TQEF Research-Informed Teaching Initiative

Final Report

Name of key contacts: Professor Richard Thompson and Dr Katherine Sloman
Department: School of Marine Science and Engineering
Telephone: x 84651
Fax: 584605
E-mail: richard.thompson@plymouth.ac.uk;

Title of Project: Developing the use of role-play and cross-year peer assessment for research-informed teaching of Marine Sciences

Type of Project: Role-play and peer assessment activity - research

Aims of Project: There were three aims to this project

(1) Further develop role-play, to expand and test its application within B.Sc. Marine Biology and examine potential usage in other programmes. **(2)** Organise a cross-year student conference where year three students will orally present their independent research projects to students from years one and two, who will critique this research. **(3)** Evaluate the use of bursaries for final year students to present their research externally at international conferences.

Background to Project (Context):

The ethos of the Marine Biology Subject Group is to generate high calibre graduates equipped with the skills to become practitioners. Providing opportunities for students to ask, and answer, their own research questions is fundamental to this, promoting deep learning, originality, independent thinking and critical evaluation. The investigators had previously developed and tested the use of large-group role-play for students to experience the process of applying for research funding and peer assessment . The associated student evaluations demonstrated considerable success in achieving these aims. Additionally, students felt they benefited from scientific discussion with other year classes, supporting the benefits of learning in an environment where novices interact with the more expert[4]. Students said they welcomed experience critiquing research and that the professional environment adopted in the role-play gave a great insight into '*what a research scientist does and the challenges faced'*. The current proposal built on this success and examined the continuing use of this kind of drama in Marine Science and Engineering. It also developed two supporting research-orientated and research-based activities.

Methods Used:

Aim 1: The large-group role-play has only been carried out once. Since it involves students from each year in different roles, it was essential to repeat and re-evaluate the event to ensure benefits are maintained for students participating in sequential years. We also included participation of staff and students from outside the Marine Biology degree as observers. Programme leaders from Marine Biology and Coastal Ecology, Marine Biology and Oceanography, Civil Engineering and Civil and Coastal Engineering had previously expressed interest in attending. We also involved potential employers to assess whether the skills that students were developing could be better tailored to their subsequent employability. **Aim 2**: At the end of their independent research project module, final year marine students are required to give a 15 minute oral presentation on their work for a formal assessment. Previously, the presentations had been graded by staff but were poorly attended by other students. The research of many final year students is of extremely high calibre and we considered these presentations were under-utilised as a vehicle for research-informed teaching. We proposed developing a professional project conference incorporating students on all three years of the three Marine Biology programmes (n = 280). Presentations by year three students were attended by years one and two who benefited from academic cross-year interaction and were involved in peer assessment of the presentations. The conference ran for a full day with four parallel sessions (~100 presentations). Year one and year two students were distributed among the sessions. Potential employers were invited to the sessions and were given an opportunity to showcase their organisations at a buffet lunch in the Sherwell Building. **Aim 3**: Our final objective built on helping our students develop the research skills they need to communicate science to a professional audience. There was no existing mechanism to allow students to present their work orally at international conferences and yet many are at an appropriate level to do so (evidenced by numerous publications of their work). Therefore, we evaluated the use of bursaries for final year students to present their research at international conferences, thereby taking University of Plymouth research-led teaching activities to the forefront of the external scientific community. Bursaries were awarded according to transparent criteria to two students who had work of appropriate quality and had identified a suitable conference venue.

Results:

Aim 1

The role play workshop was held on 23/10/09, the event ran very smoothly with very high levels of participation and engagement across all three years of the Marine Biology degree. Evaluation questionnaires demonstrated that across all three years, students considered the workshop had broadened a) their understanding of the role of scientists in society (Fig. 1) and how society could influence UK science priorities (Fig. 2). Importantly from a teaching and learning perspective students perceived that interactions, either with their peers in year classes above (Fig. 3a), below (Fig. 3b), or in the case of level two students both, were beneficial. Peer assessment was a successful element of the day. Year two students did not feel uncomfortable in having their work evaluated by their peers (Fig. 4a) and broadly speaking year three students did not feel uncomfortable in conducting these evaluations (Fig. 4b). From a practical perspective it was also useful to establish that students considered attending the event for a second time, albeit from a different perspective, was beneficial. The year three students considered participation in the previous year had helped them in the task of evaluating others (Fig. 5) while year two students considered that participation in the previous year helped them to prepare for the current year (Fig. 6). There was considerable benefit to the event from facilitation by the external representative from NERC (Fig. 7). When asked the question, should this event be repeated in subsequent years, all students responded positively (Fig 8). Supporting written commentaries from the students relating to each question gave a further insight into their responses. One of the main benefits perceived by the year one students was anticipatory; looking ahead to where they would be and the quality of work they would be producing in a year's time. Year two students also felt they benefited from being able to look ahead, but in most cases this went a step beyond the level one students, and identified ways in which the day's activities would directly enhance their future studies. Most level three students thought that the drama had improved their ability to debate opinions and make decisions and all thought that their ability to critique scientific research had improved.

