



MARITIME SKILLS
COMMISSION

DIGITAL LEARNING CAPTURED LESSONS

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Authorship and acknowledgements

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The views expressed herein are those of the authors only and are based upon independent research by them.

The report does not necessarily reflect the views of Maritime UK and the Maritime Skills Commission.



Foreword

What a long way training providers have come in a very short period of time! The authors of this report tell us that less than a year ago “the classroom remained the primary place where learning occurred, with online spaces providing opportunity for revision rather than amassing new knowledge”.

Closure of classrooms everywhere forced teachers to make a rapid shift to online learning, with some inevitable problems at first – “stressful and frantic for all concerned” – but also with growing success, and growing confidence all round. Challenges remain, but I doubt if anyone thinks we will simply go back to the ways things were before the pandemic struck. Too many people have seen the opportunities which digital learning offers.

The Commission initiated this project to capture lessons learned while they are still fresh, and to help education and training providers across the sector to reflect on those lessons and to embrace the most beneficial new practice.

We are very grateful to Lars Lippuner and Dr Carole Davis of Solent University for a stimulating and thoughtful report. In the nature of the subject it cannot be definitive, and the authors are careful to set out the limitations of their report. But we all hope that education and training providers of all shapes and sizes will be able to read the report (and the helpful concise summary) with their own circumstances in mind, and see their relevance. There are some particularly pertinent sections on when digital learning is less obviously appropriate, and on the work still to be done to help all learners to make the most of the opportunity – and all teachers and trainers.

The authors talk about “creating the conditions for a productive dialogue” and they’ve certainly done that. We will be following-up with an open invitation webinar to share the results, and give colleagues across the sector a chance to talk them through.

I am grateful to the other Commissioners who were members of the steering group for the project – Colin McMurray, Kathryn Neilson and Nikki Sayer – and to Chrissie Clarke, Secretary to the Commission, for their guidance in shaping the project and this report. The Commission is at an early stage in its work and we welcome other ideas for where we might focus our attention.

Iain Mackinnon

Iain Mackinnon Commissioner
March 2021

Executive Summary

Introduction and background

The onset of the Covid-19 pandemic in March 2020 followed by the national lockdown suddenly challenged the provision of maritime education and training. With there being no face to face teaching, then alternatives to traditional course delivery methods had to be quickly found. Indeed, most providers rose to this challenge and within the first month of the restrictions moved their face-to-face teaching and assessment online.

With re-occurring regional restrictions emerging for the rest of that year, providers subsequently further improved their digital capabilities. So, one effect of the pandemic has been the implementation of changes in educational delivery that would have taken much longer to achieve in normal circumstances. The experience of quick, sudden and innovative change and move from face to face interaction to mainly digital has been shared across education, healthcare, and the service sector. We argue that it is now time to take stock of these changes and learn from them.

The aim of this report, commissioned by the Maritime Skills Commission, is to review the shift to digital learning over the last nine months and to then:

- capture lessons which education providers learned as part of their response to the pandemic
- ensure that the challenges posed by the pandemic are turned into a long-term advantages for learners and providers alike.

Methodology

From March 2020 to December 2020, Solent University Southampton continued to collect data on learner engagement with digital learning across its maritime portfolio of courses for both the seafaring and the shore-based part of the maritime sector. Depending on the type and length of the course, this data was gathered concurrently and sequentially. To further broaden and deepen the understanding of the phenomenon under consideration this report's authors engaged in further data collection to include a broader range of stakeholders, follow up on emergent themes, and create the conditions for a productive dialogue.

The report takes a mixed-methods approach to data gathering to ensure that our findings and recommendations are based on an integrative approach to evidence. The benefits of combining quantitative and qualitative methods is to allow for one method compensating for the weaknesses or the blind spots of the other. The rationale is that it ensures our data is likely to be more reliable and valid therefore strengthening our recommendations.

Data from each phase informs the recommendation and such data is deemed to be an integral part of standard educational practices, governance and quality enhancement processes.

Our recommendations

The report argues that whilst digital learning was generally embraced well by learners, further effort is required to embed it successfully into maritime education and training. Digital delivery is fundamentally different to a classroom setting and as such courses need to be redesigned rather than just replicated to be fully effective. The redesign requires upskilling of staff and the implementation of new digital tools into the provider's learning environment. This implementation has to be based primarily on the pedagogies of digital learning, manifestly different from face to face learning.

Education providers should investigate the pedagogies of both live online lessons and an asynchronous learning model, including shorter, recorded lessons. Often a mix of approaches may prove to be the most effective, making the most of each approach's advantages whilst keeping the learning experience varied and interesting at the same time. Now is also the time to explore instructional strategies which are relatively new to the maritime sector and move to more learner-centred methods. One such example is the 'flipped classroom' where content is taught through asynchronous recorded lessons and then reinforced synchronously through collaborative problem-solving, practice, tutorials and feedback sessions.

Furthermore, it is critical to realise that not all teaching subjects lend themselves to the same extent to be transformed in their entirety to digital learning. The most often named subject in this regard was chart work, one of the core elements for the education of deck officers. Other examples include developing the applied skills and competencies required by marine engineers and electro technical officers.

Lastly, it is crucial to carefully consider the impact of the reduced peer interaction between students. Peer-to-peer learning and collaborative learning are widely

acknowledged to be among the most effective ways of learning, yet much harder to achieve in a digital environment. Significantly, the lack of physical contact with peers can also lead to additional strain on students' mental health while at the same time it is more challenging to monitor the mental well-being of students and staff in a digital setting.

The report concludes that digital learning is here to stay and provides countless new opportunities and advantages to the maritime industry; however, turning these into reality is dependent on further considerations by both education providers and Professional, Statutory and Regulatory Bodies (PSRB). It is recommended that providers invest additional time and resources to redesign their courses, with PSRBs providing a flexible and realistic framework for providers to bring about a real step-change for the maritime industry.

“ Skype, Zoom, Meetings, can't hear you, now cannot see you, good old tech – now let's try again

A Fib poem¹ written by participants of the PG Cert Learning and Teaching in HE programme in May 2020

¹ A Fib poem has 6 lines that follow the Fibonacci sequence (0-1-1-2-3-5-8) for syllable count per line.



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Introduction

The purpose of the report is to capture the lessons learnt from how maritime education has responded to Covid-19 and how these can be utilised to modernise maritime education. The Department for Transport (2019) submits that the modernisation of maritime education is one of the main priorities facing the maritime industry. This report has been written to ensure that the sector will implement the training provision it needs to include the use of digital technology to engage learners in enhanced learning environment and to keep costs for the sector down.

Maritime education and training providers have had to adapt fast to the restrictions imposed because of the Covid-19 pandemic, with most making extensive use of digital technology to keep learners learning. This emergency response has almost certainly brought forward the day when there is widespread acceptance of digital technology in learning by providers and learners. The Maritime Skills Commission is looking to consolidate the gains by capturing and sharing the lessons learned through this report's publication which encompasses a key objective the Maritime Skills Commission set by the Maritime Minister in July 2020.

This objective is to understand the existing and future skills needs of the maritime industry both on land and at sea, attract more people to the sector, ensure career progression, and future-proof training for the 220,100 people already working in the sector – including the 27,000 employed at ports around the country (Maritime UK 2019). This is essential for ensuring the workforce has the talent it needs for today, the next 30 years and beyond.

The report considers the wider context of the Commission's work and the fact that it covers the whole of the maritime sector. Discussions about maritime education and training too often focus on seafarers, thereby only resembling one of many parts of the maritime industry.

This report's scope is therefore reflective of the multiple sectors within the industry and that includes shore-based and seagoing roles. The evidence and recommendations are relevant to shipping, ports, leisure marine, engineering, science and professional services.

The report considers 4 broad areas:

- Specificity of digital learning and teaching pedagogies
- Digital technology for learning
- Assessment strategies
- Measuring learner engagement

Drawing on relevant data allowed for the exploration of recurring themes which allowed for the consideration of:

- What worked?
- What did not work?
- What barriers remain to the wider adoption of digital technology in learning?
- What conclusions can we draw when digital technology is not appropriate, and when other methods work better?

These inform the recommendations we ask the sector to consider and be prepared to enter a robust dialogue about for the benefit of maritime education.

The report acknowledges that learners vary widely, from teens setting out on maritime careers to seasoned maritime professionals in high ranking positions on ships or in high-level shore-based roles. It also considers that UK maritime education and training is an export product. There are significant numbers of international students studying on UK programmes, both in the UK and abroad.

Central to this is a commitment to increasing widening participation, i.e., making maritime

educational opportunities available to currently under-represented groups of learners and exploring what barriers may exist with regards to digital learning and how these can be overcome. Parts of the maritime sector are struggling to attract young people; much of the recruitment is from within, often from families where the parents or other relatives had worked in the maritime industry. Therefore, widening participation and increasing diversity are critical strategies to attract talent for the benefit of the sector as recognised in the Department of Transport's (2019) Maritime 2050 People Route Map. This report is, therefore, also meant to inform the Maritime UK's Diversity in Maritime programme.



The Maritime Skills Commission asks that this report be shared with all maritime training providers and other interested parties.



Background

Whilst there was evidence of digital learning in maritime education and training before the Covid-19 pandemic, the maritime sector tended to show a preference for and concentrate resources on face-to-face delivery. The pandemic forced many providers to rapidly switch to new, digital forms of learning. The response to the pandemic could be split into two phases, thus far. These two phases are an immediate, almost overnight pivot to digital learning towards the end of March 2020, and then a more planned and structured response during later stages of the pandemic. This latter approach enabled the sector to broaden and deepen conceptual understandings of digital learning and its distinct pedagogies.

