National Forum on Education in Biomedical Sciences
11 December 2007

The concept of a National Forum on Education in Biomedical Sciences (NFEBMS) held at Monash University in December 2007 was developed by Professor Phillip Nagley, Chair of the Education Committee of the School of Biomedical Science (SOBS) at Monash University. The NFEBMS was designed to include courses in Biomedical Science and also Science, Biotechnology and other courses in which biomedical sciences are explicitly taught. The relevant academic/research societies, as represented in National Committee for Biomedical Sciences (NCBMS) of the Australian Academy of Science, were approached to sponsor and be actively involved in the forum. Most, if not all, of these societies have groups of active members or even formalised special interest groups, which focus on education within their own discipline area.

The Forum was held on Tuesday 11 December 2007 at Monash University with 120 registrants. The forum attracted participants from within Australia and internationally. The five international participants came from South Africa, Singapore and New Zealand. The Australian registrants were both local Victorians (seventy) and representatives from other states (forty five).

The morning sessions consisted of presentations by the invited speakers and in the afternoon discussion sessions were held involving all forum participants. The first session of the forum was on the theme of "Concepts and Learning" and commenced with a presentation by Trevor Anderson. Trevor is the Head of the Science Education Group, University of KwaZulu-Natal, South Africa and is also a member of the Educational Sub-Committee of the International Union of Biochemistry & Molecular Biology (IUBMB). He is on the Editorial Board of *Biochemistry & Molecular Biology Education*, for which he writes a regular column entitled "Bridging the Gap between science education research and its application in teaching practice". He is also a member of the IUBMB Concept Inventory Project and the Australian Carrick Grant project which is addressing the development of a Concept Inventory for Molecular Life Sciences. Trevor's presentation was on "The multifaceted nature of conceptual understanding in molecular life science" in which Trevor discussed selected facets of conceptual understanding that require competence in specific cognitive skills such as visualization (a specific area of Trevor's research). He presented interesting examples of various student difficulties to illustrate the importance of explicitly teaching and assessing students understanding. This was followed by a presentation by Michelle Siow and Elaine Yew (Republic Polytechnic, Singapore) illustrating their "One Day, One Problem, learning system. This is an innovative integrated curriculum in which students work entirely in small groups to solve a new, relevant problem each day with the guidance of a tutor and are assessed through quizzes and a learning journal.

After morning tea, the second session with the Theme "Graduate attributes and employability" was presented by four speakers. Simon Barrie (University of Sydney) spoke on the issue of why we should actually address graduate attributes. Simon emphasized that while course planners should take into account the expectations and needs of various external stakeholders, in the end universities must be responsible for the academic content of degree courses and providing the framework for student achievement of particular skills and experiences. Phillip Poronnik (University of Queensland) discussed the importance of communication skills and the integrated approaches that he and his colleagues have used to develop communication skills for students in the biomedical sciences, across entire programs. He explained the learning guide used at the University of Queensland, which focuses on the relationships between "knowing", "doing", "language" and "evidence". Caroline Jones (Murdoch University) then gave an insightful and informative discussion on the important issue of which laboratory skills our students should learn. She discussed creative ways to teach these skills, particularly when challenged with large classes. Caroline stressed that we

all learn to do things correctly when we follow instructions we understand and that we must experience the consequences of doing things both correctly and incorrectly. The final presentation in this session by Gregor Kennedy (University of Melbourne) raised the issues of the "Pitfalls and Pleasures" in evaluating educational technology. Gregor discussed a number of evaluation tools available and their purposes, advantages and disadvantages.

The afternoon consisted of breakout groups which had lively discussions on a range of topics. In response to the question, "What should be the balance between theory, laboratory work and IT skills?", the overall view was that this will vary with the specific degree and possible graduate destinations and that there may in fact be different versions of delivery of the same content. The issue of "What is the set of core concepts and learning in Biomedical Science?" also resulted in a conclusion that we could not be prescriptive in relation to this. It was agreed, nevertheless, that both molecular and cellular aspects should be integral components of an education in Biomedical Science. The third question for discussion was "Where do we think our graduates go and do we need to know?" Again, there was lively discussion around this topic, in particular if this should influence the content and the skills base of our courses or if these decisions should be made on a purely academic basis. All this was followed by a final open discussion session chaired by Lesley Lluka (University of Queensland), commencing with Elizabeth McDonald (Director - Grants Scheme, The Carrick Institute for Learning and Teaching in Higher Education) giving a broad context to the Carrick activities which could support Biomedical Science. It became evident that perhaps the Carrick context could also be expanded, with the recognition that Biomedical Science falls between broad areas of "Science" and "Specific Disciplines" for which there are current Programs.

The National Forum would not have been possible without the generous support of all our sponsors who we gratefully acknowledge: the Australian Academy of Science, Australian Physiological Society, Australian Society for Biochemistry and Molecular Biology, Australasian Society for Clinical and Experimental Pharmacologists and Toxicologists, Australian Society for Microbiology, Endocrine Society of Australia, Genetics Society of Australasia, Faculty of Medicine, Nursing and Health Sciences, Monash University and Pearson Education Australia.

The Forum brought together a wide range of teachers and other interested individuals whose educational engagement varied from degrees in Biomedical Science as such, to those involved in Science courses with some biomedical aspects and Medical Laboratory Technology programs. We achieved an unexpected unity of spirit in approaching common challenges, in relation to specialization or breadth of courses and relationships between discipline areas. It was of significance that no one group pushed themselves forward as the mainstream area of biomedical sciences although the discussions generated a common view that central foundation studies in biomedical sciences should encompass molecular and cellular aspects.

Phillip Nagley

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