A further objective of the day was to showcase the role-play event to staff from both related degree programmes (Marine Biology and Coastal Ecology, Marine Biology and Oceanography) and from other disciplines within the School of Marine Science and Engineering. We invited around 10 staff many of whom expressed an interest in attending however turnout on the day was poor. Attendance from outside organisations was good and allowed the students the additional opportunity to meet with potential employers.

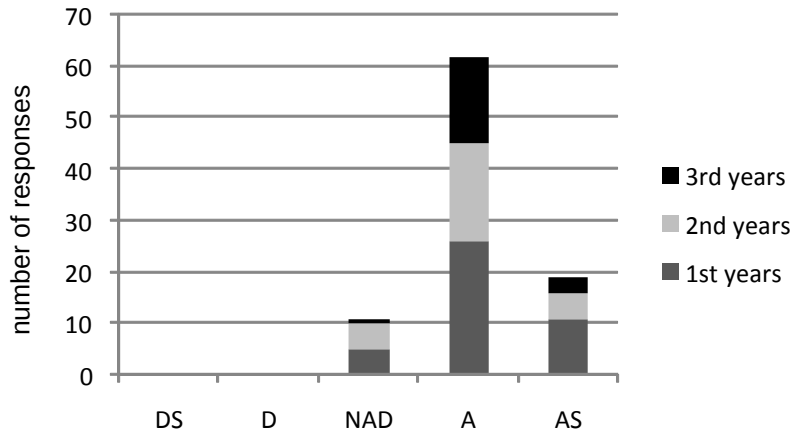

Fig. 1) I believe that this workshop has broadened my understanding of the role of scientists in society, DS = disagree strongly, D = Disagree, NAND = neither agree nor disagree, A = agree, SA = Strongly Agree.

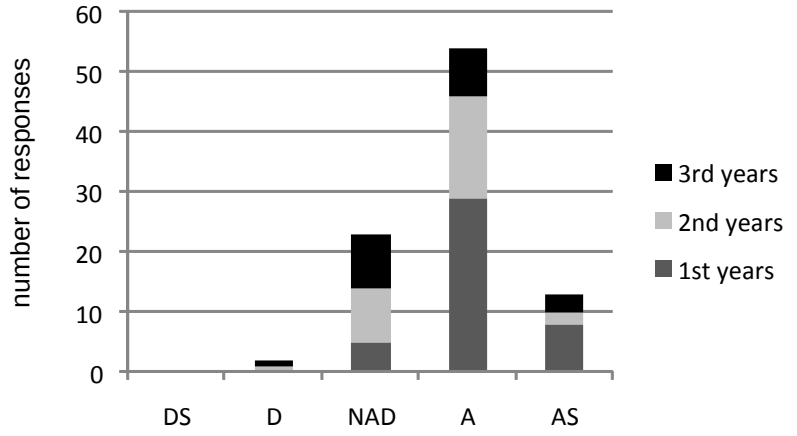

Fig. 2) I believe this workshop has broadened my understanding of how society could influence UK science priorities, DS = disagree strongly, D = Disagree, NAND = neither agree nor disagree, A = agree, SA = Strongly Agree.

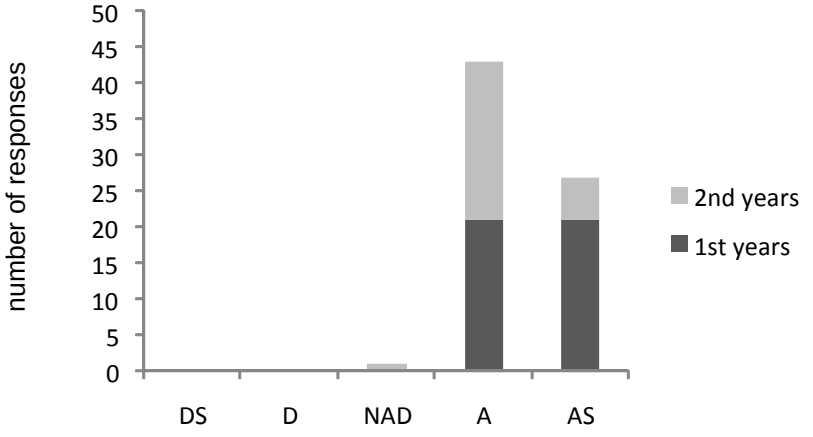

Fig. 3a) I have benefited from the opportunity to interact with students from year classes above me (years one and two), DS = disagree strongly, D = Disagree, NAND = neither agree nor disagree, A = agree, SA = Strongly Agree.

