LEARNING AND TEACHING IN YACHT ENGINEERING EDUCATION

J-B R G Souppez, Solent University, UK.

SUMMARY

With the implementation of the Teaching Excellence Framework (TEF) in the United Kingdom, efficient learning and teaching strategies that supports student engagement and eventually allow the development of the required employability skills is more than ever paramount. Higher Education institutions must therefore enhance teaching practices, provide innovative delivery methods, and ensure the intended disciplinary learning outcomes are met, while embedding employability skills in the curriculum. This paper illustrates the current practices underpinning the Yacht Engineering courses at Solent University. Firstly, the assessment of the students' learning styles allows for more refined delivery methods and supporting activities to be adopted. This is fundamental in providing effective teaching and constructively aligning the taught modules, while incorporating innovative practices, such as blended learning. Moreover, to answer the demand for a greater use of learning and teaching technologies, an action research into the benefits of micro-lecture captures has been undertaken, revealing very a positive impact on student engagement. Finally, careful considerations for employability have been made and influenced the curriculum design to ensure students can access professional positions upon graduating, thus being able to positively impact the industry from day one.

1. INTRODUCTION

This paper presents the background and strategies developed to provide a quality and engaging learning and teaching environment for yacht engineering students in the modern higher education context. With key metrics aimed at assessing the quality and impact of teaching, up to date and novel learning and teaching practices are necessary.

Firstly, the learning styles of students and how they can be assessed to refine the delivery methods will be presented. Then, the case study of a particular module featuring blended learning will be discussed, demonstrating the benefits of such approach. An innovative use of lecture capture technology will also be introduced, with evidence of significant impact for the students, but also vital feedback to the educator. Finally, employment will be tackled, moving from the wider context and general strategies to embedding employment in the curriculum to a more disciplinary application.

2. LEARNING STYLES

2.1 BACKGROUND

Higher education institutions are multicultural, and the United Kingdom has been ascertained as the most diverse higher education system [1]. It is therefore logical to see the Teaching Excellence Framework (TEF) [2] define its purpose as recognising and respecting the diversity. At a more local level, the strategic plan developed by Solent University [3] has a strong emphasis and commitment to equality and diversity.

Recognising and encouraging diversity is the culmination of a long process, labelled the *"genealogy of diversity"* by Combs [4]. 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.

In order to best account for that diversity and develop learning and teaching strategies that are suited to highly varied cohorts [5], knowledge of the students must first be gathered. In doing so, a targeted questionnaire has proven a sensible approach.

2.2 QUESTIONNAIRE

To profile the student on a given cohort, an anonymous questionnaire has been purposely developed. The aim is to identify the individual and group barriers that must be overcome to enhance the learning environment, as suggested by Hoff *et al.* [6]. Moreover, the second key principle in effective teaching in higher education given by Ramsden [7] is the concern and respect for student learning, highlighting the importance of knowing not only the students, but the way they learn.

The philosophy behind the questionnaire can be linked to the travelling teaching theory [8], and aims at identifying where the student is coming from (academic background), and where the student wants to get to (job or field of activity) after the course. This then allows to shape the learning journey accordingly.

Furthermore, the structure of the questionnaire can be related to the 3P model developed by Biggs [9], namely presage, process and product, as detailed hereafter for the three main parts of the questionnaire.

- Part 1 (Sections 1 to 5): Presage – Personal, academic and professional background prior to the course, and motivations to undertake the course. Section 1 aims at providing a quick overview of the student's origin, age, gender and spoken languages. The second and third sections tackle the academic and professional background of the students. Finally,

sections 4 and 5 respectively try to ascertained 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 aim is to further investigate the student's attitude towards the lecture, and categorise their behaviour based on the six student learning styles defined by Reichmann and Grasha [10], so that teaching practices 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 in order to better support their ambitions. Finally, in Section 8 of the questionnaire, students are given an opportunity to add anything they feel relevant in the eighth section. Answers from previous questions, relative to the student's hope and dreams about the course as well as their target level of understanding, complete this part of the questionnaire.

2.3 LEARNING STYLES

The questionnaire was completed by all 30 students of the cohort (100% response rate), and the questions inherent the students' learning styles, defined by Reichmann and Grasha [10], yielded some very clear trends, represented in Figure 1.

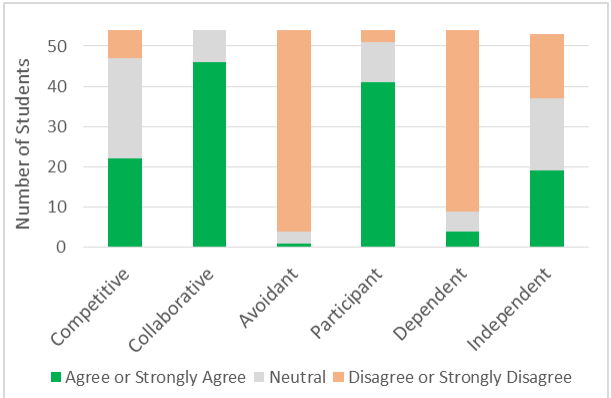

Figure 1: Reichmann and Grasha learning styles results.

The students see themselves as collaborative and participant. 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 of the students mentioned the importance of discussion. The collaborative learning style, also identified and defined by Coates [11], 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 [12].