To properly contextualise and conceptualise the benefits and challenges of moving to online teaching and learning together it is also necessary to refer in this report to the role digital learning had played in the learner experience prior to Covid-19.

Digital learning offers some key strengths but has also its weaknesses along with some distinct opportunities and threats typical of disruptive technologies. A SWOT analysis of digital learning in a maritime context is listed opposite.

Strengths

- ✓ Resilience (when face-to-face is restricted)
- ✓ Flexibility
- ✓ No travel and accommodation required
- ✓ Encourages the rise of the independent learner
- ✓ Offers a mix of synchronous and asynchronous learning

Weaknesses

- ✗ Less peer-to-peer interaction
- ✗ Requires access to appropriate equipment and sufficient bandwidth
- ✗ Presumes digital capability
- ✗ Dependent on an integrated and supportive ecosystem from the education provider

Opportunities

- ✓ Innovation
- ✓ New opportunities to measure engagement
- ✓ Measurement of progress in meaningful ways
- ✓ Lifelong learning

Threats

- ✗ Identity fraud
- ✗ Compromised assessment security and academic integrity
- ✗ Mental health impact
- ✗ Development of soft skills compromised

Data Sources

This report bases its findings on two sources of data

1

Data collated with Solent University pertaining to the education of cadets and other seafarers as well as the education of shore-based maritime professionals in the form of maritime business, law and logistics programmes at undergraduate and postgraduate level.

This data is derived from 3 distinct time-periods:

- **Phase 1:** Pre-Covid (September 2019-March 2020)
- **Phase 2:** Rapid pivot to digital (March-May 2020)
- **Phase 3:** Considered planning period for digital learning (post June 2020)

Quantitative and qualitative data on the learning experience during Covid-19 is derived from the following sources:

- Your Module Survey (systematic learner survey using EvaSys Education, a special education evaluation software)
- Professional Short Course evaluation questionnaire
- Virtual Learning Environment engagement data (frequency, intensity)
- Documentation of changes to online assessment
- Assessment results (Maritime Business; Yacht Design; Cadet Education; Top-Up programmes for seafarers; Small Vessel Engineering, professional short courses)
- Progression data (Maritime Business; Yacht Design and Cadet Education only)
- Records of dialogue with various PSRBs
- Anonymised e-mail correspondence between learners and lecturers focusing on what makes for a positive digital learning experience
- Classroom observation and peer-observation records
- Course Team meeting notes
- Learner focus groups.

2

Data from additional maritime educational and training providers across the UK. This data was gathered in the form of an online survey, which, in collaboration with the Maritime Skills Commission, was sent out in December 2020. This data set should be considered secondary data, based on data collected by the maritime education and training provider who completed the survey.

Data from each phase and data set informs the recommendation, and such data is deemed to be an integral part of standard educational practices, governance and quality enhancement processes.

The mixed-methods approach to data gathering ensures that the findings and recommendations are based on an integrative approach to evidence. The benefits of combining quantitative and qualitative methods is to allow for one method compensating for the weaknesses or the blind spots of the other. The rationale is that it ensures the data is more reliable and valid, strengthening the recommendations.

1 Phase

Pre-Covid September 2019 – February 2020

In this phase, students were predominantly taught in classrooms, with some supporting activity and material provided via the online learning platform known as Solent Online Learning (SOL).

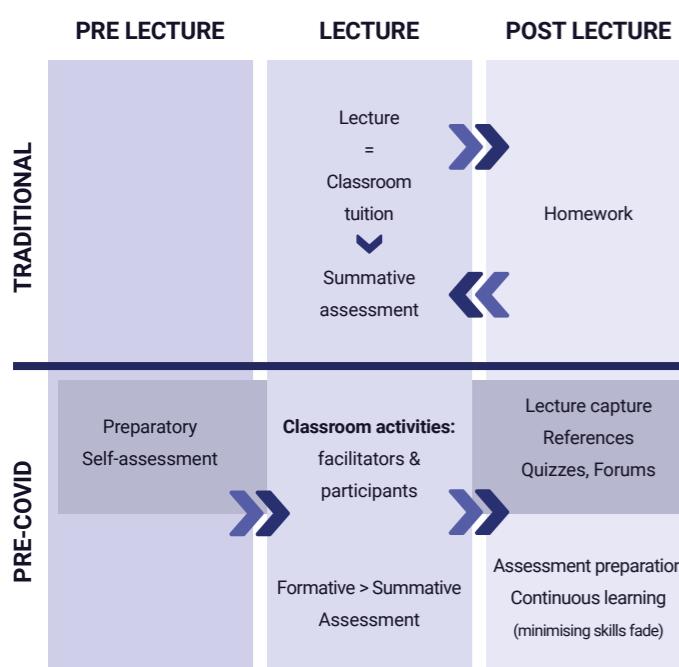


Figure 1: First steps to a more blended learning approach for maritime subjects at Solent University pre-Covid ■ VLE

Data captured for Phase 1

An analysis of digital engagement by a total of 92 learners in their first year of cadet education and maritime business degree courses was obtained by reviewing the data on Solent Online Learning, the University's online digital platform, showing the regularity with which learners logged on, length of time spent on SOL, completion of checklists, i.e. module activities, participation in discussion boards, quizzes, use of Lecture Capture. There were three points at which data was captured: at the onset of a semester, at the half-way point of a module and at the end around summative assessment. Further data was collected via learner surveys, classroom observation and learner focus groups.

Main themes in Phase 1

Access

Students indicate that they have good, regular access to the online platform and overall possess the digital skills to use the system effectively. All students accessed online learning platforms using at least one personal device. Most learners used their phone alongside a larger personal device such as laptops or iPads and/or campus computers.

Ofsted (2021) argues that while the quality of teaching is far more important than how lessons are delivered, there is some evidence that the medium does matter. Learners tend to spend longer accessing a remote lesson when they are using a laptop than when using a phone (tablets are in between).

Frequency of Solent Online Learning use

All students were found to access online learning at least once per week, with over half of students reporting that they use Solent Online Learning (SOL) daily. Only four of the 92 students lacked confidence navigating the system, with the rest of the students somewhat or very confident navigating SOL.

Student perceptions of how digital learning might support them in their learning journey

Most students found that SOL gives them an overview of the module content and that their tutors are visibly present on SOL for support. Other aspects of communication are less evident to students: less than half (42%) felt that online learning platforms provide them with a clear indication of what they need to do to pass their module. Only 22% felt they help them understand where they are in their learning journey. As a space for interaction with others, the online platform was poorly rated by students; 28% of students use it to communicate with tutors, and only one student (1%) used it to communicate with other students.

What were the most helpful aspects of SOL?

Interactive content such as quizzes and checklists are deemed helpful for learning by most students, as did passive content such as recorded lectures, reading lists and other video content. When invited to give free-text responses, students reported that they like SOL as a single, central source of information for their modules. It was useful to review content in preparation for exams and contained interactive elements such as quizzes.

What were some of the challenges with SOL?

Compared to previous experience of VLEs in college or school, 20% of the students surveyed find SOL worse, with the rest finding it equal, better or having no previous experience to compare it against. Reasons why students find other systems better are split between how SOL functions and how the tutors use it i.e. logistical and pedagogic. Collaborative or reflective activities such as forums and blogs are perceived as less useful by most students.

12% of the students reported technical issues, with varying problems relating to internet speed, device compatibility, browsers, and their system's speed. These issues were largely resolved, often with the help of the IT helpdesk, but some of challenges remain outside the education provider's control, most crucially the reliability and bandwidth of the internet connection.

The impact of individual lecturers on engagement

By far the most common issue for concern was the variability in lecturers' use of the platform and digital learning generally, causing problems with consistency and navigation.

Extent to which there was evidence of lecturers signalling to students this 'inside-outside' approach

In the curriculum review for maritime courses in 2018/19 it was intended that the student experience going forward should make better use of Solent Online Learning. It was intended that non-optional online tasks should be integrated

into classroom activities and assessment by lecturers in a planned and purposeful way, so it is impossible to avoid engaging with them. These approaches would utilise both high and low technology strategies to support student learning outside of class, they would be well-defined and well-structured with students provided with prompt and useful feedback. Examples included preparatory tasks and activities before and after class, student question generation, video capture with questions, and online quizzes to enable students to assess their understanding.

Whilst this was encouraged the outcomes were highly variable with limited evidence of this happening and face-to-face teaching and learning opportunities continued to be preferred by both lecturers and students.

Perceptions of digital learning

The purpose of online spaces was perceived to be by most learners as a repository for resources rather than an interactive space. Digital resources were commonly perceived to be those which were static and passive such as PDFs, booklets, links to reading lists. Such spaces ensured that there was less need to e-mail staff as questions could be checked. Not wanting to "pester the teacher" was a strong thread that seemed to relate to online spaces solely for the confirmation of facts. SOL was engaged with mainly retrospectively rather than proactively.

Learner expectations

It was generally accepted by learners that there was variation in the extent to which lecturers valued and would invest effort in online learning spaces or saw them as complementary to face-to-face teaching. At the same time the majority seemed accepting of the paucity of the online provision possibly because of the contact hours in class and they lacked points of comparison.

Most valued aspects of digital learning resources

Lecture capture (the recording and upload of both the Smart Board and the lecturer utilising a specialist

educational software) was perceived as the most valuable aspect, with SOL's purpose as a repository for resources rather than an interactive space. It was recognised that quality over quantity was valued which correlated with earlier SOL activity reports. Lecture capture was valued, although it is noted that this is only if what is recorded is well-structured and accessible. With complex subjects i.e. compass and maritime law unless learners have a level of initial understanding, lecture capture was perceived to be of limited value.

