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## **Undergraduate research as a form of learning**

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In a few days I will start my final year of Marine Biology at Plymouth University. One of the main attractions to the field of Marine Biology was the prospect of research and discovery, in an area that still has many unknowns. Hence, approaching the last year of my degree, where independent research will be at the forefront of my study, is an exciting but apprehensive time. Writing this article therefore comes at an excellent stage to reflect on what I have gained from my undergraduate studies so far and how well equipped I feel to undertake a research project.

Throughout my undergraduate study, I have had multiple opportunities to carry out research either independently or in small groups. Although lectures and other rote teaching methods still comprise the majority of my learning, I believe that I have gained the most through these research experiences.

Research is a central part of Marine Biology. It is imperative to our understanding and learning of the subject. However, the process of research is fundamentally different to the way most students have been taught to learn pre- university. I have always been able to apply myself to understand a subject, however usually with a teacher there to guide me through the process. Therefore, although I enjoy research it can be a bewildering place; with so many undefined questions and unknown answers.

At Plymouth University we get the opportunity to take part in two field courses as part of our program which enabled us to experience the whole research cycle from; developing a hypothesis, carrying out the experiment and presenting our findings. The field trips were a steep learning curve for all of us, and I think most would say they were very challenging. However, the university staff were very supportive and reassured us greatly. The intensive week allowed us to observe the way the lecturers approach research and enabled us to put this into practice. Through this I not only got to research in depth the subject that I am interested in, I also built upon important skills. It was very quickly evident from carrying out research that it is inevitable that problems will be encountered along the way, whether it is overcoming obstacles with experiments or issues with data analysis. I had to learn how to approach these scenarios with the right attitude. I also had to learn how to think critically. One of the first things required of you when you begin your research is to critically review related literature. This process, although still challenging to me, has been made easier through practicing research in my undergraduate studies. I also had to learn how to communicate effectively. Not only is research futile unless presented to a wider audience, it is important to be able to communicate with colleagues and lecturers throughout the process, and living and working with my peers and lecturers facilitated this. As a result of these field courses, I had a deeper appreciation of the value of confidence. At first there is a temptation to constantly look to an advisor for what to do next. However, the more experience I had, the more self-assurance I gained, increasing my capability of making these decisions. It is often an uncomfortable situation, but I think that is also one of the main lessons to

learn in research, to be comfortable with feeling uncomfortable and not knowing the answers. I really feel that these initial experiences of undergraduate research were an important stepping stone for me to be able to carry out my own research. I gained a lot of understanding about the way in which research works and most of all confidence to overcome the challenges researchers face.

As young students we are taught how to study various subjects. Teachers guide us through a topic of study and then mark our work invariably with a predominantly right or wrong outcome. In research we have to define a question/thesis, design a way of analyzing the subject and then come to a conclusion. This conclusion rarely has a straightforward right or wrong outcome. We might prove or disprove a thesis, we might discover a new aspect of that topic or, more frequently, we might just generate more questions to be answered in the next phase. All of this has to be done without the direct guiding hand of someone that already knows the outcome. At first this is daunting but the more experience I have the more rewarding I find the process. Although there is no direct instruction there are always lecturers, lab staff and coordinators that you can turn to for advice. Learning to access this support system is another important skill.

Obviously, being able to research is critical within Marine Biology; however, going through the process is a great learning aid in itself, equipping students with an academic mentality. In my 2<sup>nd</sup> year, separate from my Marine Biology studies, I was given the opportunity to carry out a piece of independent research through PALS (Peer Assisted Learning Scheme). As a PALS leader, supporting first year students, I was interested in creative learning. With the support of the PALS coordinators I developed a piece of research looking at how constraints can produce creativity. My study focused on students diagnosed with ADHD. For these students their ability to learn was potentially constrained by their symptoms, however the strengths and strategies used to overcome the challenges they face when studying may result in an increased creativity. The reason I mention the details of this study are because I feel that it lends itself nicely to this topic of learning through research. Many of the participants in my study listed issues with listening to lectures, reading textbooks, and completing assignments. However, students with ADHD may be more likely to consider and develop creative solutions in their approach to learning due to the educational barriers they face. These skills can be beneficial when undertaking research.

Following on from this research, I submitted an abstract for a poster presentation to BCUR (British Conference of Undergraduate Research). Following acceptance, the opportunity to present my research at BCUR was invaluable. The whole process starting with an initial mind map, to deciding a methodology, filling out ethics forms, hosting focus groups, analysing the data, creating a poster, and presenting at a conference allowed me to gain a real insight into the dynamics of research and communication thereof. At the heart of research is enthusiasm, and this is what came through so evidently at BCUR with so many different people from all disciplines across the world coming together to share their passion and knowledge for their subject. The conference consisted of many oral presentations, interspersed with poster sessions. One of the things that I really enjoyed and I think is probably unique to BCUR is to see so many presentations in such a short space of time and to engage with such a wide range of research. It was very inspiring to be around so

many people presenting research that spanned a multitude of disciplines. When it came to presenting my poster, I engaged with many people all of which were really encouraging and interested by my research. I exchanged and expressed ideas with my peers on a different level than I had previously. I also met final year students on my course who were presenting their dissertations which was inspiring but also reassuring for someone about to begin the process. This experience of carrying out independent research and presenting the findings will of course be of huge benefit within an academic setting; however, it has also given me life skills that have much broader implications.

My experience with the Marine Biology department and with the PALS coordinators has and continues to develop my self confidence. I have learnt a variety of research techniques that I will now have to put to use in developing my dissertation. Although most research is done independently the support that is available, whether in the lab or in the field, has been invaluable.

I hope that this brief overview of my experiences in undertaking undergraduate research encourages more students to embark on their own research projects.