On the other hand, a large majority of the students appeared 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 [13]. As per the collaborative students, participant students are characterised as learning from discussion [10].

Finally, student engagement statistics, presented in Figure 2, revealed that most students will listen to the lecture, three quarters will take notes and ask question, and 60% will make use of the virtual learning environment (VLE).

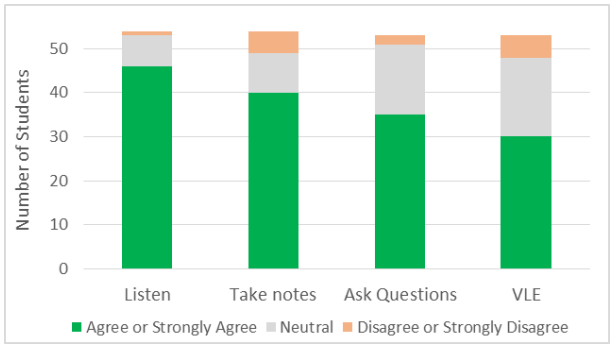

Figure 2: Student Engagement.

Having established the wide diversity of students, their collaborative and participative learning styles with a high demand for discussions and deep learning, and their current engagement with the course, new strategies can be devised to better suit their learning needs.

2.4 SUMMARY

Building on learning and teaching theories, a questionnaire has been developed to quickly profile new student cohorts. One of the main outputs being the learning styles, which represents a vital information to align the teaching with the identified learning styles. One of those strategies, particulary intended for participant students, is the use of blended learning.

3. BLENDED LEARNING

3.1 BLENDED LEARNING STRATEGY

"I am convinced that the teacher is more important and has a greater impact than any single, fixed reading program, method, or approach" wrote Duffy-Hester [14], thus placing the teacher as the keystone of learning and teaching. This statement is further underpinned by

Mathers *et al.* [15], that revealed a clear link between effective teaching and students' academic achievement.

The effective teacher is not however the only key to student success; as observed by Allwright [16], the teacher and learner are inevitably co-producers of the learning environment. The role of the student, and more precisely its autonomy, is therefore critical. Indeed, genuinely successful learners have always been autonomous. The teacher's enterprise is therefore to pursue the learner's autonomy as an explicit goal, which, according to Little [17], required a shift in the teacher's role from purveyor of information to manager of learning resources and facilitator of learning.

Those two elements are gathered by Biggs [18], who notes that the effective teacher should integrate learning and teaching, his role being to encourage the student to use the learning activities most likely to result in satisfying the intended learning outcomes.

This will be the basis of the reflection presented for a particular unit, namely Computer Aided Design. The unit and inherent learning activities will be presented as a case study.

3.2 CASE STUDY: COMPUTER AIDED DESIGN

3.2 (a) Overview

Taught to first year students, Computer Aided Design (CAD), stands aside from all other units in its structure and innovative delivery and assessments. Firstly, the unit is only taught in seminar sessions, where students have a dedicated work station, and work on an individual task. This allows the lecturer to assist and support each student individually, thus creating a more learner-centred environment [19].

Secondly, blended learning is utilised as part of the unit when looking at the use of specialist software, namely AutoCAD and Maxsurf. For the former, a *lynda.com* course is followed, while for the latter, in-house videos are made available via the *Vimeo* platform. The students can therefore follow those at home, and the seminars are focussed on a series of exercises to practically apply the knowledge gained [20].

Moreover, the unit is structured so that each summative assessment occurs after a similar formative one has been undertaken, with formative feedback given and opportunities for self-assessment and reflection, allowing the students to assess their performance, and critically evaluate changes to be made for the summative one.

Finally, the two assessment are authentic learning activities [21], particularly appreciated by the students:

- The first assessment (40%) is the design and hand-drawing of a Dory, a very simple flat panel dinghy. This is however significant for the students: within 10 weeks of starting a degree in yacht design, they have already designed a boat!

- The second assessment (60%) is perhaps the one the yacht engineering programs are most famous for: the model yacht race. Every year, a design rule is issued and the students have to design and build a 70cm long by 1.8m tall (rig and keel included) model yacht. On the last day of the year, the boats race together, and 20% of the assessment's grade is based on the performance. This unique assessment is depicted in Figure 3.

Figure 3: The start of the annual model yacht race, final assessment of the CAD unit.

The yearly scheme of work for the CAD unit is detailed in Table 1.

Teaching week	Computer Aided Design Unit	
	Topic	Comment
1	Engineering Drawing Introduction	Unit Introduction
2	Lofting 1: Background	**Formative Yacht Drawing.** Supervised in class, with self-evaluation and formative feedback.
3	Lofting 2: Body Plan	
4	Lofting 3: Half-Breadth	
5	Lofting 4: Profile	
6	Enrichment Week	
7	Dory 1: Grid	**Summative Yacht Drawing** **(Assessment 1)** Performed in class under supervision.
8	Dory 2: Body Plan	
9	Dory 3: Half-Breadth	
10	Dory 4: Profile	
11	AutoCAD 1: Introduction	**Formative Computer Aided 2D Drawing.** **Blended Learning Approach:** lynda.com course at home; practical exercises under supervision in class, formative feedback.
12	AutoCAD 2: Drawing exercise	
13	AutoCAD 3: Linetype Exercise	
14	XMAS	
15		
16	AutoCAD 4: Views Exercise	
17	Maxsurf 1: Hull Modelling	**Formative Computer Aided 3D Modelling** **Blended Learning Approach:** vimeo course at home; practical exercises under supervision in class, formative feedback.
18	Maxsurf 2: Deck and Cockpit	
19	Maxsurf 3: Appendages	
20	Maxsurf 4: Hydrostatics	
21	Model Yacht 1: Rule	**Summative 2D Drawing and 3D Modelling** **(Assessment 2: Model Yacht Design).** Performed in class under supervision.
22	Model Yacht 2: Hull/Appendages	
23	Model Yacht 3: Sail Plan	
24	Construction Layout	
25	Model Yacht 4: Report	
26	Model Yacht 5: Sails Printing	
27	Model Yacht Building	Time set aside with no other assignment as part of the course and front-loaded units to allow the student to build there model yachts before the race.
28	Model Yacht Building	
29	EASTER	
30		
31	Model Yacht Building	
32	Model yacht race	