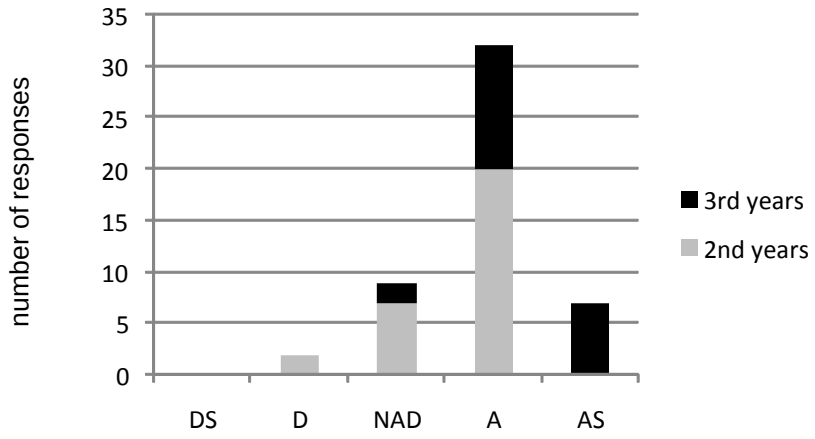

Fig. 3b) I have benefited from the opportunity to interact with students from year classes below me (years two and three), DS = disagree strongly, D = Disagree, NAND = neither agree nor disagree, A = agree, SA = Strongly Agree.

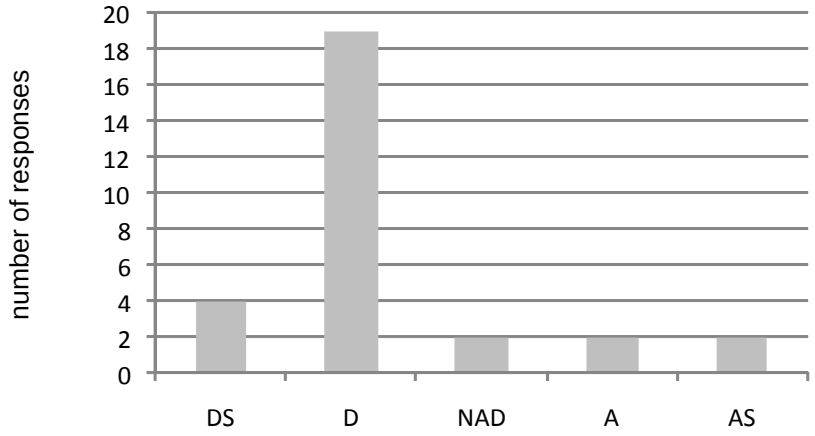

Fig. 4a) I felt uncomfortable having my work evaluated by other students (year two only), DS = disagree strongly, D = Disagree, NAND = neither agree nor disagree, A = agree, SA = Strongly Agree.

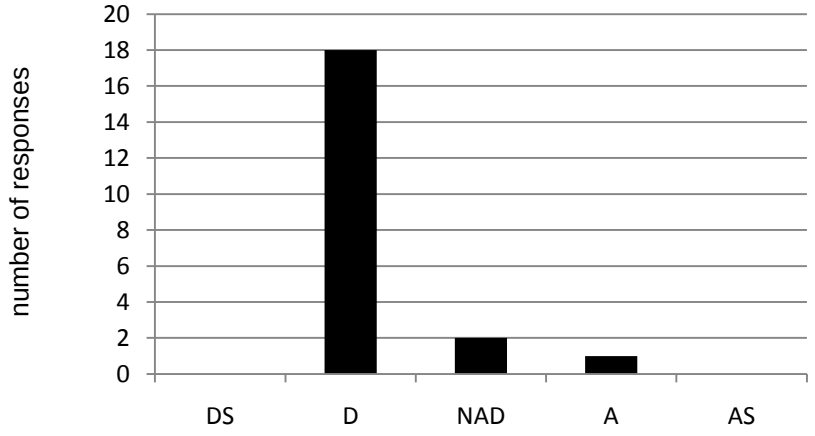

Fig. 4b) I felt uncomfortable evaluating the work of other students (year three only), DS = disagree strongly, D = Disagree, NAND = neither agree nor disagree, A = agree, SA = Strongly Agree.

