

Anchoring the Experience of Highly Diverse Students on the EMship+ Master: All Aboard!

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Abstract

The prestigious Erasmus Mundus Joint Master Degrees capitalize on diversity to achieve academic excellence; this is the case of the EMship+ Master in Ship Design. The highly varied cultural and academic background of the students however raises a learning and teaching challenge. Firstly, I assessed the diversity of the student cohort with an evidence-based approach to identify the dominant learning styles, and align the teaching to promote student engagement. Secondly, I created a more technology-enhanced learning environment thanks to an innovative use of lecture capture. The research ascertained the success and evidence of the positive impact of the refined teaching style and integration of technology using the quantitative data collected. Here, I outline the strength and limitations of the innovative solutions adopted to alleviate the difficulty of teaching highly disparate groups of students, demonstrating the need to gain knowledge of the students to construct an engaging learning environment.

Keywords: Learning Environment, Learning Styles, Student Engagement, Diversity, Erasmus Mundus.

Introduction

In the context of a more and more diverse higher education, providing a learning environment that is suited to students of varied backgrounds and cultures represents a contemporary challenge to be answered. This case study will focus on a highly international Erasmus Mundus programme to demonstrate how knowledge of the students is crucial to satisfy their learning styles, i.e. their preferred and most engaging way of learning, and how this can further be improved using lecture capture in both a traditional and innovative way.

Firstly, I will introduce the EMship+ course, with a strong emphasis on the benefits of diversity and dialogue in higher education. Then, the evidence-based knowledge of the student cohort will be detailed, and the main findings inherent to their learning styles will be the basis for a reflection on my teaching practice that will lead to a refined delivery method. A survey eventually revealed that the students preferred this unit's teaching style over the more traditional one of all the other units. In addition, a two weeks trial with lecture capture (recording both full sessions and creating micro-lectures with embedded quizzes), employing an action research methodology, yielded some very positive results with a high student satisfaction that suggest it should become part of the normal course delivery. I will discuss the limitations to the proposed solutions, revolving around the logistical difficulty at such an international scale and staff resistance. Finally, I will tackle the conclusions and recommendations regarding the creation of a more modern and student-focussed learning environment for the EMship+ students.

The EMship+ Master

Created in 2011, the EMship master course in Ship Design is part of the prestigious Erasmus Mundus Joint Master Degree (EMJMD) programme, that aims a bringing together a cohort of highly diverse students, enhance the quality of higher education and promote dialogue and understanding between people and cultures through mobility and academic cooperation. In recognition for its outstanding performance, the course was later granted the *Erasmus Mundus +* label by the European Commission. The students are given the opportunity to study in at least

three countries over the 18 months duration of the course. Indeed, the first semester is taught at the University of Liege, Belgium; the second at the University of Nantes, France; and the third in either Germany, Poland, Romania, Italy or France. Furthermore, between the second and third semester, students can conduct their research thesis in a partner University worldwide, such as Southampton Solent University; the universities involved in the EMship+ master are presented in Figure 1. As of 2018, a new version of the master, extended over four semesters instead of three has been launched to attract more students. The ambition of the master is to build on diversity, with an interdisciplinary approach with exceptional depth and scope thanks to the wide range of international universities involved (Rigo, et al., 2015). As a result, Southampton Solent University contributes in its area of expertise, namely Yacht and Powercraft Design.



Figure 1: EMship+ network (Soupeez, 2016).

Recognising and encouraging diversity is the culmination of a long process, labelled the *genealogy of diversity* by Combs (2002). Originally, the concept of equal opportunity was primarily focussed on eliminating racial discrimination. Today, diversity is being taken further, towards the integration of differences, in a process defined as pluralism. Diversity has become a strength that higher education is looking to exploit to its full potential, particularly in the Maritime field, as previously shown by Soupeez (2017), and clearly stated by Michaeli et al. (2015):

“The faculty capitalize on the diversity in the classrooms, which includes traditional students (high school direct to college), active duty and military veterans as well as those who have work experience and are now pursuing an engineering degree. Having a 28-year old sailor with a shipboard experience in the same classroom as a 19 or 20 years old with very little experience and a 34-year old shipyard welder working on her engineering degree brings so much more depth and peer-to-peer learning in the classroom”.