Table 1: Syllabus for the CAD Unit.

The teaching theories and motivations behind the learning activities set for this particular unit are presented in the following sub-sections.

3.2 (b) Classroom Strategies

A variety of classroom strategies are necessary to be an effective teacher [22]. For the delivery of the Computer Aided Design unit, the primary motivation is to create a fully learner-centred learning environment in order to stimulate motivation, and so that the learners feel individually encouraged and supported [19]. This is further strengthened through the use of authentic assessments [21] and teaching through creation, giving the students the space and time required to attain a more valuable learning experience [23].

Indeed, the CAD unit revolves around the students creating their very own designs, in an allocated work-station, and with longer seminar sessions (3 hours a week, compared to 1 hour lecture plus 1 hour seminar in all other subjects). The small groups and availability of the lecturer makes for a more individual support. There is also an element of peer-controlled activity [24] which is strongly encouraged, thus creating a community of practice, making for a more powerful learning environment [25] where the student engagement is motivated by the feeling of being part of a community. This also answers the needs of the collaborative learning style [11] that characterises yacht design students [26, 27].

Overall, a cultivated community of practice approach is taken, as defined by Hofman & Dijkstra [28], with a network stimulating enthusiasm, with communication through participation in informal knowledge exchange and peer-support. Behind this specific classroom strategy created for the Computer Aided Design unit lies the true aim: promoting deeper learning.

3.2 (c) Promoting Deeper Learning

Magee [29] highlights that mature students build on their previous experiences and are therefore intrinsically motivated to achieve deep learning. Conversely, younger students carry their secondary education approach into university, and acquire a surface learning approach, as theorised by Marton & Saljo [13]. Yet students with a deep learning mentality are more likely to have a higher quality learning outcomes [30], hence the necessity to stimulate a deeper understanding.

In addition to the classroom environment already introduced, the patchwork assessment model [31] has been adopted as a remedy to contemporary problems with higher education assessments. The concept of the patchwork assessment consists in a series of small self-contained task, to which a learning session is allocated. The overall assessment is then retrospectively assembled. As a result, the short and sharp activities offer the students with a varied and stimulating range of tasks that seem less daunting than a large single assessment.

This also offers an opportunity for experiential learning [32]; indeed, the self-assessment opportunities after each small task allow the concrete experience to be followed by reflective observations. Learners then build on the experience, working towards an abstract conceptualisation, then practiced through active experimentation in the next task, thus completing the Kolb cycle [32].

Learning and teaching theories have therefore been put into practice in the Computer Aided Design unit to create a powerful learning community and promote a deeper learning approach. The student perception of the teaching practices implemented is however vital [33], hence the need to gather and respond to student feedback [34], as regularly done along the delivery of this unit.

3.3 SUMMARY

From the knowledge of the students gained, their participant and collaborative nature drove the development of the Computer Aided Design Unit, featuring authentic assessments and blended learning. As a result, classroom strategies building on work conducted during the student's independent study time results in deeper learning and a greater scope of work covered, while providing a suited and engaging learning environment for the students. Other methods can also be employed to promote learning outside the classroom, such as lecture capture.

4. LECTURE CAPTURE

This section presents an overview of the use of lecture capture technology that can be made to boost student participation and learning. This represents a summary of the work conducted on micro-lecture capture with embedded quizzes, detailed in a separate publication, entitled *'Innovative Use Of Lecture Capture Technology In Undergraduate Yacht Design And Postgraduate Ship Design Courses'* by J.-B. Souppez, and published in the proceedings of the 2018 *Education and Professional Development of Engineers in the Maritime Industry* Conference [35].

Traditional lecture capture publishes the hour long recordings for students to review. This is a fantastic practice, with significant positive impact on student results. There is therefore nothing problematic about lecture capture; the aim here is to provide a different format, closer to vodcast, with active student engagement. Hence the creation of micro-lecture captures with embedded quizzes: a 5 minute recording encapsulating all the key concepts of a particular topic. The recording is interrupted approximately every minute by a quiz, which must be answer so that the rest of the video can be watched.

The shorter format and the gamification provided by the quizzes have proven very successful with the students.

Looking at the viewing patterns over an entire year, as depicted in Figure 4, two main findings were yielded:

- Micro-lectures are vastly more used by students than the traditional lecture captures.
- Micro-lecture captures are primarily utilized as a revision tool, prior to examinations and assessments.