Classroom teaching prized over online spaces

The classroom was the primary place where learning occurred with online spaces providing opportunity for revision rather than amassing new knowledge through independent study. Above all else, what was valued was the opportunities for individualised face-to-face feedback and interactive engagement with "teacher as expert" which was available in class. Online learning was perceived as supplementary and complementary to taught classes. There was a strong sense of a taxonomy of learning in which the classroom experience is seen of greater value. Their perception was that subjects such as maths could not be adequately mastered via online learning. A substantive number of learners freely admitted that the effort needed to locate relevant and useful items on SOL was often too much, indicating a need for better signposting and structuring. Central to a positive experience is speed and efficiency, including ease of navigation of SOL.

Vulnerability and exposure together with safe places

Existing interactive spaces on SOL such as forums were rarely used raising the issue of vulnerability associated with asking questions in a public online space and the unpopularity of reflective places and forums for maritime.

Key findings from Phase 1: Pre-Covid (September 2019 – February 2020)

While access seems not a problem, students perceived the online learning platform mainly as a central repository lacking interactivity and accepting this as the norm. The perception was that the real value would only happen in the classroom. Recording live and then uploading of lectures to SOL was perceived as a useful addition to the classroom experience and in particular as an aid for revision.

The main concerns were centred around the variability, i.e. the lack of consistency of the amount and the representation of the supporting material on the online platform. Another concern was the increased vulnerability when making use of interactive tools such as forums. Asking questions in the classroom was the main way of interacting, with little digital interaction between lecturers and students and between students themselves.

Crucially, the classroom remained the primary place where learning occurred with online spaces providing opportunity for revision rather than amassing new knowledge, with both teachers and learners perceiving the online platform as a relatively static construct with its sole purpose of complementing face-to-face teaching.

2 Phase

Rapid pivot to digital March – May 2020

In this phase, students were predominantly taught by digital means as face-to-face tuition had ceased due to a national lockdown. Whilst Solent Online Learning (SOL) had a mainly supporting role pre-Covid, it now rapidly became the central focal point and platform for all delivery. The pivot was rapid and initially focused on replicating the activity that had happened in the classroom into a digital format. With no break in tuition, there was little time for up-skilling and establishing an overarching strategy. The implementation was largely depending on the skills, initiative and vision of the individual lecturer.

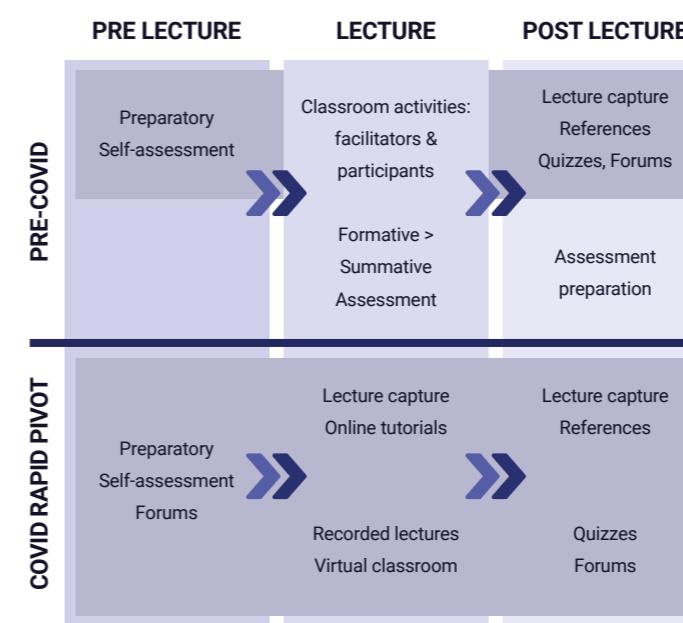


Figure 2: Rapid pivot to digital in phase 2 sees all teaching activity at Solent University go online ■ VLE

Data captured for Phase 2

The sample size consisted of 143 learners from long and short maritime courses including cadet training, maritime business, yacht design and small vessel engineering programmes. In this phase, staff sought to create the best possible student learning experience with limited planning time. Teaching teams regularly held complex and time-consuming discussions about how to best reconfigure assessments for online submission and continued to deliver teaching to students as per the scheduled timetable.

Main themes in Phase 2

Student engagement – how was it measured?

The weekly Solent Online Learning (SOL) Health Reports compiled and sent by the Solent University's centre for teaching and learning provided an indicator of the number of resources supplied for each module and levels of student engagement with their online spaces. Maritime provision at Solent University had over 300 modules (typically 20 academic credits each) being delivered in this period; a RAG rating assisted a visual indicator of performance which was easy to comprehend.

The accompanying status report that received most attention was the number of active students and number of views per module via the online platform. Reviewing the weekly reports for maritime since the move to online teaching in chronological order suggests that, in the initial stages, there appeared to be slightly more student engagement with digital learning in the initial weeks than later on in this time-period when engagement peaked and, in some modules, dropped off slightly. Whilst some variation exists between levels and subjects there seemed to be on average around two-thirds of learners actively engaging with their studies, with lecturers anecdotally reporting a slightly higher number. This may at first seem low however in the context of Covid-19 and sector benchmarks this is above normal. The sudden lockdown saw a pivot for which providers were unable to adequately plan and the lack of engagement is in a number of instances due to other factors, e.g. returning home, health issues, lack of digital access. The reasons for students not engaging with online learning was often difficult to ascertain and often only became known retrospectively.

The authors argue that quantitative reports recording learner involvement alone are unable to capture accurately what is frequently a complex picture. Engagement is more than number of clicks on a page and whilst students were given explicit messages that SOL was the primary platform for content and guidance it is important to recognise other forms of engagement also.

Such reports whilst helpful do not reflect the full picture of digital engagement and by focusing entirely on the frequency with which learners log-in we privilege quantity over quality. Education providers need to provide a more analytical and nuanced approach to monitor learner engagement. It needs to include strategies that encourage deeper learning online and feedback from students regarding what is most effective in supporting online learning. One way of doing this is through student partnerships which encourage open communication.

The importance of an already in place online learning platform with dedicated support

A critical factor in enabling a successful rapid pivot to online learning was the existing online platform and a skilled team of learning technologists and instructional designers who enable us to utilise it to best effect. These are specialist skills which often take years to acquire and recognise that digital learning has its' specific pedagogy. The term "online platform", in this context, can be misleading in so far that it could give the impression of one simple software solution when in fact it refers to a complex eco-system and the integration of various system and solutions which in conjunction which each other achieve a comprehensive platform for digital learning. Such an eco-system would have been developed and grown over many years and will need to evolve continuously. A simplified diagram of Solent University's digital learning eco-system is provided in Annex 1 – Solent Online Learning. Whilst the supporting infrastructure will be scaled down for smaller providers such joined up thinking remains critical to success.

As mentioned in the introduction, UK maritime education and training is an export product with significant numbers of international students studying on UK programmes, both in the UK and abroad. Due to the pandemic there were also students stuck abroad, in some cases as far as Australia. The rapid pivot to digital learning and the use of the existing online platform in combination with recorded lectures enabled these students to continue their education regardless of their geographical location.

Audit trails

What is vital from an audit and governance point of view is that education providers leave a clear audit trail on their digital learning spaces which makes explicit the range and reach of their teaching and learning activity via module announcements, module forums, assessment tabs and support which are occurring away from online platforms. In time, the Department for Education and the Office for Students will need to see robust evidence of the nature of the online learning provided to students. It is noteworthy that there is an increasingly greater understanding amongst staff of the importance of demonstrating evidence of impact and influence.

Key findings from Phase 2

In summary, the emergency pivot whilst stressful and frantic for all concerned allowed learners to keep learning and teachers to keep teaching. Regular and clear communication together with managing student expectations was critical to the transition.

Effective communication was particularly relevant around assessments which had to be either postponed if aligned with PRSBs or redesigned for online. Negotiating with professional bodies was a critical feature of this period to ensure a robust, authentic assessment approach and maintaining of standards alongside a reconsideration of evidence for fitness to practice.

Maintaining contact with and care for students was highly significant, both relating to academic and pastoral matters.

Many students were without suitable devices and good Wi-Fi access with the same challenges faced by lecturers. Issues of digital capability regarding technical skills were relevant for both; however, support was fortunately available from learning technologists.

It became apparent that digital learning opportunities included flexibility and cost reduction, especially for international learners.

Importantly, it allowed for the opportunity to challenge the notion of 'how we have always done things around here', implementing institutional change through widespread adoption of digital learning at pace.





3

Phase

Considered planning period for digital learning post June 2020

During which plans were put in place to support a Hybrid model of delivery although the online learning mode still dominates

In this phase, Solent Online Learning (SOL) remained the central focal point and platform for all delivery, but some face-to-face activity on campus resumed. Lecturers and students became much more familiar with the principles of digital learning and an element of routine was setting in. Whereas in the previous phase the implementation was mainly depending on the skills, initiative and vision of the individual lecturer, there was now time for upskilling and for an overarching strategy to be embedded, providing much-needed consistency and making use of new opportunities that come with digital learning. Where possible, students are feeding into the course design as co-creators.