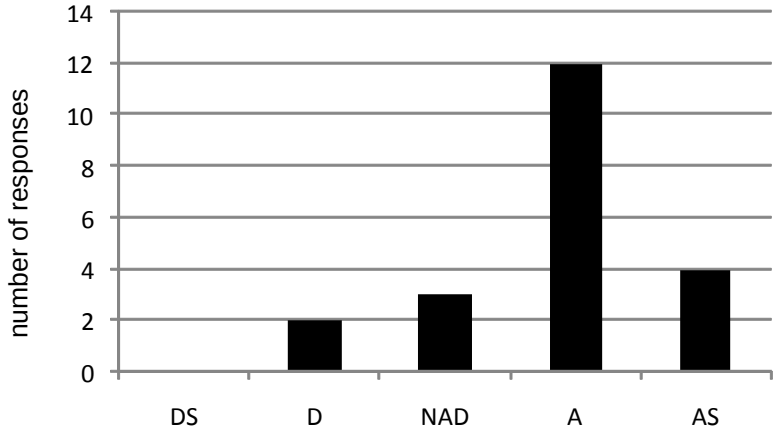

Fig. 5) My participation in last year's workshop helped me to evaluate the work of other students (year three only), DS = disagree strongly, D = Disagree, NAND = neither agree nor disagree, A = agree, SA = Strongly Agree.

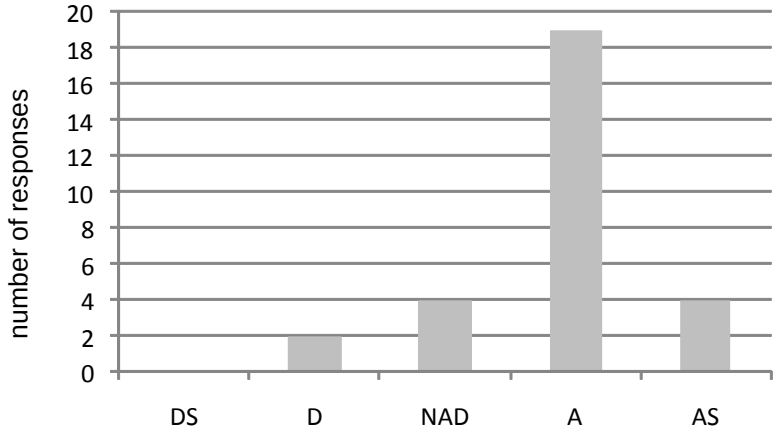

Fig. 6) My participation in last year's workshop helped me to prepare for this year's workshop (year two only), DS = disagree strongly, D = Disagree, NAND = neither agree nor disagree, A = agree, SA = Strongly Agree.

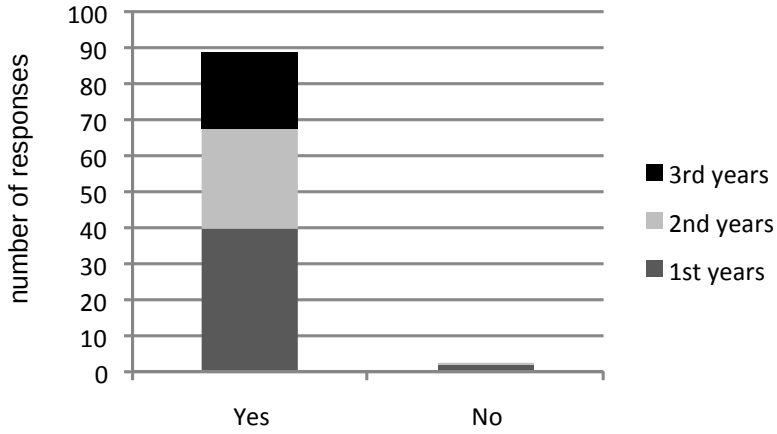

Fig. 7) The presence of a representative from the Natural Environment Research Council added realism to today's exercise.