This is the approach taken by Erasmus Mundus programmes, promoting student mobility and multicultural learning environments in higher education. This however raises one major challenge: how to teach such a diverse cohort of students?

Higher education institutions are multicultural, and the United Kingdom has been ascertained as the most diverse higher education system (Huisman, et al., 2007). It is therefore logical to see the Teaching Excellence Framework (TEF) (Business Innovation and Skills Committee, 2016) define its purpose as recognising and respecting the diversity. At a more local level, the strategic plan developed by Southampton Solent University (2015) has a strong emphasis and commitment to equality and diversity.

Another critical aspect in building the learning environment for the EMship+ students will be creating a dialogue. The growing importance of dialogue in higher education is revealed by its increased presence in the literature

(Gunnlaugsen & Moore, 2009). Dialogue is indeed a significant component of education and learning, as argued by Carducci, et al. (2011) and later supported by Stern (2014). Open dialogue has also been shown to promote constructive curriculum development (Hayen & Maelstaf, 2014). Moving away from the old fashion perception that the teacher is in a position of power, controlling knowledge with authority (Freire, 1968), modern Dialogue Education advocates and places respect as a core value, so that the learner's voice is heard, and a feeling of respect is fostered (Gerber, 2015). Henard & Rosevearne (2012) presents evidence that cultivating an ongoing dialogue between teachers and learners results in an enhanced student engagement and a greater student satisfaction regarding the curriculum.

To evaluate the diversity of the EMship+ students and establish a beneficial dialogue that will allow to adopt a relevant and effective teaching style, I performed an evidence-informed analysis of the 2016 and 2017 cohorts. This is primarily driven by the fact that the students have an extremely diverse background; and were completely unknown prior to the actual teaching; the course was developed without knowledge of the students, and will therefore need to be refined based on the findings inherent to the student's learning styles.

Teaching for Diversity

I developed an anonymous questionnaire to build a profile of the student cohort, including some indication of the ways in which they preferred to learn. This helped me identify individual and group barriers that I would need to overcome to enhance the learning environment (Hoff et al., 2004). Furthermore, it was an indication of my concern and respect for the students and the ways in which they learned (Ramsden, 2003). My rationale for the questionnaire was linked to Fox's (2006) *travelling theory*. I wanted to shape the students' learning journey by better understanding where each was coming from (their academic background) and what they saw as their final destination (their intended job or field of activity). The three-part structure of the questionnaire is related to the 3P model (Biggs, 1989), namely presage, process and product, as detailed hereafter.

Part 1 (Sections 1 to 5): Presage – Personal, academic and professional background prior to the course, and motivations to undertake the course.

Section 1 provides a quick overview of the student's origin, age, gender and spoken languages. An important aspect had to be left out of this section: religion. Indeed, while gathering religious statistics in common practice in the United Kingdom, it is forbidden under Belgian law. The second and third sections tackle the academic and professional background of the students. Finally, sections 4 and 5 respectively assess why the student decided to move towards naval architecture, and the motivations behind undertaking the course.

Part 2 (Section 6): Process – Identification of learning styles, student engagement and most effective learning activities.

Entitled '*How do you learn*', the sixth section looks at what makes a lecture engaging and how the students learn. This part comprises a multiple-choice section to allow for a quantitative analysis of the results; the purpose of which being to investigate the student's attitude towards the lecture, and categorise their behaviour based on the six student learning styles defined by Reichmann and Grasha (1974), so that teaching practice can be altered to better suit their learning needs.

Part 3 (Sections 7 and 8): Product – What are the intended learning outcomes and student ambitions for the future.

Section 7 tackles their future job and career goals, so their ambitions can be better supported. Finally, students are given an opportunity to add anything they feel relevant in the eighth section.