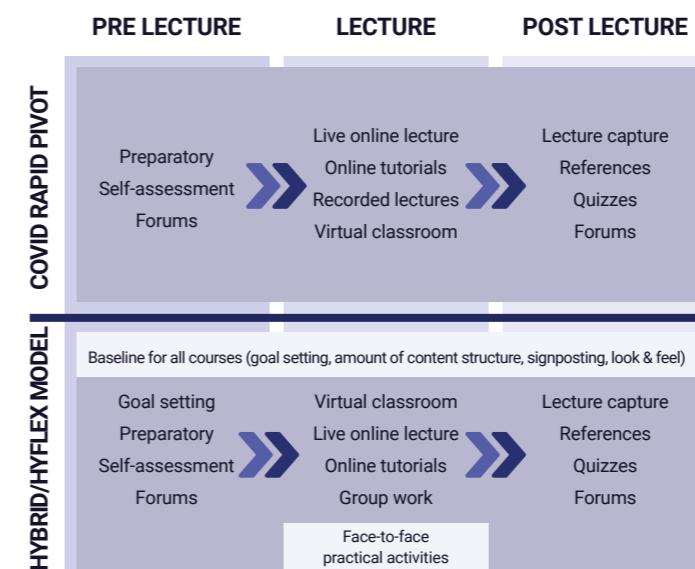


Figure 3: Hybrid / Hyflex model applied at Solent University in phase 3 ■ VLE

Data captured for Phase 3

The following data was captured for Phase 3:

- Review of 200 plus student evaluation surveys across maritime subjects (Your Module Survey & short course feedback forms) on their learning experience, which yields qualitative and quantitative data, including commentary of online.
- Progression and assessment data

Main themes in Phase 3

Sharing best practice and creating a baseline

Following the rapid pivot to digital learning in Phase 2, the University set up a Transformation Academy in June 2020. At the core of the Transformation Academy was a forum for the academic community to share successes and challenges and build a community of practice. It aimed to share knowledge, ideas, approaches, practice and resources to assist all staff who teach or support learning to transform their teaching even further for online delivery.

As well as sharing best practices and upskilling all involved, it crucially set a baseline for what an online learning space should entail and how it should look like, to address the issue of variability highlighted in previous chapters. The result is a significant step up, with learners appreciating the consistency of digital resources across the various modules and a much richer and more engaging digital experience.

In short, it was recognised that more attention and appreciation needs to be given to the structuring of digital learning thus putting pedagogy first. When developing digital learning, it is critical to always consider that learners come with differing perceptions and expectations of what constitutes independent study in the digital realm and levels of preparedness.

It is equally important to consider that there will be varying levels of digital literacy amongst staff, lecturers do need to be supported in choosing the correct digital teaching tools and facilitating optimal usage through staff development and training.

Live lessons versus recordings

Ofsted (2021) argues that while live lessons are often perceived as the 'gold standard' of remote education, this isn't necessarily the case. Live lessons (synchronous learning) and recorded lessons (as part of an asynchronous learning) have their advantages and disadvantages.

In live lessons, the teacher has more control over the learning environment, which helps keep the learner's attention. As a form of synchronous learning, it has the advantages of receiving and providing feedback in real-time and adapting the delivery if required. Live lessons may also generate a greater sense of community and connection to peers, which can help achieve higher levels of motivation and contribute positively to the participant's mental well-being. Conversely, live lessons rely on set class schedules and log-in times, which provides less flexibility for learners in different time zones or with other commitments. Live lessons also require a good quality and stable internet connection without interruptions.

Asynchronous learning, on the other hand, offers many attractive features for maritime digital learning. The maritime sector could be considered the epitome of a truly global industry; with a highly mobile workforce and learners that spread across many different time zones with hugely varying levels of internet connectivity. Recorded lessons provide more flexibility for these learners. The lessons can be produced to a high level of quality and make it easier to include other subject matter experts or integrate other content such as video sequences seamlessly. Web technologies such as HP5 can be utilised to great effect to add some interactivity to recorded lessons, e.g. by creating quizzes which are embedded in the video itself and provide instant and interactive forms of self-assessment.

Caution is advised when using recorded live lessons for asynchronous learning for a group of learners other than the class taught by the live lesson. It may be suitable for class members who could not participate in the live lesson to catch-up with the taught content. However, learners from another cohort will feel that the content is not specific to them, and it may be perceived as a demotivating 'second-class' experience. Recorded lessons also require a greater clarity of explanations as any misunderstandings or misconceptions cannot be as easily corrected.

Since evidence suggests that concentration online is shorter, we recommend to keep the duration of recorded lessons shorter than lesson which would have been delivered in classrooms.

Crucially, this is not a debate about utilising exclusively one or the other; different approaches to digital learning suit different types of content and learners. In many cases, a mix of approaches may prove to be the most effective, making the best of the advantages that each approach offers whilst keeping the learning experience varied and interesting at the same time. A good example is the use of the 'flipped classroom' where the content is initially taught asynchronously through recorded lessons and other digital resources. The learning is then reinforced synchronously (online or in classrooms) through sessions including collaborative problem-solving, practice, or tutorials.

Different generations have different learning needs

Maritime education and training stretches across a broad range of age groups. As an example, an analysis of the learners of the Warsash Maritime School revealed a minimum age of 16, a maximum age of 72, with a mean age at 36.8 years and positively skewed distribution with median age at 34 years (sample size 17,864 students). In the instructional design process, it is essential to consider that learners from different generations have experienced varied pedagogical practices in their school years and have vastly different levels of digital literacy.

These inter-generational differences pose interesting challenges for maritime digital learning. The same content may be taught to groups of learners from different generations and vastly different prior educational experiences. A good example is the Level 4 Higher National Certificate (HNC) in Nautical Science. The curriculum is largely pre-determined by the STCW convention and the requirements as set out by the PSRB. These Level 4 modules are on the one hand taught for cadets, who mainly comprise of young learners with a GSCE or A Level entry. On the other hand, the same modules form part of the programmes for experienced seafarers, whose entry relies on years of professional experiences rather than academic

entry requirements. Therefore, it can be argued that while the content of these modules remains the same, the delivery should vary and be planned accordingly.

Adapting the delivery may also occur more naturally in a classroom setting; an experienced teacher may do so almost instinctively and continuously based on the class's feedback. It is more challenging to achieve the same in live online lessons due to the lesser degree of instant feedback.

We propose that much of maritime education and training in the UK, certainly that of seafarers, is primarily teacher-centred learning, thus not doing justice to more mature learners and also not fully capitalising on the opportunities that asynchronous offer to the maritime industry. Therefore, it is essential that maritime education providers seek the dialogue with the relevant PSRBs with the aim to bring about a real step-change when moving towards more digital maritime learning.

The modularisation of content

As previously mentioned, evidence suggests that concentration online is shorter than in a traditional classroom environment. It is suggested that there are several reasons why it can be more challenging for learners to focus when taught remotely, either related to too much or too little sensory stimulus. Learners may be more easily distracted by what is going on around them, equally staying in one place all day without adequate breaks and social interaction can stymie focus, and gazing at a screen will tire most learners out.

It is good practice, therefore, to divide content into smaller chunks. Ofsted (2021) suggests shorter lessons followed by exercises or retrieval practice when teaching remotely.

The chunking of content can also benefit the education provider in other ways. Over time, providers will establish a rich library of short modules of digital content which can be packaged in various ways to create different programmes. A more modular content would also work well with the UK Government's push for life-long learning. It would more readily support programmes

that allow professionals to 'top-up' with additional learning in a flexible way throughout their career or when choosing to move into a different maritime sector. An example of the latter could be naval officers who want to enter the civilian sector.

Connectivity remains a concern

Same as in phase 2, connectivity issues and varying stability across platforms remain a concern. For example, during this phase, the University introduced Microsoft Teams to replace Zoom, which led to access issues for students and staff in the initial stages. Much could be said of the politics of providers making what are perceived by staff to be poor and unpopular choices of learning platforms. It is critical to recognise the existence and the concept of digital poverty and inequity of digital capacity from both a learner and lecturer perspective and its impact on effective learning. While providers can help overcome digital poverty with loans of laptops and other devices, connectivity is mostly beyond the provider's control, especially in an international context.

Mental health requires special attention

Ahead of considering the impact of digital learning on the learner's mental well-being, it is critical to remind ourselves that a large number of learners will fall into demographical groups with an increased risk of developing mental health conditions. According to the "Suicide-safer Universities" report by Universities UK (2018) and Papyrus, the UK's national charity dedicated to the prevention of young suicide, nearly one in four young people will experience suicidal feelings at least once in their lives, with one in twenty trying to take their own life.

The maritime industry should be particularly sensitive to the issue of mental health; there is much discussion in the sector around data captured by P&I clubs and flag states and whilst no single source of statistics on mental health and seafarer suicide rates exists it is widely accepted to be of particular concern to the industry. The pandemic would have only added to this sentiment, with many students reporting increased levels of anxiety and stress due to the pandemic itself and secondary effects such as the changes to their studies and their finances during the pandemic and lockdown

Non-verbal behaviour and verbal cues are compromised in online spaces leading to teachers unable to respond to student needs adequately i.e. vulnerability, sense of anonymity, and lack of motivation. The same cues are also less visible to peers who often form a crucial safety net.

The mental well-being of staff is equally important. Working remotely from home can remove the distinction of being at home versus being at work. Therefore, it is vital to agree with learners on lecturers' reasonable availability outside online classes for tutorials and to respond to questions via forums. Furthermore, consideration has also to be given to the negative impact of long periods of screen time on learners.

The value of peer interaction

Most educators will have observed that students learn a great deal by explaining their ideas to others and by participating in activities in which they can learn from their peers. An increase in online learning can result in varying experience of group work and peer learning amongst students. It is, therefore, critical peer activities are considered at the course design stage. However, implementing effective peer learning into digital programmes can be complex and requires careful consideration. Peer learning is not a single practice; it covers a wide range of different activities each of which can be combined with others in different ways to suit the needs of a particular course (Stanford University, n.d.).