Some regular usage along the year, coinciding with the weekly micro-lecture releases can however be observed. From an educator's perspective this time, this is vital as the results of the quizzes can be monitored. Consequently, misunderstood concepts can be identified and further emphasised in the following face-to-face session. This also allows to provide individual support when required.

The micro-lecture captures with embedded quizzes have therefore proven a suitable practice, once again in line with the expectation of participant students, that appreciate any additional resources that will allow them to make the most of the course, with employment as an end game. Indeed, graduate employment is a primary concern for all students.

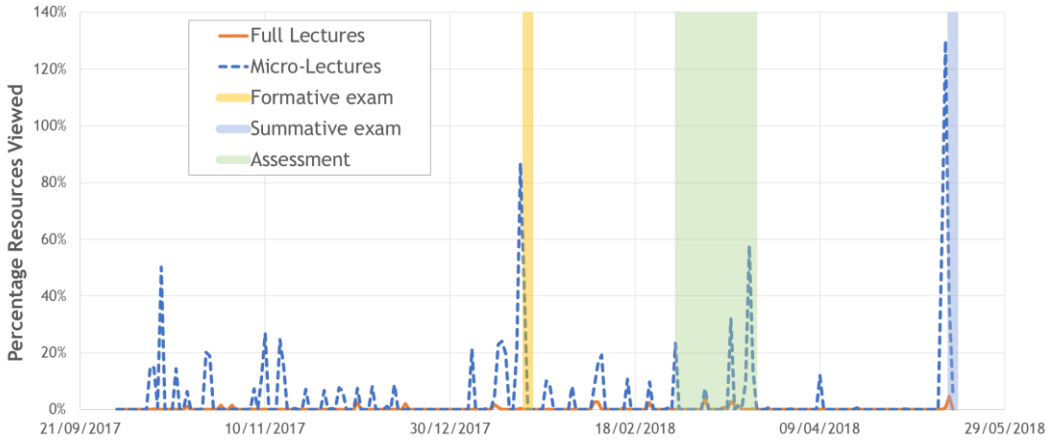

Figure 4: Viewing pattern for full and micro lecture captures [35].

5. EMPLOYABILITY

5.1 INTRODUCTION

Higher earning prospects over the duration of the working life is one of the primary motivations to invest into a higher education degree. But with the increase in fees and the marketization of the sector, employment is more than ever a crucial factor. The importance of employability skills in the higher education curriculum and strategies promoting them will therefore be tackled.

Fallows and Steven [36] argued that: *"Today's challenging economic situation means that it is no longer sufficient for a new graduate to have knowledge of an academic subject; increasingly it is necessary for students to gain those skills which will enhance their prospects of employment"*; a statement that remains true in today's higher education context. There is a vital need for employability skills to be embedded in the curriculum in order to answer the modern demand for higher education.

Firstly, the wider context will be acknowledged and discussed to highlight the current drivers behind employability. Then, the strategy put in place at a local level by Solent University will be presented to investigate the opportunities available to promote employability. The issue will also be tackled from a more disciplinary approach, with a close look at the marine industry. Finally, pedagogic strategies to enhance employability in higher education will be presented.

5.2 WIDER CONTEXT

The higher education landscape has been profoundly transformed in the last decade, a phenomenon accentuated in the United Kingdom by the introduction of higher fees and the increasing proportion of the population educated to degree level, as illustrated in Figure 5.

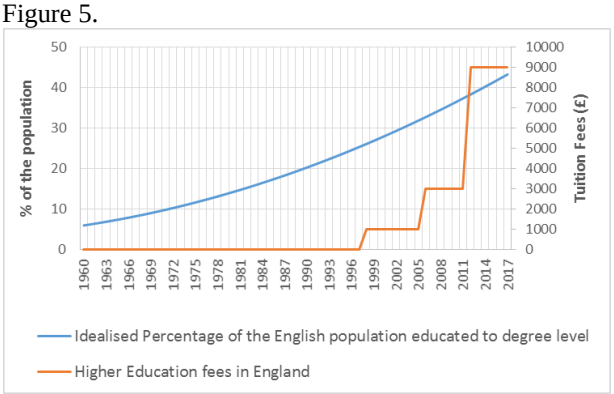

Figure 5: Evolution of the idealise percentage of the English population qualified to degree level and the cost of tuition fees.

Consequently, transitioning from an academic qualification into employment has become more complex. Individuals are also more likely to move away from a 'job-for-life' career towards the 'portfolio-career' [37]. Furthermore, there is an increasing expectation that

a vast array of transferable skills for employability will be incorporated within the academic curriculum, irrelevant of the discipline. Brown and Hesketh [38] have however exhibited the inequalities between students reaching the job market, particularly in their abilities to utilise transferable skills, thus highlighting that transition from higher education to employment is also an active process for the students. Yorke [39] further argues that the personality and personal qualities of a graduate are the most vital skill to capitalise on the transferable skills acquired in the work place, also suggesting the personal background and inclusivity of higher education institutions play a key role [40].

Indeed, there is evidence to suggest that employers now rely on higher education institutions to equip graduates with the skills required for an entry-level job [41]. This is one of the drivers behind the 'plug-and-play' graduate concept [42] developed in the yacht engineering department at Solent University to remedy the 'skills gap' identified in the marine industry [43].

This approach is also strongly driven by the will to better align the graduate skills with the graduate jobs, eventually leading to better employment, reflected in key statistics such as the Destination of Leavers from Higher Education (DLHE) survey, which is critical in modern higher education.