The questionnaire was completed by 30 students in 2016 (100 % response rate) and 24 students in 2017 (89% response rate), and revealed that over those two years 16 nationalities (depicted in Figure 2) and 19 different languages were represented, thus creating a strongly diverse group. The questionnaire also showed that English was a second language in over 90% of the cases.

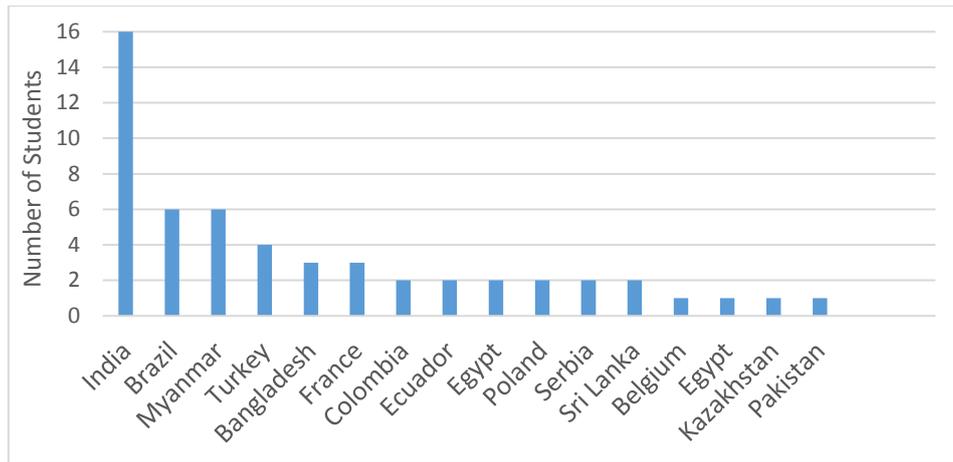


Figure 2: EMship+ nationalities (2016 and 2017).

Another primary objective was for me to establish from which industry the students were originating. Indeed, the EMship+ course is intended for students with a background in other engineering disciplines than naval architecture. In fact, only 22% of the students have a naval architecture education, while the rest comes from an array of diverse industries, as presented in Figure 3.

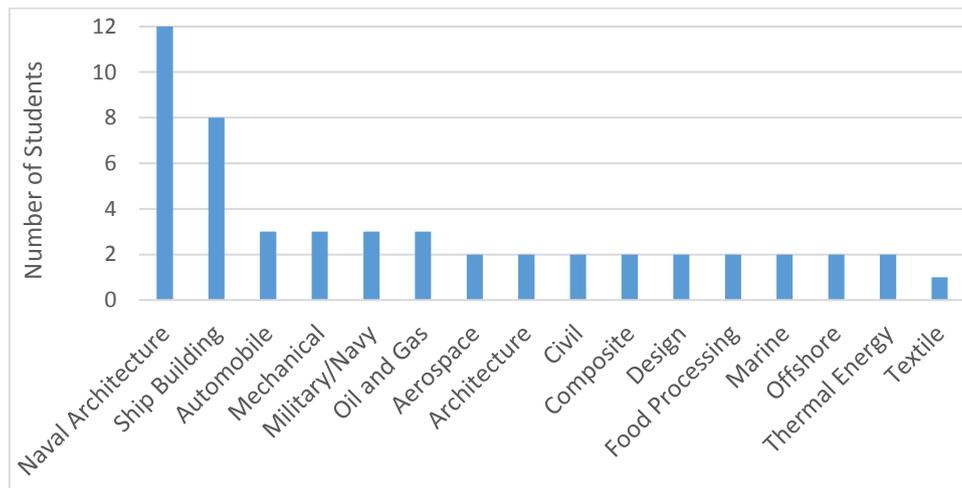


Figure 3: EMship+ backgrounds (2016 and 2017).