One such example is Problem-Based Learning (PBL); in a PBL activity, a small group of students analyses a problem, identifies relevant facts, and applies existing knowledge and experiences to solve a problem. Seibert (2020) argues that PBL as a learning strategy empowers critical thinking and perseverance skills and works particularly well for the skills and learning needs of

Generation Z

Key findings from Phase 3

In summary, the experience of Phase 2 and responding at pace led to the application of lessons learnt based on lecturer experience and student feedback. It became clear that 'less is more' with learners advocating as they did in Phase 1 Pre-Covid for less resources of better quality and relevance to avoid cognitive overload.

Familiarity of learners and lecturers with online learning spaces increased confidence and competence. Staff development for all aspects of digital learning, including pedagogic and technical, was offered both generic and bespoke. The setting of a baseline and the introduction of templates allowed for a consistent structure.

Balances and checks were put in place by other departments outside maritime education to ensure consistency and a common standard.

The time commitment for lecturers who continued to teach and assess online whilst planning new content for future courses was intense.

Importantly, the majority of students were able to adapt to online learning and accepted that lecturers were trying their best with relational aspects highly valued. Addressing those who were less able to adapt is a complex issue. Many of the reasons are outside the provider's control relating to personal circumstances and digital access. The key advice is to focus on relational aspects through one-to-one tutorials, peer-learning and including students as co-creators of curriculum.



The view of other Maritime Education & Training providers

Covering Phases 1-3 March – December 2020

In order to broaden the findings and also to include providers of education and training to other sectors within the maritime industry, a Survey Questionnaire was sent out via Survey Monkey to determine characteristics of their experiences with digital learning in the form of 36 open and closed questions based on common themes emerging from previous data sets.

The combination of the methods is thought to provide both metrics and textual commentary to better address the project and objectives which attempts to discover how often learners and staff are experiencing digital learning, what they are doing when they get there and the 'stories' behind the frequency or infrequency with which they engage.

The SurveyMonkey Questionnaire was open from 9th to 23rd December 2020 and received six returns.

Together, these training providers:

- Employ 558 teaching staff/trainers/instructors (smallest 30, largest 160)
- Educate and train 17,120 learners annually (smallest 500, largest 6000)

Colleges and universities are over-represented as we received only two responses from other nonFE/HE maritime educational settings. Most courses on offer were subject to approval by a Professional, Statutory or Regulatory Bodies (PSRBs) including the MCA, MNTB, RYA, Seafish, OPITO, SQA, Highfield, NMEA.

Jointly, these institutions cover a wide range of sectors within the maritime industry (see Annex 3 for full list of sectors covered by these providers).

Relevant emerging themes from the SurveyMonkey Questionnaire to a broad spectrum of Maritime Education and Training Providers

Dramatic shift to digital learning

Although five out of the six providers offered some digital learning pre-Covid, pure classroom-based delivery dominated the space with an average share of 77%. Forced by the pandemic, this balance shifted dramatically, with online learning (38%), blended learning (27%) and classroom-based delivery (35%) now taking place in almost equal measure, whilst Computer Based Learning (whereby the learner does not interact with a tutor) remains very low.

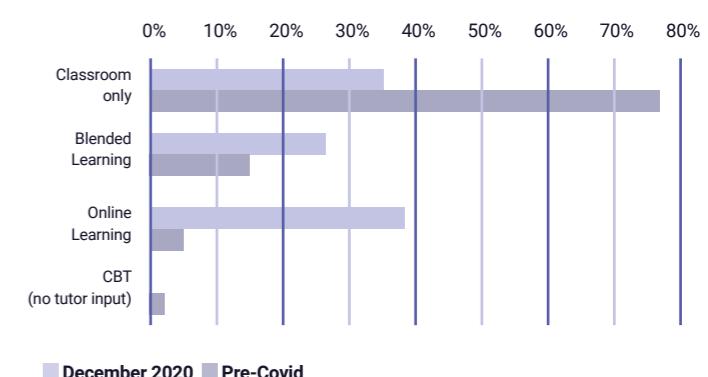


Figure 4: Methods of teaching in December 2020 compared to Pre-Covid

The roll-out was very swift and included various measures

Most providers reacted very quickly to changed circumstances caused by the national lockdown towards the end of March 2020. Out of the six organisations which replied, three providers changed their delivery mode in March 2020, and one each in April, May and August.

All providers remodelled their courses, including creating new digital resources and changed their courses to live webinars. Half of the providers complemented this with pre-recorded lessons.

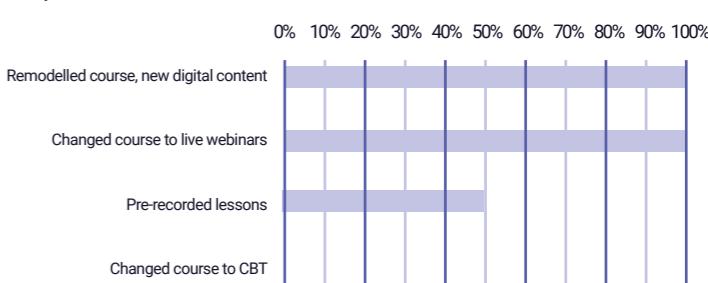


Figure 5: Actions taken to adopt teaching in the pandemic

Often more than one conferencing platform was used

The survey data illustrates that providers often defaulted to using multiple conferencing platforms, with Microsoft Teams and Zoom being the most commonly used platform for live webinars.

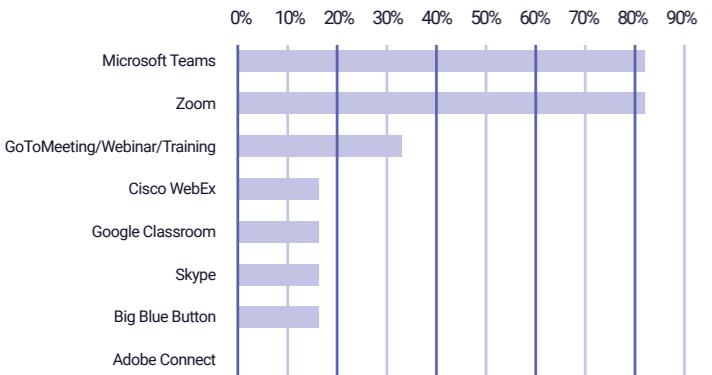


Figure 6: Conferencing platforms used by maritime education providers in the pandemic

It is worthwhile bearing in mind that the functionality of these conferencing platforms has significantly changed since the pandemic began. At the beginning, there were security concerns surrounding Zoom, plus the limiting factor that free licenses would only provide a session of 40 minutes. Teams initially lacked the opportunity of a gallery view, which allows participants to see a larger group of attendants and a breakout function. When asked to rank these platforms in the survey, providers rated Zoom slightly higher than Teams, but with a slim margin.

Students seem to have equally taken to either of these two platforms. However, anecdotal evidence suggests that Teams is putting more strain on IT systems, i.e. requiring both staff and students to have more powerful IT equipment and a better internet connection.

It is critical to mention that while a conferencing platform is a crucial element, it is only one part of the solution for digital learning. Effective digital learning relies on an online learning management system (LMS) platform which ties all elements together. Most educational institutions, including most FE and HE institutions in the UK rely on Moodle based systems.

Moodle is an acronym for Modular Object-Oriented Dynamic Learning Environment. It is an open-source software solution with a very active community of developers constantly working on new features and so plug-ins. With more than over 100,000 implementations worldwide it is by far the most popular LMS currently in use (eThink, 2021).

However, a core Moodle installation is unlikely to yield much benefit on its own. It is the integration of the LMS into the institution's systems environment and the right set of Moodle plug-ins that create an effective solution for both the provider and its learners (see simplified schematic in Annex 1).

Supporting hardware for teaching

While software solutions are central to enabling effective digital learning, it is important also to consider hardware requirements. All providers who responded utilise additional technology to support live online tuition, including:

- Professional cameras
- Lighting / selfie-rings
- Hover cams
- Graphics pads
- Professional microphone

All the hardware listed above is easy to get hold of and relatively inexpensive. The largest expense is likely to remain personal computers and laptops that are powerful enough to deal with the increased load posed by video processing and screen sharing.

Digital access for students

Laptops with enough processing power are likely to be the main Achilles' heel for learners. Whilst it can be expected, to some extent, that senior maritime professionals on professional short courses would have access to suitable IT equipment, this may pose a problem for younger students, such as apprentices, ratings or cadets. Where students are enrolled on longer programmes, providers may be well advised to explore options for loan of laptops or the option of discounted purchases. There may also be an opportunity for maritime charities to step in with some support for maritime students in need.

There have been a number of hardship funds across various education providers during the pandemic to assist students in offsetting costs for laptops or broadband connections. A stable broadband connection with suitable bandwidth is critical for both teachers and learners. Whilst the situation in the UK will further improve with the roll-out of fibre-to-the-home and better mobile data connectivity, it is critical to consider the international nature of maritime education and training with students studying from abroad or whilst on-board ships. The loan of laptops to students should be considered even in post-pandemic situations. The potentially time-consuming administrative task can largely be automated with self-service laptop loan charging lockers that integrate into a Library Management Systems, as the depicted below.



Figure 7: Self-service laptop loan charging locker at Solent University, Southampton

Barriers that were not overcome

Despite all these efforts, providers reported several barriers that were not overcome or work on better solutions is still being undertaken, including:

- Student access (they need provision of laptop or other device that has the configuration and access through firewalls for accessing some college systems).
- Accurate attendance monitoring. It is easier and more accurate to monitor engagement.
- A platform that can easily manage multiple synchronous events and simple recordings that can be published intuitively without waiting ages to render, save and publish MP4 files. A platform that can also have a main plenary area + break-out rooms where people can move to and from would also be good.