The use of statistics and metrics raises the question of quality, a major challenge in higher education, particularly to achieve the UK's 'knowledge-based' or 'post-industrial' economy strategy [37]. Note that this is not restricted to the UK, with most governments recognising the benefits of investing in higher education in order to sustain their national economies [44], primarily due to the similar skill requirements across the world [45]. Those crucial skills are presented in Figure 6.

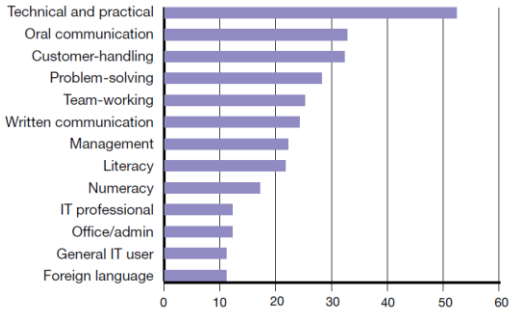

Figure 6: Main skills lacking where skill-shortage vacancies exist in England.

To support its economic ambition and contribute to remedy the skills-shortage by embedding employability into higher education, the UK has recently introduced the Teaching Excellence Framework (TEF) [2] which uses standard metrics to rank universities using a gold, silver and bronze system, based on the quality of their teaching. Several criticisms have however been made on the metrics used [46], with strong evidence of dissimilarities between university ranking for the quality of teaching, and university ranking for employability. A number of other metrics used, such as entry requirements, research outputs and contact hours have also been criticised as they do not provide a true measure of teaching quality.

Finally, a very strong point regarding graduate employability is made by Morley [47], who advocates the need to implicate employers into the education process. This is the only way to ensure graduate skills are aligned with the required professional attributes. This will be further tackled in Section 5.4 on disciplinary employability, with the example of a survey of graduate employers realised to revise the curriculum [42].

5.3 EMPLOYABILITY AT SOLENT UNIVERSITY

Acknowledging the wider context of higher education and the importance of employability, Solent University has made a strong commitment to improving student employability [3]. The approach taken can be linked to research conducted on the connection between enterprise education and employability [48], that concluded on the necessity to fully integrate enterprise into higher education institutions.

Multiple specific and specialised services have therefore been put into place to support employability and enterprise. Examples include Solent Futures, particularly focussed on supporting students in start-up businesses through workshops, guides, mentoring schemes and funding. On the other hand, Solent Graduate Jobs aims ensuring suitable jobs are offered to students during their studies (with campus jobs), but more importantly upon graduation, with both internal (graduate assistant positions) and externals employment offer. As demonstrated in Figure 7, Solent's employability is much higher than the sector, thanks to a strong employability strategy.

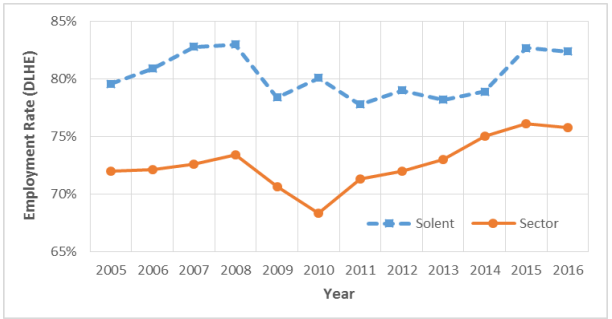

Figure 7: Employment rates for Solent graduates.

5.4 DISCIPLINARY EMPLOYABILITY

While there are common elements to employability skills across fields [44], but there is also an element that is disciplinary specific, and as such student employability must be supported in a more custom fashion depending on the industry the students will work in.

Focussing on the maritime industry, one of the main issue that permeates through both academia [43] and industry [49] is characterised as the 'skills gap', and defined as the difference between an employer's expectations and a graduate's ability. This has been a recurring trend in the maritime industry, and suggests a misalignment between the material taught and skills developed in higher education curriculums, and the real needs of employers.

In the latest validation of the Yacht Engineering degrees at Solent University, particular emphasis was therefore put on the real needs and expectations of industry in order to reshape and align the courses. A large survey of the industry and the skills they are looking for in graduates was therefore conducted [42], with the key findings detailed hereafter.

Firstly, as depicted in Figure 8, graduates from a 3 year BEng are by far the preferred employer's qualification for entry-level jobs in the marine industry, thus justifying the relevance of the two yacht related degrees at Solent University.

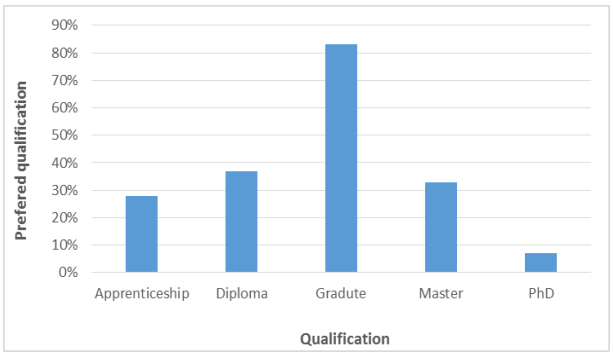

Figure 8: Employer's preferred qualifications.

Moreover, employers were questioned on the relative importance of an applicant's personal characteristics versus its technical abilities, the results being presented in Figure 9.