In order for me to provide a teaching that will be more engaging and allow the students to achieve the intended learning outcomes in a stimulating way, questions targeted at defining their learning style were incorporated. Those were inspired by the learning styles defined by Reichmann and Grasha (1974), namely: competitive, collaborative, avoidant, participant, dependent and independent. I opted for this particular inventory as it is considered part of the family of learning styles more targeted at learning approaches and strategies (Coffield et al., 2004), thus fitting well with my ambition for this research. Moreover, previous work undertaken with this theory revealed its suitability for maritime courses (Soupepez & Ridley, 2017). The results of the survey completed by the 54 participants over two years yielded some very clear trends, represented in Figure 4, with the students clearly seeing themselves as collaborative and participant.

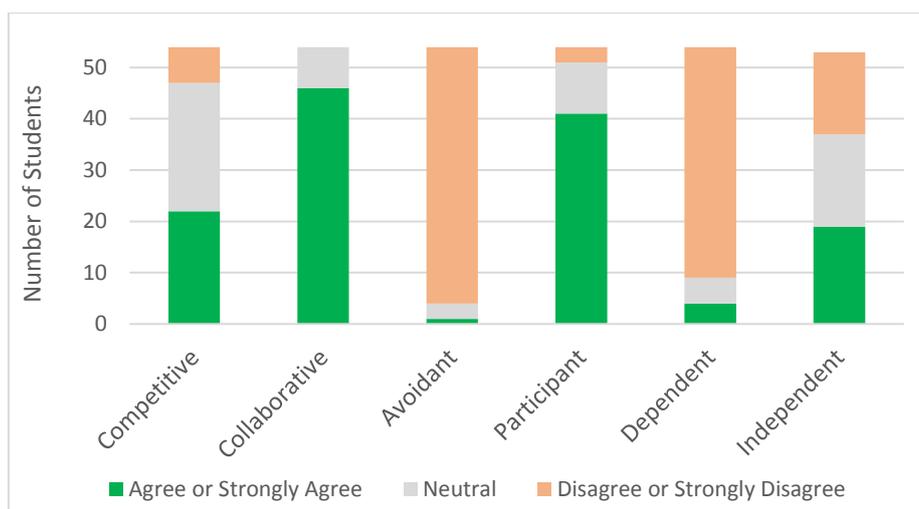


Figure 4: Reichmann and Grasha (1974) learning styles results.

Collaborative students learn by sharing ideas; this call for more group activities and group discussions. This is further revealed in the students' answers to the questions 'what makes a lecture interesting/engaging?' and 'what are the best ways you learn?' where a large proportion mentioned the importance of discussion. The collaborative learning style, also identified and defined by Coates (2007), builds onto the social aspects of teaching, the student engagement being motivated by the feeling of being part of a community, thus reinforcing the social constructivism (Clack, 1998).

On the other hand, a large majority of the students appear to define themselves as participant, i.e. looking to make the most out of the course. Once again, this is validated by another part of the questionnaire, where all student either strongly agreed (67%) or agreed (33%) that they want to learn as much as possible from the course. This suggests the students are aiming to achieve deep as opposed to surface learning (Marton & Saljo, 1976). As per the collaborative students, participant students are characterised as learning from discussion (Reichmann & Grasha, 1974).

Finally, statistics relative to student engagement with the lectures and course material are presented in Figure 5. While most will listen to the lecture, a decreasing proportion will take notes and ask questions, and only 56% will make use of the virtual learning environment (VLE). This reveals a lack of engagement both in an out of the classroom, suggesting more appropriate leaning and teaching strategies could be implemented.