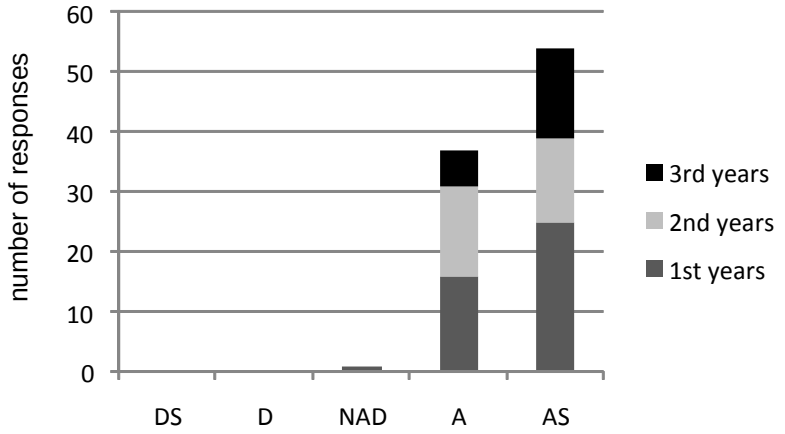

Fig. 8) This workshop should be repeated again in subsequent years.

Aim 2

The Marine Biology Project Conference was held for the first time in its new format on 28th May 2010. Over 260 students and around 20 academic and technical staff attended. There was a full programme of events from 09:00 – 17:30; with four main lecture theatres (Portland Square and Sherwell) running parallel sessions all day. A printed program and a name badge were given to everyone who attended. The event was very successful with most students engaging and participating until the very end of the event. Students from all years considered they had benefited from listening to the final year presentations (Fig. 9a, b). Final year students felt they had benefited from having the opportunity to present their research in a conference environment (Fig. 10). All three years considered the conference broadened their understanding of how science is communicated (Fig. 11). First and second year students felt the day had broadened their understanding of what would be required from them when they reached the third year (Fig. 12). Broadly speaking the third years were comfortable having their work evaluated by first and second years (Fig. 13), while the first and second years themselves were spread across a range, with most feeling '*neither comfortable nor uncomfortable'* about evaluating the work of others (Fig. 14). There was a clear consensus that the conference should run again in subsequent years (Fig. 15). The high level of attendance even in the concluding presentation at 5pm was a clear indicator of the level of engagement and enthusiasm from both staff and students (Fig. 16). The level of engagement is further emphasised by considering the timing of the event, which meant that for year one and year two students the conference was in effect the last formal timetabled session of teaching or examinations in the academic year and for year three students it was the last session in their entire degree.

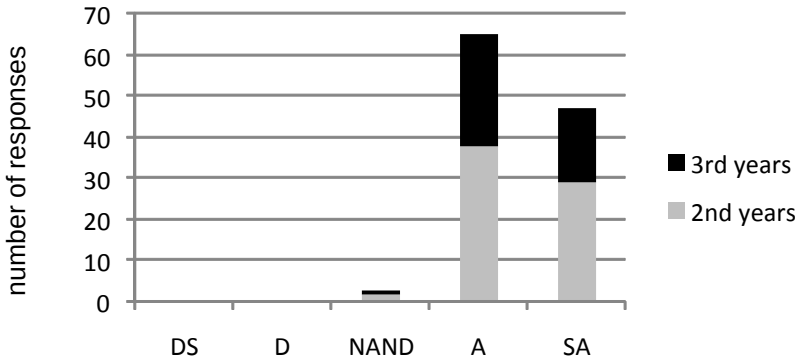

Fig. 9a) I have benefited from the opportunity to: listen to presentations from final year students (years one and two only), DS = disagree strongly, D = Disagree, NAND = neither agree nor disagree, A = agree, SA = Strongly Agree.

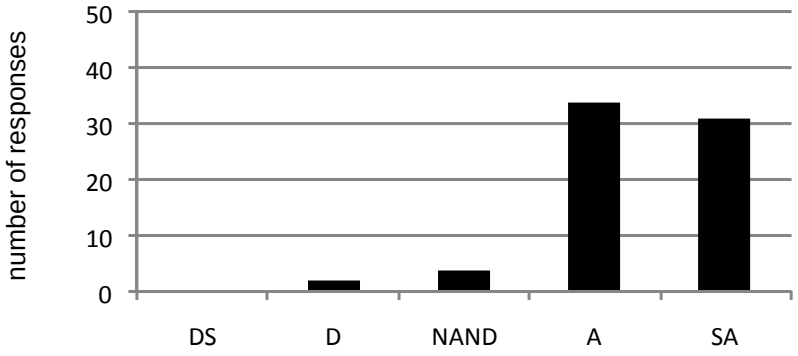

Fig. 9b) I have benefited from the opportunity to listen to presentations from other final year students (year three only), DS = disagree strongly, D = Disagree, NAND = neither agree nor disagree, A = agree, SA = Strongly Agree.