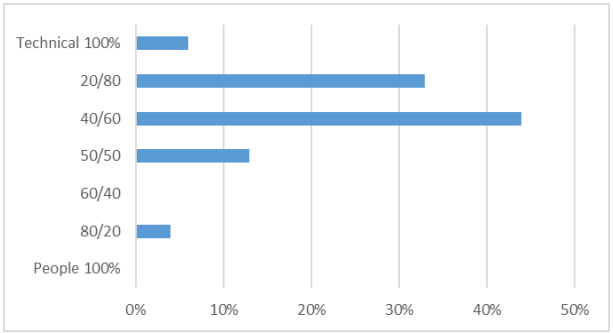

Figure 9: Importance of the people versus technical skills for employers.

In contradiction with Yorke's work [39] that identified the individual as the decisive factor in transitioning from education to employment, in the marine industry, the technical skills remain more critical. It is therefore vital to equip graduate with the appropriate technical skills thought after by industry. This observation logically prompted an assessment of what specific skills employers were looking for in a graduate; the top answers being shown in Figure 10.

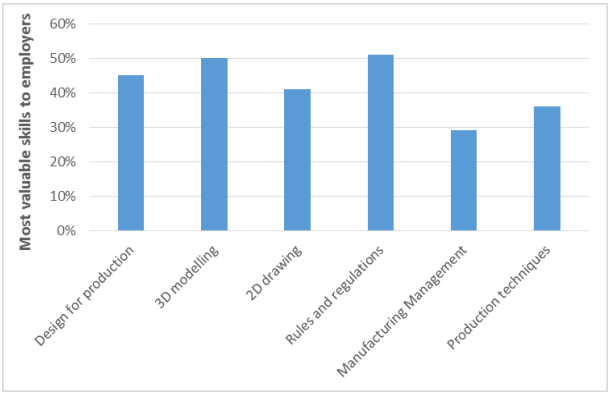

Figure 10: Most valuable skills for employers.

Building on the skills identified by industry and employers are critical for graduates, and based on the observation that the technical skills were key to gain employment in the marine industry, the syllabus of the yacht courses where altered and aligned during their latest validations. The two new courses therefore incorporate new units on 3D modelling and 2D drawing, and a stronger emphasis on regulatory framework, design for production and management, thus better meeting the expectations of industry and ensuring student employability can be maximised.

Finally, to ensure demand is met where needed, employers were asked about the size of vessels they are normally dealing with. The results in Figure 11 yielded one key results: boats are getting bigger!

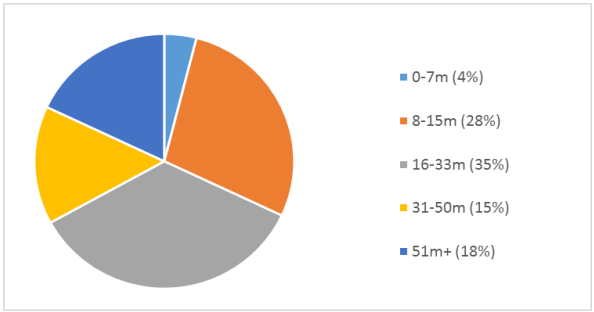

Figure 11: Size of crafts designed and build by employers.

There is therefore an emerging market for larger vessels and superyachts, which motivated the creation of the MSc Superyacht Design, launched in September 2018, to complement the current yacht courses and take the knowledge and skills acquired on small crafts at BEng level, and extend it to larger yachts at MSc level.

Employability in the marine industry therefore has some very specific aspects, sometimes going against established employment theories, which is why employability needs to be considered at a disciplinary level. This has been done in order to better align the

curriculum of the yacht courses at Solent Universities, building on industry and employer surveys to bridge the skills gap and enhance graduate employability.

5.5 UNDEGRADUATE RESEARCH

Recognising the importance of gaining soft skills such as working independently and presentation skills, Solent University has made a strong commitment to undergraduate research.

On the one hand, the support provided for student to attend the yearly British Conference of Undergraduate Research (BCUR) is an additional way to gain those essential soft skills. This is fantastic opportunity to build confidence in a professional environment, as well as enhance one's CV. Consequently, a number of yacht engineering students have had the opportunity to present their novel technical research [50, 51, 52, 53].

On the other hand, the Solent University Research Internship Scheme (SURIS) provide an opportunity for undergraduates to take part in wider research projects, often in other disciplines [54].

5.6 SUMMARY

In addition to institution-wide policies and strategies for employability, a strong discipline dependent expectation still exist, specific to each industry. In the case of the maritime industry, graduates with skills evolving with the commercial demand are needed, hence the constantly updated curriculums so the most up-to-date and relevant skills are provided. This eventually prepares the graduates to transition from education to employment.

6. CONCLUSIONS

The modern higher education context is particularly concerned by the quality of teaching, driven by new metrics such as the Teaching Excellence Framework. Furthermore, with the increasing tuition fees, a greater 'value for money' must be offered to prospective students, with ultimately the ability to transition into employment.

The yacht engineering course at Solent University have therefore adapted, first by gaining better knowledge of the student's learning style to better align the learning and teaching activities. With strong participant cohorts, extra activities going outside the traditional classroom based face-to-face session are very much in demand. Consequently, approaches such as blended learning or micro-lectures captures with embedded quizzes have been successfully implemented. Moreover, with employability in mind, the structure and content of the courses are kept up to date with the industry's expectation. This also involves creating new courses, such as the new MSc Superyacht Design to answer the demand for engineers qualified to work on larger crafts.