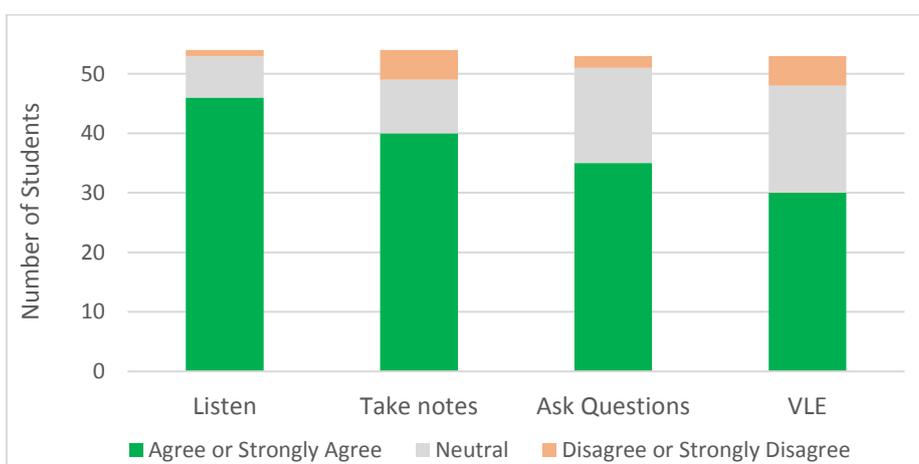


Figure 5: Student Engagement (2016 and 2017).

Having established the wide diversity of students, their collaborative and participative learning styles with a high demand for discussions and deep learning, I was in a position to alter and refine my teaching practice to better suit the highly diverse student cohort.

Reflection on Teaching

The evidence-informed knowledge of the EMship+ students allowed me to understand the way the students' learn and align my teaching with it. The questionnaire highlighted the wide cultural and academic origin of the students, and revealed their collaborative and participant learning styles. With highly diverse backgrounds, coming from a range of engineering disciplines, it is therefore no surprise that students are passionate about learning from each others, exchanging their points of view via discussions and group activities. Furthermore, despite their varied education, students are now studying the same subjects, hence the call for more details on specific vocabulary to bring everyone to the same level. Finally, being in a practical branch of engineering, the cohort showed a distinctive interest for real case studies and practical worked examples. This supports the outcome of the questionnaire that the cohort is pursuing a deep learning process, and is therefore concerned by the ability to apply the theory learnt to solve real problems.

These highly significant findings allowed me to remodel the programme, which I had previously been developed without prior knowledge of the students. Armed with new information, I was able to begin the task of refining learning and teaching approaches to better suit the students on the course; I wanted to transform the pedagogy in line not just with students' expectations and preferences, but also with my own understanding that varying the activities and lecture format would stimulate a higher level of engagement (Becker & Watt, 1995).

The questionnaire responses had highlighted that the students were keen to experience collaboration and to actively participate in their learning. Three examples of the changes I made in response to this knowledge of the students were:

- Using worked examples to demonstrate applications of design methods, reflecting the industry project model (Zimbardi & Myatt, 2014) and helping students to develop skills relevant to their future employment. In essence, rather than presenting the theory, I put a stronger emphasis on the actual practical applications of that theory in a real design scenario.
- Ensuring that students were introduced to technical vocabulary to support their comprehension and use of naval architecture terms. Here, all technical terminology was fully detailed, so that students from all background could clearly understand the words being used.
- More peer-controlled teaching and learning activities, such as group discussions, where outcomes were shared with the class (Biggs, 1999). An example of how I modified a particular slide to promote a group activity is shown in Figure 6 and Figure 7.



Figure 6: Original Slide.

- Different approaches:
 - Stabilised Monohull
 - Proa
 - Motor-Sailor
- In groups of 5, discuss the technical pros and aesthetical cons of each superyacht.
- Now let's bring your findings together.
- Does any approach seem more acceptable?



Design of sailing yachts and fast powerboats - EMAG © Jean-Baptiste R. G. Soupez, 2016

Figure 7: Modified slide to include more group discussion in my delivery of the course.

As my research progressed, I also began to make use of lecture capture technology in two forms. I had identified that students did not often take the time to view a complete lecture recording, so I explored the use of micro-lecture captures with embedded quizzes. I inserted quiz questions at key points in the short videos to stimulate students' engagement with the VLE and promote retention.

Using my prior knowledge, gained from the questionnaires I was able to reflect on my current teaching practice and begin to build a learning environment that was better suited to my students. In particular, I reflected on the ways in which new technologies might be used to enhance their learning experience.