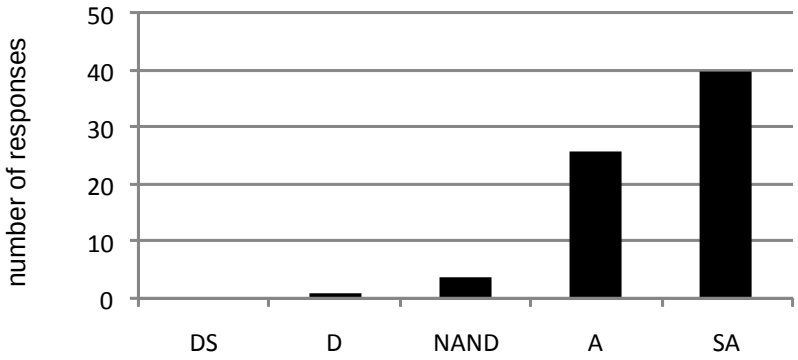

Fig. 10) I have benefited from the opportunity to present my research in a conference environment (year three only), DS = disagree strongly, D = Disagree, NAND = neither agree nor disagree, A = agree, SA = Strongly Agree.

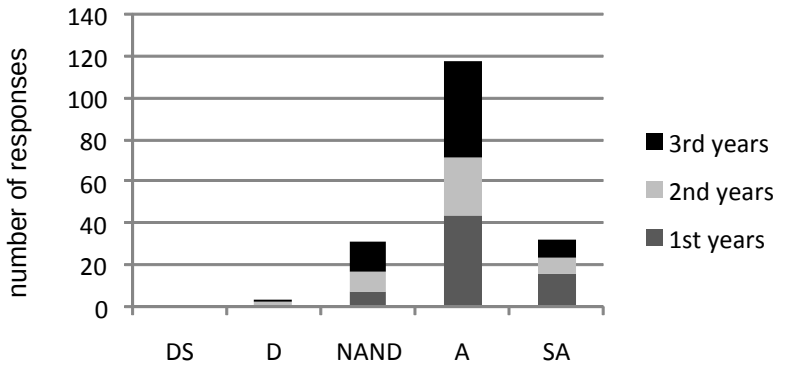

Fig. 11) I believe that this conference event has broadened my understanding of how science is communicated, DS = disagree strongly, D = Disagree, NAND = neither agree nor disagree, A = agree, SA = Strongly Agree.

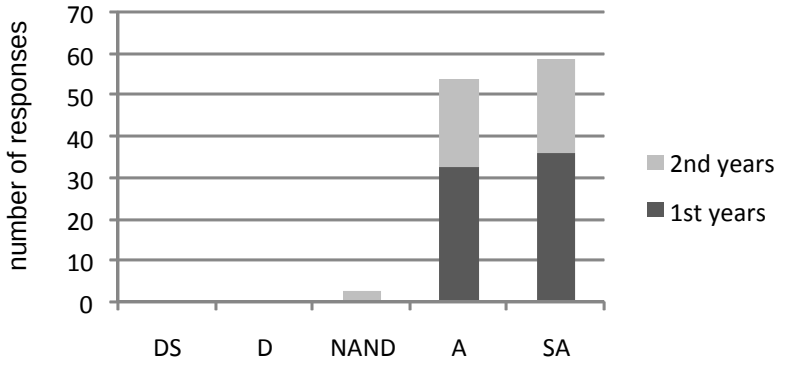

Fig. 12) I believe this conference has broadened my understanding of what is required of me for my own final year honours project (years one and two only), DS = disagree strongly, D = Disagree, NAND = neither agree nor disagree, A = agree, SA = Strongly Agree.