7. REFERENCES

1. Huisman, J., Meek, L. & Wood, F., 2007. Institutional Diversity in Higher Education: a Cross-National and Longitudinal Analysis. *Higher Education Quarterly*, 61(4), pp. pp563-577.

2. Business Innovations and Skills Committee, 2016. *The teaching excellence framework: assessing quality in higher education*, London: House of Common.

3. Southampton Solent University, 2015. *Building an Excellent University*, Southampton: Southampton Solent University.

4. Combs, G., 2002. Meeting the Leadership Challenge of a Diverse and Pluralistic Workplace: Implications of Self-Efficacy for Diversity Training. *The Journal of Leadership Studies*, pp. Vol. 8, No. 4.

5. Souppez, J.-B., 2018. 'Anchoring the Experience of Highly Diverse Students on the EMship+ Master: All Aboard!'. *Dialogue: Journal of Learning and Teaching*, issue 2017/2018, pp 93-108.

6. Hoff, T. J., Phol, H. & Bartfield, J., 2004. Creating a Learning Environment to Produce Competents Residents: The Roles of Culture and Context. *Academic Medicine* Vol. 79 No. 6, pp. 532-540.

7. Ramsden, P., 2003. *Learning to teach in Higher Education*. 2nd ed. New York: Routledge Falmer.

8. Fox, D., 2006. Personal theories of teaching. *Studies in Higher Education*, 8(2), pp. 151-163.

9. Biggs, J., 1989. Individual differences in study process and the quality of learning outcomes. *Higher Education*, Volume 8, pp. 381-394.

10. Reichmann & Grasha, 1974. A Rational Approach to Developing and Assessing the Construct Validity of a Student Learning Scale Instrument. *Journal of Psychology* 87 (2), pp. 213-223.

11. Coates, H., 2007. A Model of Online and General Campus-Based Student Engagement. *Assessment and Evaluation in Higher Education*, 32(2), pp. 121-141.

12. Clack, C., 1998. Hello learners: Living Social Constructivism. *Teaching Education*, 10(1), pp. 89-110.

13. Marton, F. & Saljo, R., 1976. On Qualitative Differences in Learning. 1 - Outcome and Process. *British Journal of Educational Psychology*, Volume 66, pp. 4-11.

14. Duffy-Hester, A. M., 1999. Teaching Striggling Readers in Elementary School Classroom: a Review of Classroom Reading Programs and Principles for Instruction. *The Reading Teacher*, 52, pp. 480-495.

15. Mathers, C., Oliva, M. & Laine, S., 2008. Improving Instruction through Effective Teacher Evaluation: Options for States and Districts. *Research and Policy*.

16. Allwright, D., 1991. *The death of the Method.* Centre for Research in Education.

17. Little, D., 1995. Learning as Dialogue: the Dependence of the Learner Autonomy on Teacher Autonomy. *System*, 23(2), pp. pp 175-181.

18. Biggs, J., 2003. Constructing Learning by Aligning Teaching: Vonstructive Alignment. In: *Teaching for Quality Learning at University*. Maidenhead: Open University Press, pp. 11-33.

19. Savery, J. R., 1999. Enhancing Motivation and Learning through Collaboration and the use of Problems. In: *Inspiring Students: Case Studies in Motivating the Learner*. London: Kogan Page, pp. 33-41.

20. Jeffrey, L. M., Milne, J. & Suddaby, G., 2014. Blended Learning: How Teachers Balance the Blend of Online and Classroom Components. Journal of Information Technology Education: *Research*, 13, pp. 121-140.

21. Ashford-Rowe, K., Herrington, J. & Brown, C., 2013. Establishing the Critical Elements that Determine Authentic Assessment. *Assessment and Evaluation in Higher Education*, 39(2), pp. 205-222.

22. Blair, T., Rupley, W. & W, N., 2007. The Effective Teacher of Reading: Considering the "What" and "How" of Instruction. *International Reading Association*, pp. 432-438.

23. Harland, T. et al., 2014. An Assessment Arms Race and its Fallout: High-Stakes Grading and the Case for Slow Scholarship. *Assessment and Evaluation in Higher Education*, 40(4), pp. 528-541.

24. Biggs, J., 1999. What the Student does: Teaching for Enhanced Learning. *Education Research and Development*, 18(1), pp. 57-75.

25. Lave, J. & Wenger, E., 1991. *Situated Learning. Legitimate Peripheral Participation*. Cambridge: Cambridge Press.

26. Michaeli, J., Moses, P., Hou, G. & Ayala, O., 2015. *Developing a Naval Engineering Workforce through Undergraduate Research and Experiential Learning*. London, RINA Education & Professional Development of Engineers in the Maritime Industry.

27. Souppez, J.-B., 2016. *An Interdisciplinary Approach to Education: Case Study of an Academic Exchange*. RINA Education & Professional Development of Engineers in the Maritime Industry.

28. Hofman, R. H. & Dijkstra, B. J., 2010. Effective Teacher Professionalization in Networks? *Teaching in Higher Education*, 26, pp. 1031-1040.