Digital learning requires change of assessment methods

66% of the providers indicated that they changed the assessment methods, including:

- Online assessments, use of two devices, one to check the room was clear and one to show the student was the one completing the assessment. LMS used to create assessments, secure access, one-time only answers to questions.
- Largely removed closed book exams, replaced with portfolios, projects, online assessment (viva and tests) holistic material review.
- From exams to online quiz; report; case study; viva.
- Created more assignments where practicable and moved to online assessment

Remote invigilation or proctoring solutions, which enable students to write an exam in a remote location while maintaining the examination's academic integrity, still seems to be in its early stages, but have made huge strides during the pandemic and will continue to do so with advances in AI. Nevertheless, none of the providers reported the use of commercial remote invigilation/proctoring. Conversely, a more "old-fashioned" tool has made a veritable comeback, the viva. Vivas were accepted by some PSRBs early in the pandemic as an alternative and easy-to-implement means of assessment, but require a lot of staff time.

Interestingly, all of the providers reported that assessment results either remained at the same level or that grades had improved (see figure 8). While generally speaking it is encouraging to see that the new approaches yield good assessment outcomes, the authors of this report would urge caution and stipulate that further analysis would be undertaken to assess the impact of digital learning on assessment results. During the pandemic, it was quite common across the education sector for providers to implement a no-detiment policy. It could be argued that the no-detiment policies worked and had the desired effect of mitigating some of the potentially negative impacts of the pandemic on exam results.

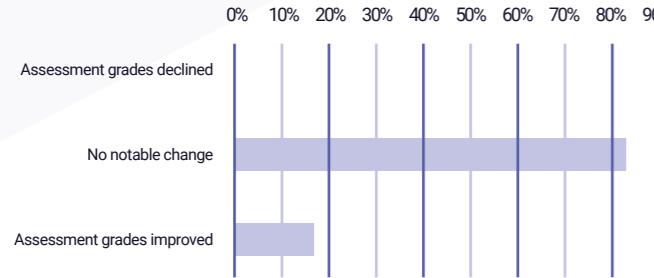


Figure 8: Impact of digital learning on assessment grades during the Covid-19 pandemic

On the other hand, there are concerns around growing evidence of academic misconduct. Often the academic misconduct relates to contract cheating but it extends to other forms also, and in many cases, students weren't even clear they were cheating, since they've grown up with the expectation that they can use the internet to find answers (THE 2020).

The Irish Universities Association (2021a) suggests to make information about academic integrity easy to find within the online course on the online learning platform. The information should be clear and useful and discuss issues such as what academic integrity means for the particular course and assessment or, if online assessment is to be "open book", what that means. It should clearly lay out what legitimate sources can be consulted during the assessment if any.

Measurement of engagement

Four out of six providers indicated that they measure their students' online engagement, with measures such as:

- Attendance, logons and interaction with systems, questionnaires and course review.
 - Number of times and length of time students logged in and interacted with the online resources and virtual learning environment.
 - Online engagement measured through registers with specific marks for engaged-online.
 - Attendance only – observation can be intrusive in online classes.
- Encouragingly, the survey responses showed that student satisfaction across the surveyed providers either remained the same (50%) or rose (33%). However, in 17% of the cases student satisfaction decreased, which is higher than the sector average (across all subjects) and it is important to

Maritime education and training, particularly the education of seafarers, has long had a reputation to be very rigid in the way of attendance requirements, not least due to the strict requirement by the PSRB. While attendance monitoring is relatively straight forward in a classroom setting, it is questionable whether it is the right measure for digital learning, not least because it can occur asynchronous.

Besides, digital learning offers new opportunities that stretch well beyond the simple registration of attendance. The authors of this report argue that the measurement of engagement may be a much more meaningful measure. However, the measurement of engagement may require additional tools and careful consideration when planning learning activities at the time of course design. As illustrated in an earlier chapter (Phase 2: Rapid pivot to digital) measuring engagement is a complex task and needs to consider that engagement can stretch beyond the digital realm.

Overall, students' satisfaction increased with digital learning

Student satisfaction is a crucial metric in education, and it is not surprising that all providers indicated they would measure their students' satisfaction. The providers who completed the survey questionnaire used the following methods to measure student satisfaction:

- Online feedback forms post-course
- Internal student satisfaction survey by module; meetings with course reps
- Surveys in Microsoft forms
- Feedback forms
- L1 feedback forms/evaluation summaries and L2 assessment. Would only use a 4 level Kirkpatrick-type model for a specific project.

recognise that many students still prefer classroom teaching. It will be interesting to monitor future levels of student satisfaction as the quality of digital learning and digital literacy increases.

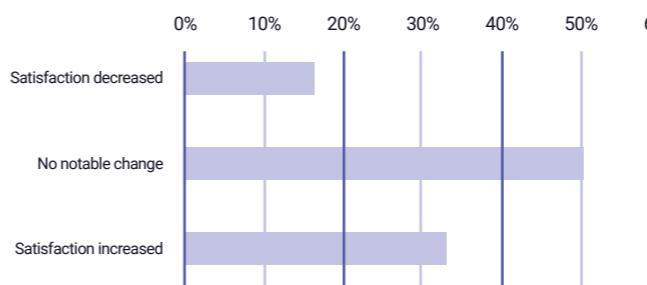


Figure 9: Student satisfaction in Dec 2020 versus pre-pandemic

Students' main concerns

The providers who completed the survey indicated the following as the main areas of concern for students:

- Interaction with instructor prior to course, feedback post course was positive and often surprised at how effective it was.
- Lack of interaction with cohort, learning community not as effective, social isolation.
- Mental health and isolation. Hard to do some practical activities from home.
- Access to platform due to connectivity issues both internal and external to the college
- Face to face interactions
- Some students prefer face-to-face classes though accepted the need for a revised format. Around 800 other international students were able to access new digital resources on Moodle for the first time and loved it.

All of these areas have been discussed in this report already.

What students liked best

On the other hand, providers who completed the survey indicated the following as the areas that students liked the best:

- Being able to complete the course without the expense of travel and accommodation
- Tutorial time, increased availability of asynchronous learning

- Online resources, videos, quizzes etc.
- Staff support and guidance
- Flexibility of working from home
- The quality of the delivery
- Less time spent away from their place of work
- Discussion forums and support from experts, live sessions, interactive Scorm courses.

Based on the experiences, which topics and types of learning, do lend themselves well to online learning?

When providers were asked what would be particularly suitable for online learning, most answered by listing the exemptions of what doesn't lend itself for it, the following, unedited answers should hence be read in conjunction with the next question.

- A lot depends on how practical the topic is, we normally try to make everything as practical as possible, we successfully connected our simulators to the sessions which allowed students to take control of them for Radar and Electronic Charts training. We made videos for other courses for demonstrations we would normally do to illustrate stability for example.
- Theory where research material and reading is available (Construction/Naval Arch, Cargo Ops, Fluids, propulsion systems, meteorology)
- Cargo Operations, Bridge Management, Law, HELM, Orals prep and exams.
- Pretty much everything apart from chart-work – we have even done some simulation using online delivery.
- Most things we offer can be delivered well online, though a live session on law feels quite different to a class on ship types and trade routes. The important thing is to support an expert in their subject who is learner-centred with the tools they need to deliver learning.

Based on the experiences, which topics and types of learning, do not lend themselves well to online learning?

When providers were asked what would be not particularly suitable for online learning, they provided the following unedited answers:

- Some of the Navigation topics have been harder, it's not as easy for the instructor to quickly see the obvious mistakes like plotter wrong way round so tide being applied wrong way etc. It didn't make them impossible but just trickier for the instructor to adapt.
- Calculations heavy. Thermodynamics, navigation, stability.
- Practical – chart work, fabrication – most short courses.
- Chartwork Compass
- Chartwork
- Marina management
- We don't do any lab or workshop type experiments, so can cope fine.

Teaching activities and subjects that may be more difficult to deliver by online learning could be categorised in the following ways:

1

Courses which require specialist facilities

Examples include marine engineering workshops, fire grounds or maritime simulators. The requirement for specialist facilities may entirely preclude that particular piece of education and training to be delivered online. However, it should be mentioned that significant progress has been made during the pandemic with cloud-based simulation. The latter was only just trialled by leading simulation software providers, but was rapidly introduced to the market during the first lockdown. However, courses utilising cloud-based simulation are yet to be approved by the PSRBs.

Courses in this category, especially maritime safety courses and engineering workshop training, are often skills-based with the aim of both increasing the understanding and the psychometric response.

2

Courses which require specialist tools

The course most commonly mentioned to be difficult to teach online was chart work. On the one hand, these courses may be more challenging to broadcast; on the other hand, it may be because it requires a suitable learning environment at the learner's end. We found that sending out paper charts to students and equipping lecturers with overcame help overcome some of the challenges. However, it does remain challenging for the learner to showcase the chart work to receive comments about its accuracy and presentation.

3

Courses covering complex, often mathematical, topics

There is a perception that courses with large amounts of calculator tasks, such as stability or thermodynamics, are more difficult to teach online.

4

Courses which require physical interaction between learners

An example is the Bridge Resource Management course, where a group of learners worked together to master exercises. An essential part of the course is the observation of the actions of fellow learners. In these courses, both verbal and non-verbal play an important role.

Future strategies for maritime digital learning should recognise that not all subjects can be adapted to online learning with same ease and to the same extent, however, many of these challenges might be overcome over time with new digital learning technologies, increased digital literacy of both teachers and learners and new virtual learning environments.