Evidence of Impact

The impact of my teaching practice and the changes I made to align with the preferred learning activities was qualitatively quantified during the 2016 end of year course survey, where students rate the quality of each module and lecturer based on three criteria, namely the scientific content of the lecture material, the teaching style, and the level of spoken English. Out of the 25 taught modules delivered by 12 lecturers, the highest satisfaction was obtained by the pedagogy described in this case study, which was the only module to adopt an alternative teaching method. This is best represented in Figure 8, comparing the survey results for my lectures with the average results for all other modules, all performed without consideration for the student's learning styles and delivered in a more traditional teaching way (no open discussion, no group activities, limited use of technology).

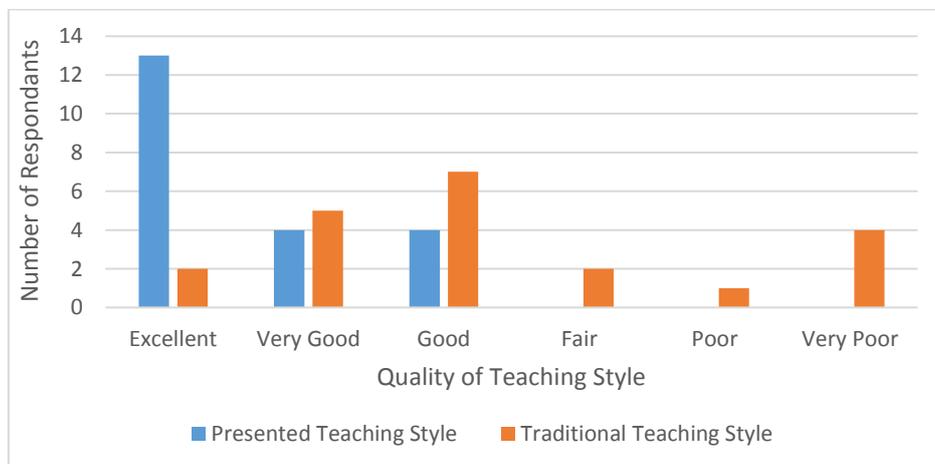


Figure 8: Student feedback on course (2016).

This clearly demonstrate that the students positively perceived the changes I put in place once better aware of their background and expectations.

Secondly, I gathered data on the use of lecture capture made in 2017, both prior to and after its two weeks trial with the students, so that the original perception could be compared to the final satisfaction. This is very much representing a cycle of action research methodology, planning and implementing a change in my practice, and then assessing the impact. Students were asked whether the EMship+ course should adopt lecture capture, micro-lecture captures, and provide a more technology-enhanced learning environment. The initial answers to those three questions are presented in Figure 9.

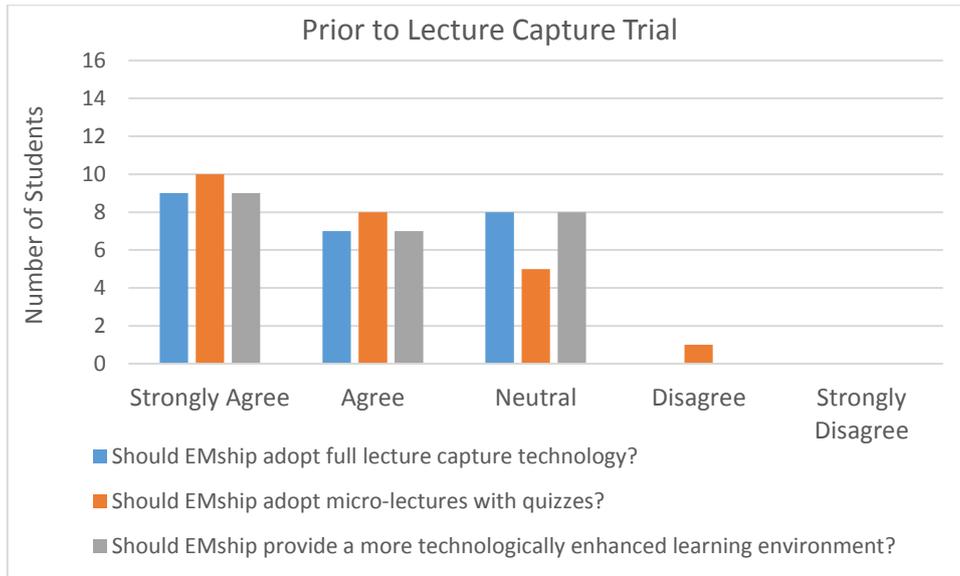


Figure 9: Student opinion prior to Lecture Capture Trial (2017).