29. Magee, R., 1998. Age, Gender and Course Differences in Approaches to Studying in First-Year undergraduate students. In: *Motivating Students*. London: Kogan Page, pp. 83-92.

30. Prosser, M., 1999. Students' Approaches to Learning. In: *Understanding Learning and Teaching: the Experience in Higher Education*. Buckingham: Open University Press, pp. 83-107.

31. Winter, R., 2003. Contextualizing the Patchwork Text: *Addressing Problems of Coursework Assessment in Higher Education.* Innovation in Education and Teaching International, 40(2), pp. 112-122.

32. Kolb, D. A., 1984. *Experimental Learning*. Englewood Cliffs, NJ: Prentice Hall.

33. Brookfield, S., 1995. *Becoming a Critically Reflective Teacher*. San Francisco: Jossey-Bass.

34. Sadler, D. R., 1989. Formative Assessment and the Design of Instructional Systems. *Instructional Science*, 2(18), pp. 119-144.

35. Souppez, J.-B., 2018. *Innovative Use of Lecture Capture Technology in Undergraduate Yacht Design and Postgraduate Ship Design Courses*. In the proceedings of Education & Professional Development of Engineers in the Maritime Industry. The Royal Institution of Naval Architects, London, UK

36. Fallows, S. & Steven, C., 2000. Building Employability Skills into the Higher Education Curriculum: a University Wide Initiative. *Education and Training*, 2(42), pp. 75-83.

37. Tomlison, M., 2007. Graduate Employability and Student Attitudes and Orientations to the Labour Market. *Journal of Education and Work*, 20(4), pp. 285-304.

38. Brown, P. & Hesketh, A.J., 2004. *The Mismanagement of Talent: Employability and Jobs in the Knowledge-Based Economy*. Oxford: Oxford University Press.

39. Yorke, M., 2006. *Employability in Higher Education: What it is – What is its not*, Heslington: The Higher Education Academy.

40. Yorke, M. & Knight, P., 2006. *Employability in Higher Education: What it is – What is its not*, Heslington: The Higher Education Academy.

41. Cassidy, S., 2006. Developing Employability Skills: Peer Assessment in Higher Education. *Education and Training*, 48(7), pp. 508-517.

42. Barkley, G., 2012. *Attracting & Equipping Yacht Design and Production Graduates for Employment in Today's Yacht Design and Manufacturing Industry.* Southampton, Proceeding of the Royal Institution of Naval Architects Seminar on Education and Professional Development.

43. Desty, N., 2012. *The Marine Skills Gap and its Impact on Industry*. Southampton, Proceeding of the Royal Institution of Naval Architects Seminar on Education and Professional Development.

44. Knight, P.T. & Yorke, M., 2003. Employability and Good Learning in Higher Education. *Teaching in Higher Education*, 8(1), pp.3-16.

45. Andrews, J. 7 Higson, H., 2008. Graduate Employability, 'Soft Skills' Versus 'Hard' Business Knowledge: a European Study. *Higher Education in Europe*, 33(4), pp. 411-422.

46. Gibbs, G., 2017. *The National Policy Context for Teaching in Universities*, Southampton: Southampton Solent University.

47. Morley, L., 2001. Producing New Workers: Quality, Equality and Employability in Higher Education. *Quality in Higher Education*, 7(2), pp. 131-138.

48. Rae, D., 2007. Connecting Enterprise and Graduate Employability: Challenges to the Higher Education Culture and Curriculum? *Education and Training*, 49(8/9), pp. 605-619.

49. Cookson, R., 2015. *The Marine Skills Gap and its Impact on Industry*. Fareham: Matchtech.

50. Guell, A. and Souppez, J.-B., 2018. *Combining Modern Hydrofoils with Wooden Classic*. In the proceedings of the British Conference of Undergraduate Research.

51. Linden, V. and Souppez, J.-B., 2018. *Sailing towards Sustainable Trading with Wooden Cargo Schooner*. In the proceedings of the British Conference of Undergraduate Research.

52. Pignone, F. and Souppez, J.-B., 2018. *Applications of Hydrogen Fuel Cell technology to the Sustainable Propulsion of Leisure Crafts.* In the proceedings of the British Conference of Undergraduate Research.

53. Thomas, J. and Souppez, J.-B., 2018. *Development and Growth of the Thames A Rater Fleet*. In the proceedings of the British Conference of Undergraduate Research.

54. Souppez, J.-B. and Vazquez Bonome, L., 2018. *Micro-Lectures Capture with Embedded Quizzes: An Innovative use of Lecture Capture Technology.* In the proceedings of the Solent Learning and Teaching Community Conference.

8. AUTHORS BIOGRAPHY

Jean-Baptiste R. G. Souppez holds the position of Senior Lecturer in Yacht Design and Composite Engineering at Solent University, teaching on the prestigious BEng (Hons) Yacht and Powercraft Design, BEng (Hons) Yacht Design and Production and MSc Superyacht Design. He contributes to the European Master in Integrated Advanced Ship Design (EMship+) as a Visiting Professor and Research Supervisor, and is also the UK Principal Expert in Small Craft Structures, in charge of representing the interests of the British Marine Industry in the development of international structural regulations (BS EN ISO 12215). His research in fluid dynamics features twisted flow wind tunnel, towing tank, wave and current flume, particle image velocimetry, laser doppler anemometry, and full size instrumented testing, as well as a range of numerical methods.