How have the views of providers changed?

Finally, providers who completed the survey had the opportunity to indicate how their views had changed, below the unedited answers:

"It has its place, shorter courses easier for instructors and students, there is a slight feeling of overuse this year for some and they would rather attend a classroom course. For apprenticeships, benefits are greater, it has and will allow greater connection between blocks of training, quick 1-2-hour sessions work well as refreshers or for reviews and allow us to focus on targeted areas of support."

"Invaluable and progress has been rapid because of the crisis. Especially valuable in pre and consolidation learning. Needs investment in both skills and tools and there is a risk of compliance with metrics rather than measured competence if not approached carefully."

"Yes. Digital learning must become an integrated part of the learning process in the future to form a mixed learning environment."

"It is something to be embraced. The ability to teach students remotely from all over the world is very convenient and helps the students save money, many of who are self-financing."

"I am more inclined to use it going forward, but it has its limitations for some topics."

"My views have not changed though there is much wider acceptance and support within my organisation. Since nearly everyone across generations has now levelled up their skills and familiarity with online platforms, the need to train tutors and induct learners on systems is less burdensome. There is now an appetite to review online assessment methods though this is a complex task to deliver the same integrity and level for high-stakes assessment."

Key findings from other Maritime Education and Training providers

The survey questionnaire revealed a rapid and largely successful response to the first national lockdown across most surveyed education providers. Overall, student satisfaction increased as have assessments results. Many of those surveyed indicate that digital learning will continue to play a larger role in their organisation than a pre-Covid situation, even once the pandemic is over.

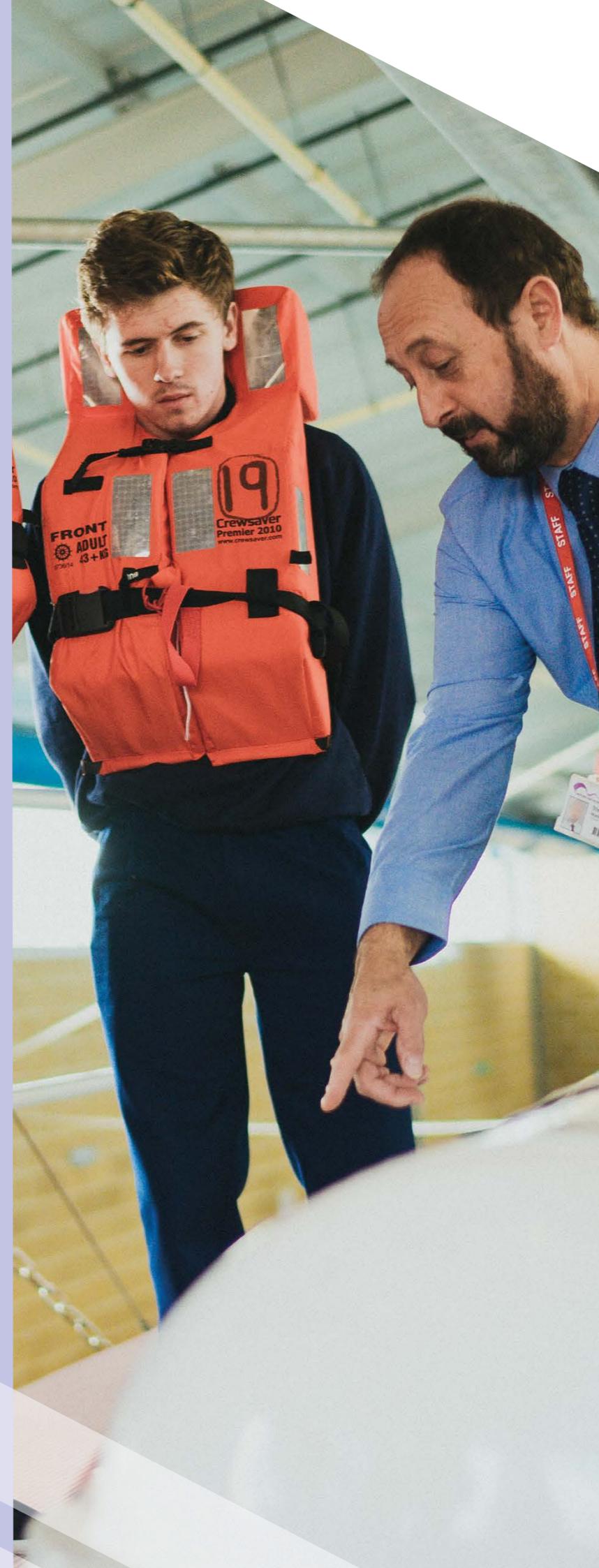
In that respect, the pandemic has certainly fast-tracked developments which many providers had started already. There is also evidence that it also has inevitably led to a levelling of digital literacy amongst teachers. Nevertheless, the upskilling of staff will still be required, for example, in workshops with educational technologists to fully explore the functionality and opportunities that modern virtual learning environment offers. Such workshops should include case studies of best practice and focus on techniques that encourage learner engagement.

It is also likely that further investment is required in enabling technology, such as add-ons to existing digital learning platforms or equipment that aids the recording or broadcasting of online lectures.

A key concern remains the possibility of increased academic misconduct. To fully benefit from the advantages presented by digital learning, it is critical to create conditions for academic integrity and authentic assessment to thrive. In close collaboration with PSRBs, this will require exploration of solutions such as remote invigilation/proctoring and alternative means of assessments.

Another challenge which remains is the delivery of courses which require specialist tools or facilities and those which contain large amounts of calculations. In many cases, these courses may revert to face-to-face tuition or then require additional course design to overcome some of these barriers.

Providers raised concerns around the increased risk of isolation and the impact thereof on both staff and students' mental well-being. Peer interaction remains essential, both to enable peer learning as well as to facilitate social contacts.



Other Considerations

Peer-to-peer observation

Academic development is an iterative and reflective process. It is a good approach to implement peer observation amongst lecturers to encourage digital learning dialogue and share good practice.

To some extent, it is easier to implement peer-to-peer observation amongst lecturers as physical constraints are no longer a barrier. Lecture captures can also prove to be useful resource. However, while peer-to-peer observation is a highly beneficial form of professional development for educators, to fully reap the benefits, it requires a framework and rules of engagement which encourage dialogue.

This ensures it is an edifying learning experience for all involved and improves the learner experience.

Students as partners and co-creators

Students can contribute to the success of digital learning in numerous ways. An example was set by the Irish Universities Association where the Enhancing Digital Teaching and Learning (EDTL) student intern team collaborated to produce advice for students for effective remote learning during Covid-19 (Irish Universities Association, 2021b).

The move to digital learning provides an excellent opportunity to include students as co-creators of courses. It is good practice to include student representatives in the course development team and to include them in teams which discuss and decide on digital learning strategies and roll-outs across the organisation.

Educational spaces and even office layouts have to change

Even before the pandemic, many educational spaces were in the process of being transformed from traditional classrooms settings to classrooms with more flexible

designs that encourage collaborative learning; the pictures below provide a few examples:



Figure 10: Example of flexible classroom layouts at Solent University's East Park Terrace campus

With further advances in digital learning the space utilisation of teaching buildings and campuses will have to be re-evaluated. Learners indicated that they needed more quiet study spaces to engage with this form of learning. Not only may it require less classrooms, the space itself may have to be purposed in different ways with more breakout areas for collaborative working, quiet study studies and new additions such as pods for video-conferencing.



Figure 11: Examples of breakout pods

Equally, it became apparent that lectures also require a different environment. It is very challenging to teach a class online when seated in a shared open office space. There will be an increasing requirement for dedicated areas from where teachers deliver their class online, either live or as a recording. A standardised, ready-to-go arrangement with a high-resolution camera, a good quality microphone, adequate lighting and other tools which benefit online teaching may make sense.



Discussion & recommendations

This report argues that whilst digital learning was generally embraced well by learners, there are still challenges to be resolved. Digital delivery is fundamentally different to a classroom setting and to be fully effective courses will need to be redesigned rather than just replicated. Such a redesign requires upskilling of staff and the implementation of new digital tools into the provider's learning environment.

However, it is critical to realise that not all subjects lend themselves to be transformed in their entirety to digital learning. The most often named subject in this regard was chart-work, one of the core elements for deck officers' education. Other examples include developing the applied skills and competencies required by marine engineers and electro technical officers.

Furthermore, it is crucial to carefully consider the impact of the reduced peer interaction between students. Peer-to-peer learning and collaborative learning are widely acknowledged as one of the most effective learning forms, yet are much harder to achieve in a digital environment. Significantly, the lack of physical contact with peers can also lead to additional strain on students' mental health. Simultaneously, it is even more challenging than in normal circumstances to monitor student and staff mental well-being in a digital setting.

The report concludes that digital learning is here to stay and provides countless new opportunities and advantages to the maritime industry. However, it does present a conceptual leap and significant development that requires the adoption of a more learner-centred approaches to learning and delivering content via learning technology tools.

Such activities should not be optional and instead integrated into learning activities and assessment by lecturers in a planned and purposeful way, so it is impossible to avoid engaging with them. These approaches utilise both high and low technology strategies to support student learning

outside of class; they are well-defined and well-structured with students provided with prompt and useful feedback. Examples include preparatory tasks and activities prior to and after online classes, learner question generation, video capture with questions, and online quizzes to enable learners to assess their understanding.

Through a deepening and broadening of our understanding of how learners engage with learning technologies, we hope to create better learning experiences and raise attainment. That said, further consideration is needed as to how the recommendations can be best implemented by education providers and PSRBs, including new assessment strategies. We propose that providers need to set aside additional time to redesign their courses with PSRBs providing a flexible framework for providers to do this. We also propose that the Maritime Skills Commission organises a webinar.