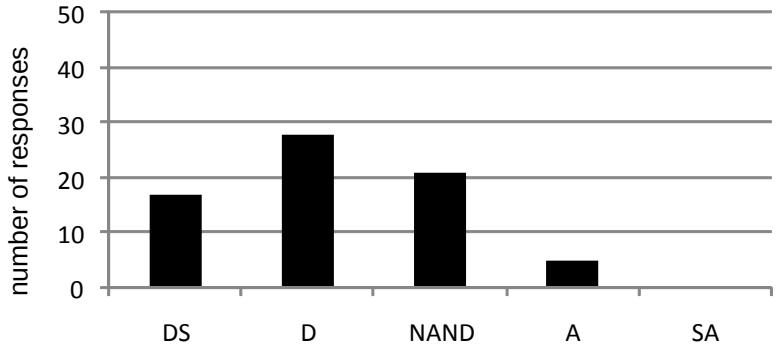

Fig. 13) I felt uncomfortable having my work evaluated by other students (year three only), DS = disagree strongly, D = Disagree, NAND = neither agree nor disagree, A = agree, SA = Strongly Agree.

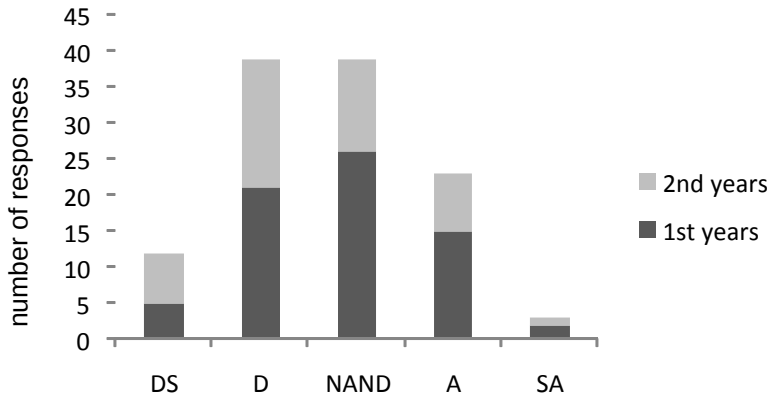

Fig. 14) I felt uncomfortable evaluating the work of other students (years one and two only), DS = disagree strongly, D = Disagree, NAND = neither agree nor disagree, A = agree, SA = Strongly Agree.

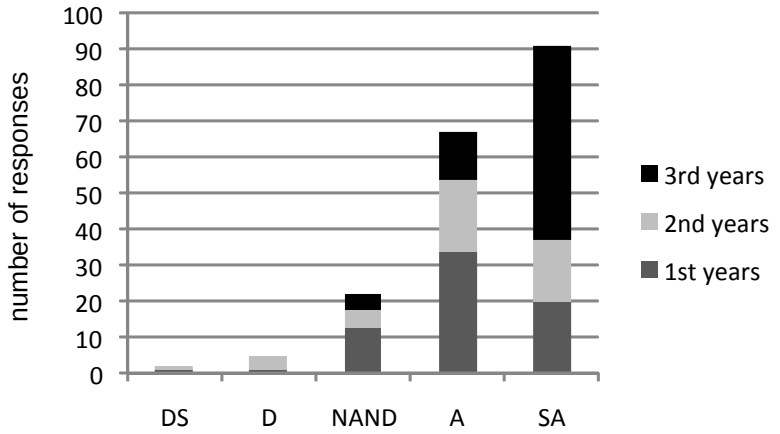

Fig. 15) This conference should be repeated in subsequent years, DS = disagree strongly, D = Disagree, NAND = neither agree nor disagree, A = agree, SA = Strongly Agree.

Fig 16) Attendance at the Final Year Project Conference by both students and staff was exceptionally high throughout the day. This picture shows the concluding presentation in Sherwell Upper at 5pm.

Aim 3

The research informed teaching award also funded conference visits for final year students to present the outcomes of their research projects at international conferences. Awards were made in response to an open call/competition among final year students in Marine Biology, Marine Biology and Coastal Ecology and Marine Biology and Oceanography. There were three objectives here; a) to showcase research done at the University of Plymouth, b) to provide an invaluable opportunity and experience for some of our best final year students and c) to provide an illustration of the quality of projects produced by our students (e.g. for use at open days). The level of uptake by students was relatively low with only but two awards being made one to Lewis Eaton and one to Louise Baldwin; both attended the 9th International Congress on the Biology of Fish and have provided short summaries of their experience (Fig. 17).

Summary of Conference attendance for Lewis Eaton

'*Being awarded a travel grant by the University of Plymouth to attend the 9th International Congress on the Biology of Fish in Barcelona allowed me the invaluable opportunity to present my 3rd year project as a poster presentation to experts in the field. As well as giving me the chance to meet scientists whose research formed the cornerstone of my own project it also allowed me to explore other areas of fish biology through attending the conference lectures. I feel conference attendance and presenting my own work has increased my employability and potential in progressing within a research career. Although it is unusual for undergraduate students to present their work at an international conference, I would highly recommend any student to take up the opportunity as it is an experience in networking with scientists, gaining new research ideas and improving presentation skills.'* Lewis Eaton July 2010.

