

[P36] *Biomathtutor*: students' and tutors' verdicts

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Introduction

Biomathtutor represents video-led, multimedia and interactive e-learning materials which aim to support post-16 mathematics learning in the life sciences. The pilot *biomathtutor* DVD-ROM was designed and produced in collaboration with the Educational Broadcasting Services Trust (EBST) and was funded by a NTFS 2003 award. Its development represents a timely initiative in response to growing evidence of a mathematics skills deficit among increasing numbers of bioscience undergraduates (Tariq, 2002).

Biomathtutor adopts a contextual, scenario-based problem-solving learning model which aims to motivate students to *want* (rather than merely *need*) to learn the mathematics they will encounter in their chosen discipline. The case study scenario presented, which covers aspects of haematology and microbiology, is introduced to the students through a stimulating high quality narrated video. Computer-assisted formative self-assessment is provided via thirty-three scenario-linked questions and twenty-four additional extension practice exercises; these cover a range of basic mathematical concepts presented in biological contexts. In addition, a series of brief face-to-face video tutorials, similar to those incorporated in *mathtutor*, deliver and support the teaching and learning of some of these mathematical concepts.

In 2006, the Higher Education Academy, through one of its e-learning research grants, funded a twelve-month project to assess the impact of blending *biomathtutor* with more traditional teaching methods to support mathematics learning within the life sciences. One of the aims of this project was to evaluate students' and their tutors' reactions to the pilot *biomathtutor* learning resources.

Methodology

Colleagues in eleven UK institutions, representing both pre- and post-1992 universities, who had volunteered to participate, were each forwarded a copy of the *biomathtutor* DVD-ROM. Most arranged for the contents of the DVD to be transferred to one of their institution's servers so that their students could access *biomathtutor* via their university's intranet, often via a link from their virtual or managed learning environment (e.g. WebCT, Blackboard). In some instances, where relatively few students would be involved, copies of the DVD-ROM were produced and distributed to those participating.

Two types of data collection instruments were used in the evaluation of students' and tutors' reactions to *biomathtutor*. Firstly, separate questionnaires were designed for students and their tutors. While the majority of questions were multiple-choice in format,

using a Likert scale, open-ended questions were included to gain further insight into respondents' particular likes and dislikes with regard to *biomathtutor*. Secondly, students and tutors participated in focus groups and semi-structured interviews respectively, with a view to gaining further insight into their use of *biomathtutor* and their views regarding the embedding of e-learning resources such as *biomathtutor* into current learning and teaching practices to develop a more blended learning experience.

Results and discussion

Overall, both students' and their tutors' reactions to *biomathtutor* were positive. Tutors reported that the resource is useful when teaching maths to bioscience undergraduates, the content of *biomathtutor* is relevant to undergraduate curricula and that *biomathtutor* has the potential to enhance student's competency in elements of biomaths.

Regarding the design and structure of *biomathtutor*, both students and tutors thought it was well designed, easy to navigate through, and provided a logical sequence of materials through which students could work. The potential of *biomathtutor* to support learning was recognised, with responses indicating that presenting maths in the biological context helped students to better understand the logic of the mathematical calculations and manipulations. The following comment supported the view that the mathematical and biological content were linked appropriately:

'Problems well related to Biology. Clean explanations and worked examples' (a physiology tutor)

Both students and tutors agreed that the case study film was informative and enjoyable to watch and that it provided a valuable learning experience, particularly in conjunction with the related questions. The feedback provided on users' answers to all questions was also helpful and enhanced the learning experience.

'It's helped me build the bridge between maths and biology because although there was a lot of maths in 'A' level chemistry, it wasn't biologically related . . . but this one [biomathtutor] helps on a bigger scale with other things, the case study questions, all the maths helps us see the link, show us the link and then teach us how to work things out, transfer one number into another and work out differences and things like that' (2nd-year physiology student)

When evaluating the maths tutorials, participants raised the interesting point that it wasn't always clear what the tutorial was about from the title alone; however, the tutorial itself provided an adequate explanation of the topic it covered. Another issue that was raised concerned the time it took for some tutorials to get to the main point of the topic. Some suggestions for future development included changing the order in which the tutorials appear, re-naming the tutorial titles and in the tutorials themselves, showing the workings out more clearly on the board:

'I felt the use of the tutorials on the board was possibly a little confined space-wise, maybe if it was written on a white board on a wall I think that would be more useful, because you can space things out a bit more because once or twice the board looked a little cluttered' (2nd-year physiology student)

Finally, it was felt that whilst there existed the potential to integrate *biomathtutor* into the curriculum, the course and module content would have to be taken into account when

assessing the relevance of this resource to students' learning needs. The suggestion was also made that *biomathtutor* would need to be developed further to include a variety of case study scenarios, reflecting a diversity of bioscience fields. One student's observations were that:

'The use of only one case study was disappointing. I'd have preferred more case studies encompassing different clinical conditions with other clinical and pathological tests performed and additional data to analyse'.

In conclusion, this project has explored students' and their tutors' reactions to the pilot *biomathtutor* resources and their views regarding the potential for blending *biomathtutor* with more traditional teaching methods to support mathematics learning within the life sciences. Overall, the findings indicate that there is support for integrating *biomathtutor* into the curriculum and the perception that such integration would support the teaching and learning of mathematics in bioscience courses and ultimately help improve the mathematical skills of life science undergraduates.

References

Tariq, V. N. (2002) A decline in numeracy skills among bioscience undergraduates. *Journal of Biological Education*, 36 (2), 76-83.