

S-STAR's trial Bioinformatics Course: an online learning success

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Introduction

The S-Star group of teaching institutions formed an alliance to provide a global, unified bioinformatics learning environment (GLOBULE) made up of modular courses in the disciplines of genomics, bioinformatics, and medical informatics. The S-Star group is alternately titled the S*Life Science Informatics Alliance and comprises six institutions from five continents. It is the result of cooperation between Karolinska Institutet Sweden², the National University of Singapore¹, Stanford University USA³, Uppsala University Sweden⁴, the University of Sydney Australia⁵, and the University of Western Cape South Africa⁶. The cooperation was initiated because there is an overall global demand for bioinformatics teaching. The initial aims of GLOBULE are to jointly provide:

- A globally accessible online course for training in bioinformatics and genomics;
- Accessibility to the highest possible quality of online courseware available in the world today;
- High quality assessment, grading and courseware that has been approved by the educators from the host institutions.;
- An integrated modular learning environment that allows a student to select from both pre-requisite modules and advanced modules in order to build a comprehensive program in genomics and bioinformatics.

The main mission of the project is to provide an introductory course in bioinformatics to anyone with Internet access. All classes are given in English, regardless of whether the classes are attended by individuals or in groups.

Results and Discussion

The first S-Star Trial Bioinformatics Online course was offered by the S* Life Science Informatics Alliance from October to November 2001. Participants were enrolled from Asia, Australasia, Europe, North America and South Africa, each from diverse academic backgrounds. Of the initial 150 students, 96 followed the entire course and 70 passed the final examination. The course was free to all online registrants. The management and delivery of the course was facilitated through the National University of Singapore's Integrated Virtual Learning Environment [IVLE - <http://www.ivle.nus.edu.sg>]

During the course, participants from various continents and academic backgrounds accessed streaming video lectures from the S-Star website. Lecture notes, discussion forums and multiple choice question assessments were hosted on IVLE. The discussion forums and assessments were made accessible to the S-Star course participants following the lecture schedule. For each lecture, participants contributed to the associated discussion forum and assessments during the two weeks duration specifically assigned to each lecture. At the end, 70 participants had fulfilled the course requirements and were awarded a certificate of participation signed by all cooperating universities. 62 students dropped out of the course; 36 did not participate in the first assessment; 18 indicated they did not have time to complete the

course and 8 commented that they encountered technical difficulties (Internet access and bandwidth issues). Problems of bandwidth and Internet connectivity were initially resolved with the set up of mirror sites in South Africa, Singapore and USA as well as regional helpdesks to address these issues. Further mirror sites have since been set up in India, China and Malaysia. For those participants who experienced low bandwidth problems in viewing the lecture video files via real time streaming, the mirror sites have been particularly helpful in enabling students to download lectures easily.

For the duration of the discussion forum for a specific lecture, the lecturer gave guidance and answers to issues raised by students. The discussion enabled a sense of community between students and staff. Participants learned from each other, clarified issues and were involved in group learning. Active participation was considered of utmost importance to the effectiveness of the discussion and to both comprehension and learning.

Feedback from participants upon completion of the course (as indicated in the charts below) show that the course was rated as informative, interactive (because of discussion forums) and above all effective for dis-

course learning. Overall, participants felt that the course content was useful and well presented with good technical support. They also indicated that the strength of the course lay in the flexible online accessibility (via audiovisual streaming) to the course content. The discussion forums received a broadly distributed rating from the participants and this is likely to reflect the preferred learning styles represented as well as varying degrees of comfort and familiarity with the approach.

The lack of live two-way interaction in the course did not seem to limit the participants' ability to learn the course material as judged by our assessment results. We were reassured by the result that 69 out of 71 respondents said they would participate in future S-star online courses. On the basis of received student feedback (Figure 1) we have introduced further rounds of the S-star Bioinformatics online course. The lecturing staff, their affiliate institutions and links are described in detail at [<http://www.s-star.org>].

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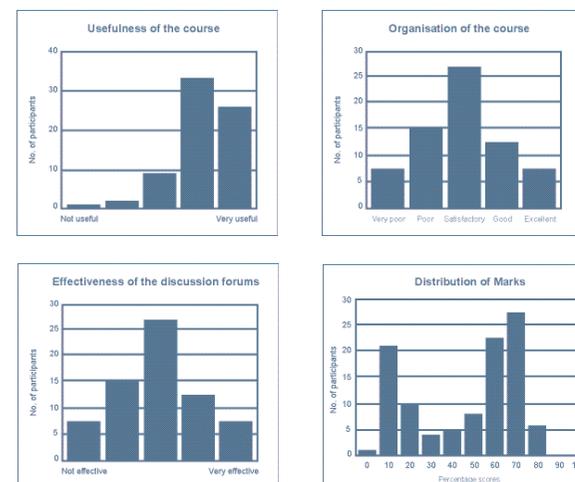


Figure 1. Breakdown of survey responses by students and the mark distribution