At first, the overall perception is generally positive, with however a third of the group emitting reserves. However, when asked the same questions two weeks later, a major shift was noticed, with a large majority of the class strongly agreeing with the benefits of lecture capture, and the number of sceptical students reducing to 12%, as depicted in Figure 10.

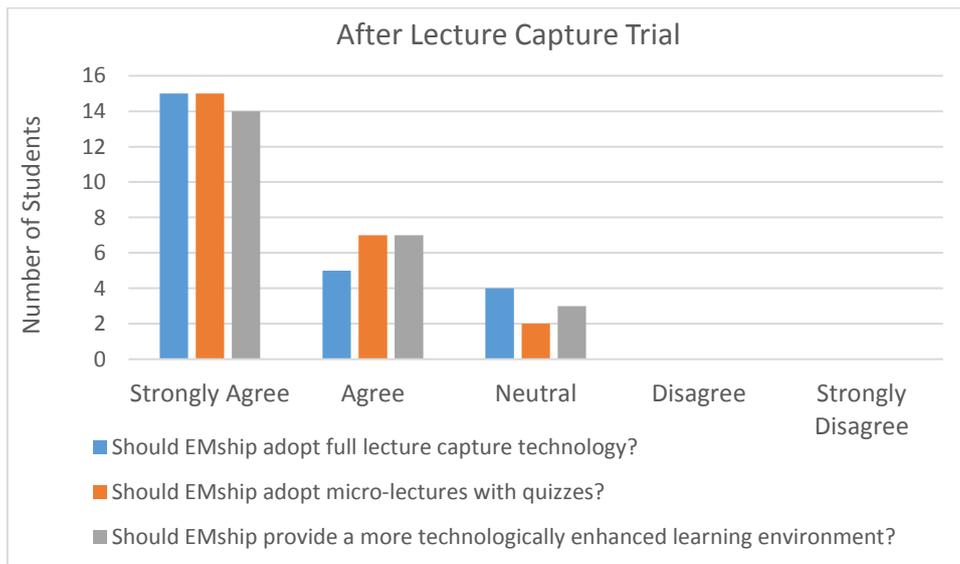


Figure 10: Student feedback on Lecture Capture (2017).

The shift towards a greater satisfaction is a strong indication of the positive impact of the lecture capture technology (in both full and micro-lecture formats) as well as the benefits of the technology-enhanced learning environment I experimented with during the short course.

Another particularly pleasing finding was the greater use of the micro-lectures with embedded quizzes compared to the full lecture captures. Indeed, comparing the viewing patterns for the micro-lectures and full lectures captures, depicted in Figure 11, there is a much stronger use of the micro-lectures made. Furthermore, the viewing pattern between the delivery of my lectures and the exam is particularly encouraging. The majority of the views occurred during the course, the holiday, and the week before the exam. In all cases, a greater use of my micro-lectures was made by the students, thus providing further evidence of the rationale behind my action research experimentation with the innovative use of the lecture capture technology.

