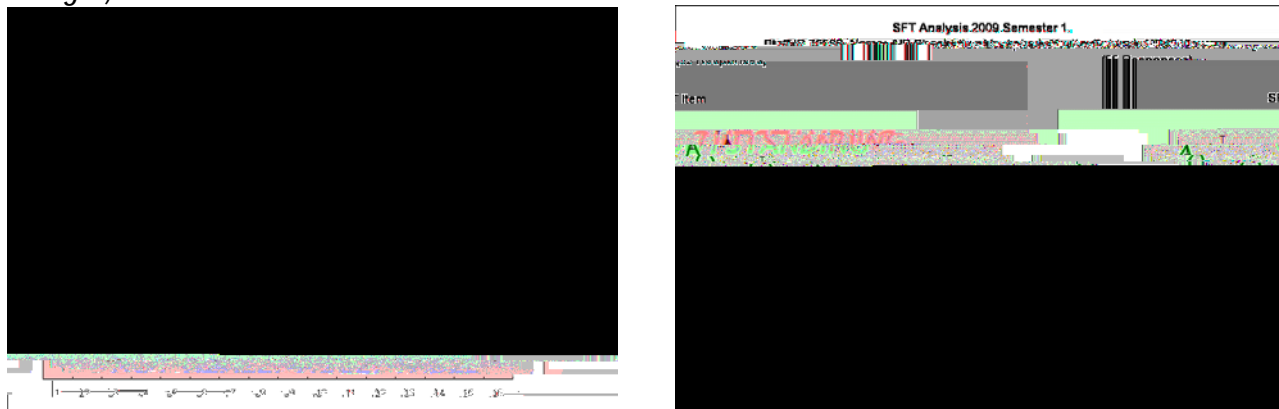
The Digital Microscopy Teaching Laboratory, Winners Club & Electronic Student Response System in Teaching Pathology are effective innovations I have introduced to JCU.

EVIDENCE OF SUSTAINED IMPACT ON STUDENT MOTIVATION AND LEARNING

Together, these integrated approaches in the Year 4 pathology course have resulted in significant improvements in student motivation, performance and satisfaction. In 2006, before I implemented these innovations, average class performance as measured by final exam results was 68%. Performance has steadily improved every year and last year the class average was 74%, the highest in the school's history.

These improvements in final results which show overall better performance, support the view that Pathology learning significantly improves overall clinical performance.

The 2006 SFT chart (before implementation of changes) compared with 2009 chart (after implementation of changes):



The questions comprehensively cover academic feedback about teaching. Student response ranges from not acceptable at the bottom to outstanding at the top. The University average (Blue solid line) compared with my feedback (Green solid line) clearly shows significant improvement from below the University average to outstanding feedback in the course of the development I have initiated.

SELECTED COMMENTS FROM STUDENT FEEDBACK ON TEACHING (SFT):

- "Best lecturer ever" always concerned about improving our learning.
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Louis Peachey, Clinician and Student supervisor, Mount Isa, Rural Health Centre: (Email to Year coordinator) *"So far the feedback from the medical staff has been excellent. There have been a number of preceptors who have noted the substantial difference between this years 4th yrs and last years 4th yrs. A number of their preceptors in the hospital, who are not easily impressed, have gone out of their way to tell me how impressed they have been with this group. Also for the record, I am looking forward to Shashi's visit as a source of my own learning"* (2006)

Tarun Sen Gupta A/Prof. Head, General Practice & Rural Medicine & Director of Medical Education: *Shashidhar has been at the forefront of educational innovation, and has generously shared his expertise in this area with colleagues at schools professional development sessions. He has also taken his expertise and school name to national and international conferences.* (2009)

Richard Murray, Dean JCU SOMD: *"Under Shashi's leadership, the development of the MBBS year 4 pathology curriculum with its focus on case and problem-oriented learning has been a great success.* (2010)

AMC Accreditation Team (2010): While in a meeting with staff, the accreditation team member (Prof. J Nicky Hudson, University of Wollongong) said "I have heard a lot about innovations in pathology teaching here..!"

Following my presentations at national and international conferences, I have responded to several requests for establishing similar teaching tools in other medical schools. Below are two recent parternships I am working with:

1. Flinders University School of Medicine, Adelaide which is establishing the Northern Territory Medical Program(NTMP) a new rural medical school based in Alice Springs NT, sent their pathologist in 2010, following consultations with me, to visit our teaching facility to implement the same in Alice Springs.
2. The Vice Chancellor of Manipal University, India, came to Townsville in 2010, and has appointed me as adjunct Professor of Pathology to facilitate establishment of our pathology teaching innovations and the sharing of my teaching experience with their staff. I am planning to visit Manipal to establish a pathology teaching facility there.

CONFERENCE PRESENTATIONS WHERE THESE INNOVATIONS WERE PRESENTED:

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