Summary of Conference attendance for Louise Baldwin

'Being awarded a travel grant by the University of Plymouth allowed me to attend the 9th International Congress on the Biology of Fish held in Barcelona. Whilst at the conference I was able to present my third year research thesis to a wide range of experts in the field. This experience improved my confidence in relation to presenting work in front of an expert audience and also gave me the chance to improve my communication skills, which is an important skill to master to aid in getting your science acknowledged. I feel that conference attendance has enabled me to meet and interact with like minded professionals, it has also helped me to build a set of contacts which may in the future aid my employability and research career.'

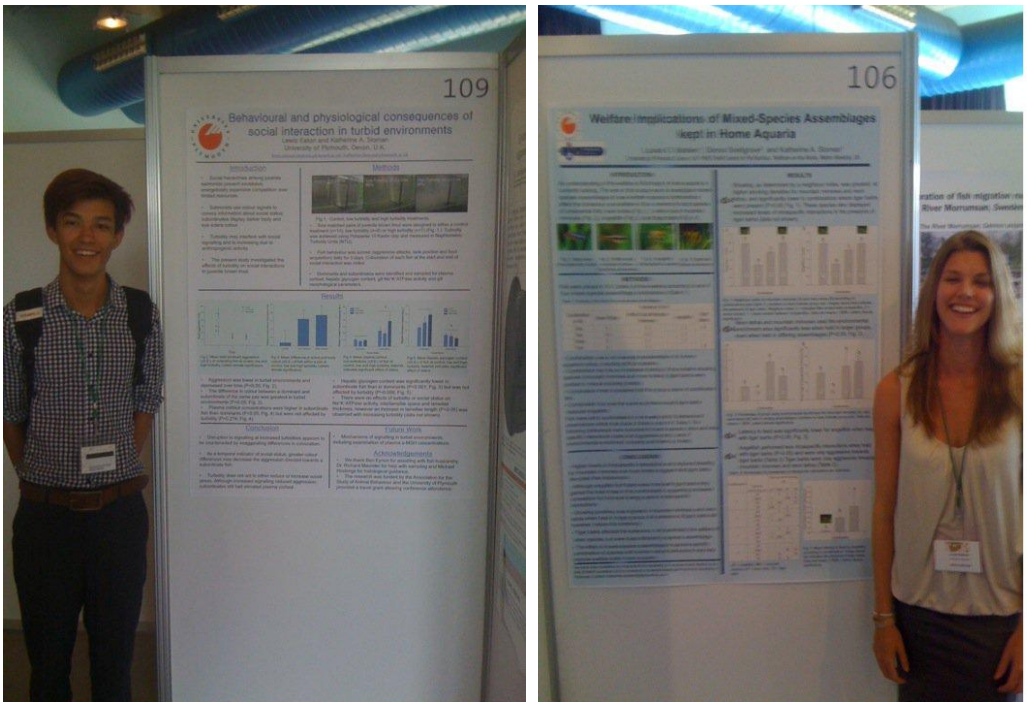

Fig. 17) Lewis Eaton (left) and Louise Baldwin (right), who both studied B.Sc. Marine Biology 2006 – 2010, alongside their posters at the *9th International Congress on the Biology of Fish*, Barcelona, June 2010.

While it was disappointing not to have had more applications form students the presentations form Lewis and Louise were both of very high calibre. In terms of time scale final year students needed to apply to us for funding to attend an international meeting ahead of presenting their work internally at the project conference (Aim 2). Most students reported on the positive and confidence building experience of the project conference at the University of Plymouth. Therefore had it been possible for students to apply for support after the final year conference then uptake may well have been greater.

Associated Publications: It is hoped that the Research Informed Teaching Award will lead to at least one peer-reviewed publication: Sloman, K.A. & Thompson, R.C. in preparation. We had also anticipated attending the Society for Research in Higher Education conference in December of 2010. We had allocated resource for this but unfortunately it was not possible to do so within the time frame available for monies to be spent July 2009 – July 2010. It is unfortunate that some of the unspent funds could not have been made available to us for this purpose as we feel that the work would have been well received at the conference and would have highlighted the ongoing commitment to Learning and Teaching at Plymouth.

Keywords: role-play, drama, critical thinking, research funding, peer-assessment