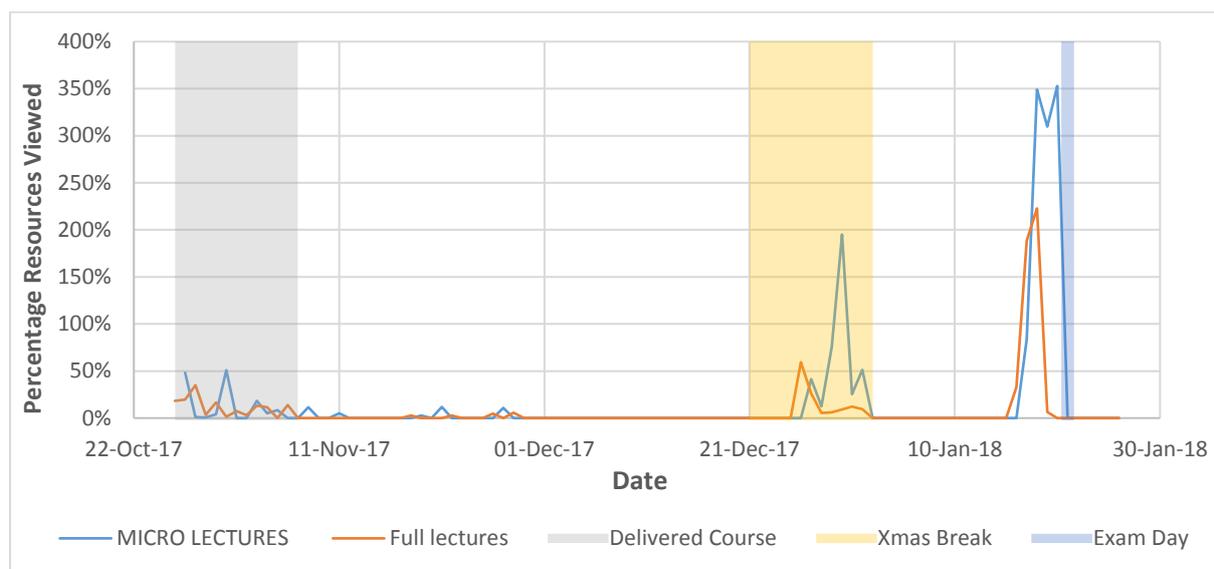


Figure 11: Viewing pattern of lecture captures and micro-lecture captures.

Both initiatives, namely a more aligned teaching style and the use of lecture capture have therefore proven to be well received and appreciated by the students, and should therefore feature not only in my own teaching practice, but be implement across all units of the EMship+ Master.

There are however some limitations to the application of my proposed pedagogical improvements suggested here. Firstly, due to the high mobility of the students, a number of classrooms is several universities across Europe would need to be fitted with lecture capture technology, which represents a logistical and financial challenge. Moreover, the nature of the course is to involve a high number of academics to ensure students are taught by the best experts in their field. This implies that a large number of lecturers would need to adjust their delivery methods. In that respect, some resistance has been experienced from certain academic staffs, not willing to reflect on their practice and modify their teaching style. Those constitute challenges that must be overcome to provide an optimum learning environment to the EMship+ master students.

Conclusions

The acknowledgment made by higher education that diversity is a strength and should be promoted led to the creation of the interdisciplinary Erasmus Mundus Joint Master Degrees, promoting student mobility across the world and attracting a highly diverse group of students, amongst which features the EMship+ Master in Ship Design.

By gathering information inherent to the backgrounds and future ambitions of my students, I was able to transform the learning journey, promote student engagement and provide learning activities targeted for their learning styles. Indeed, one of the outcomes of the evidence-informed research I conducted was the collaborative and participant

learning styles of the students. Consequently, I incorporated opportunities for discussions, better detailed the technical vocabulary, and added practical case studies and worked examples, thus meeting the expectations of the students. This particular unit achieving the highest satisfaction that year reveals its successful impact.

Furthermore, by bringing new technologies, such as lecture capture, and making innovative use of it, via micro-lectures with embedded quizzes, I successfully achieved an even more suited and engaging learning environment. The student survey realised before and after a two weeks trial showed the value of lecture capture as part of the course, and a significant increase in satisfaction after only a short period of implementation.

Both initiatives should therefore be fully integrated as part of the delivery of the course, with nevertheless some logistical challenges due to the international nature of the course, as well as staff resistance.

Knowledge of the students is therefore vital in order to build a suitable learning environment, offer an engaging learning journey and benefit from the diversity of today's higher education, as I demonstrated in this particular case study.

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