Recommendations

Based on our findings, we suggest that the MSC considers the following recommendations:

For providers

- I Providers should invest in the development of their digital capability and capacity. Investment is required in infrastructure and resources, including hiring instructional designers (a specialist role) to support staff in creating content and applying the pedagogies of digital learning which are distinct from classroom teaching.
- II Recognise that an effective online learning platform is a complex eco-system of various tools centred around a Learning Management System and may require significant investment.
- III Use the evidence from successful online learning over the last ten months as an opportunity to challenge the notion of 'how we have always done things around here' and to start a debate dialogue about change in maritime education.
- IV Upskill teaching staff and learners to ensure they are digitally proficient and confident.
- V Organise bespoke workshops that are mandatory with staff relieved of other duties to create online spaces, acknowledging that it takes time and staff start with different levels of expertise.
- VI Acknowledge issues of digital poverty amongst learners such as lack of equipment, poor connectivity and a lack of suitable study space at home. It may be necessary to provide laptop loans, bursaries and appropriately socially distanced study spaces where possible. The same applies to lecturers, who may also need additional digital devices such as hover cams and additional screens to teach maritime subjects.
- VII Consider the impact of isolation and screen time on students' and staff's mental well-being. Create activities that require social interactions.

For learners

- IX Learners must be guided and supported in moving from a more teacher-centred to a more learner-centred approach. Ideally, this is facilitated at the point of enrolment.
- X There should be a move away from monitoring attendance/minimum required attendance hours, which is common in current maritime education, and move towards the more meaningful measure of engagement.
- XI Recognise that the measurement of engagement is complex and must move beyond metrics such as number of times learners have logged on. Students use online spaces in different ways and engage with study material both on and off-screen. Capture the student perspective in terms of their engagement with digital learning.

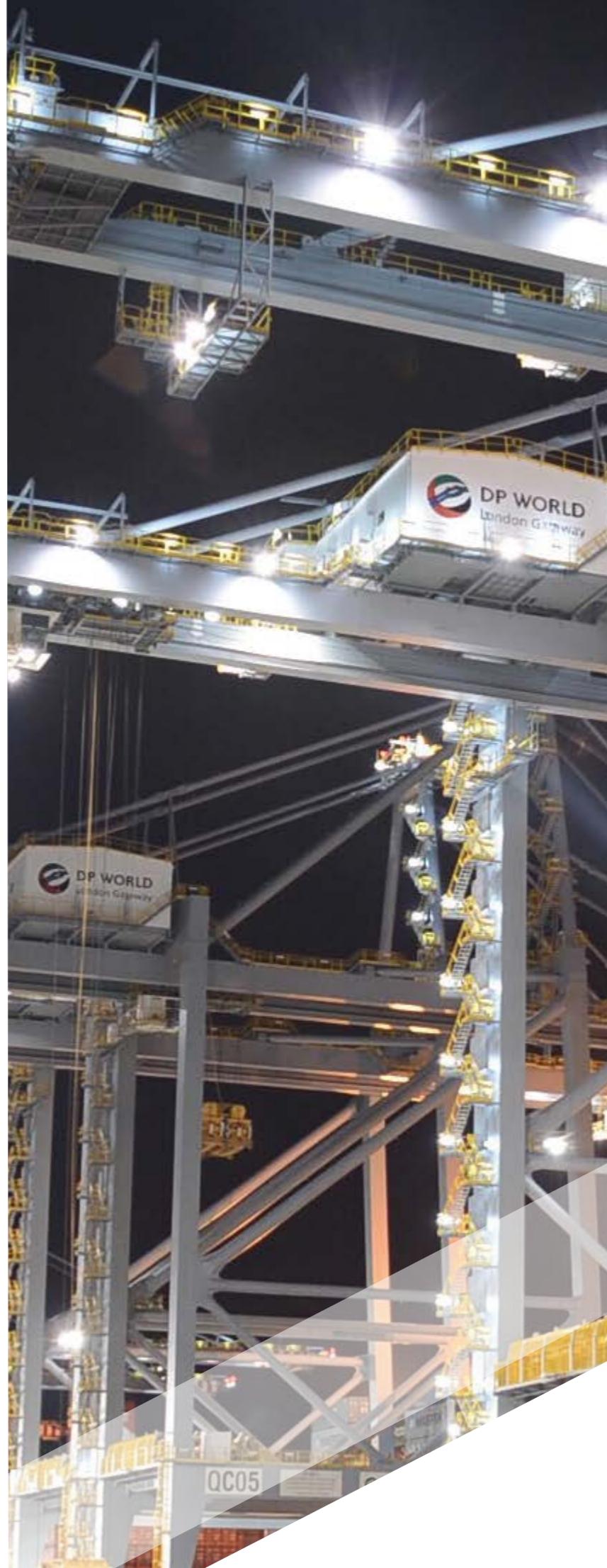
For teachers and support staff

- XII Explore how digital technologies are used for learning in classroom spaces to encourage an 'inside-outside' pedagogic approach, i.e. an integrated approach to digital learning between physical classrooms and online spaces, ready for the return to physical classrooms/hybrid learning. For example, lecturers can use digital tools to create quizzes or polls for learning and require learners to engage before and after classes with online platforms through the completion of tasks.
- XIII Improve online learning spaces through the sharing of best practice and new perspectives, including peer observation. Create a baseline and make recommendations for the adequate preparation of these online spaces.

- xiv To mitigate the risk of academic integrity being compromised via online assessments, providers should introduce measures to create conditions conducive to academic integrity and authentic assessment. Explore solutions such as remote proctoring/invigilation or alternative means of assessments.
- xv Provide clear information at the beginning of the course level and a debate with learners about what constitutes academic misconduct.
- xvi Have equivalent online assessments aligned to learning outcomes when exams cannot be conducted face-to-face.
- xvii To consider the importance of praxis, i.e. the interface between theory and practice, including those instances where teaching and assessment cannot be replicated easily in an online environment, e.g. chart-work, marine engineering skills.
- xviii Develop new digital content for asynchronous learning and to break content down into smaller chunks.
- xix Include students as partners and co-creators, embrace student involvement when formulating digital learning strategies, and include learners in course development teams.

For Professional, Statutory and Regulatory Bodies

- xx To work with education providers and experts to create a new approval framework for the implementation of maritime digital learning.
- xxi To recognise that the pedagogies of digital learning are manifestly distinct from classroom teaching and, therefore, not to insist for approval purposes for the online version to be a digital replica of the classroom course.
- xxii To work with education providers to explore new solutions to maintain academic integrity, including technical solutions such as remote proctoring/invigilation and alternative means of assessments.



Proposal for implementation

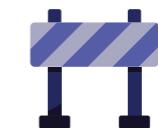
The sudden shift to digital learning in maritime education has largely been a success. However, several challenges still need to overcome before it is fully established, and not all subjects are equally suitable for digital delivery. We suggest that to take advantage of the opportunities provided by digital education, then the full involvement of both education providers and Professional, Statutory and Regulatory Bodies (PSRB) is required.

We recommend to benefit from lessons learned from the shift to digital education providers should invest in course redesign and that the PSRBs provide a flexible and realistic framework for the implementation of these changes. We ask that these recommendations are considered and accepted by the Maritime Skills Commission.

For these recommendations to be put in place and to further facilitate digital learning for the maritime industry, we propose that the MSC sets up a digital learning planning group ensuring their effective implementation over the next 12 months.

The planning group will have a Senior Responsible Officer (SRO) to oversee its implementation and a programme manager to manage its delivery.

The SRO and the programme manager will be responsible to the digital learning planning group programme board which will operate under the auspices of the Maritime Skills Commission.



Limitations of this report

As this report was written, between December 2020 and early January 2021, during the third lockdown, additional regulations were imposed on educational settings. As a result of this, the response rate to the survey was approximately 50%. Colleges and universities are over-represented as we received only two responses from other non FE/HE maritime educational settings. However, the authors believe that the results are still representative and applicable to the entire industry, and every effort has been made to include the whole sector.



Summary & thanks

In summary, providers must continue to review student engagement with online learning in a critical and holistic way. Of importance is that stakeholders strive to implement the recommendations and critically engage with what approaches are most likely to ensure the most effective and efficient learning for the maritime industry.

We would like to thank everyone who has taken part in the various surveys without whom this report would not have been the same. The authors would also like to thank the Maritime Skills Commission's working group "Covid-19 and Use of Technology in Learning" for entrusting us with compiling this report. Particular thanks extend to Iain Mackinnon, the lead Commissioner, for his guidance and support and Chrissie Clarke for her exemplary assistance throughout this project.

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Glossary

Blended learning

A combination of online learning with more traditional, campus-based teaching and learning.

Online learning

Whereby all the learning, teaching and support services are done online.

Digital learning

Any type of learning that is accompanied by technology or by instructional practice that makes effective use of technology. It encompasses the application of a wide spectrum of practices including blended and virtual learning.

CBT

Computer based training, whereby the learner does not interact with a tutor.

PSRB

Professional, Statutory or Regulatory Body

MCA

Maritime and Coastguard Agency

MNTB

Merchant Navy Training Board

MET

Maritime Education and Training

Andragogy

The method and practice of teaching adult learners

Asynchronous learning

Asynchronous learning does not require real-time interaction; instead, content is available online for students to access when it best suits their schedules, and assignments are completed to deadlines.

Synchronous learning

Synchronous learning is online education that happens in real time, often with a set class schedule and required log-in times.

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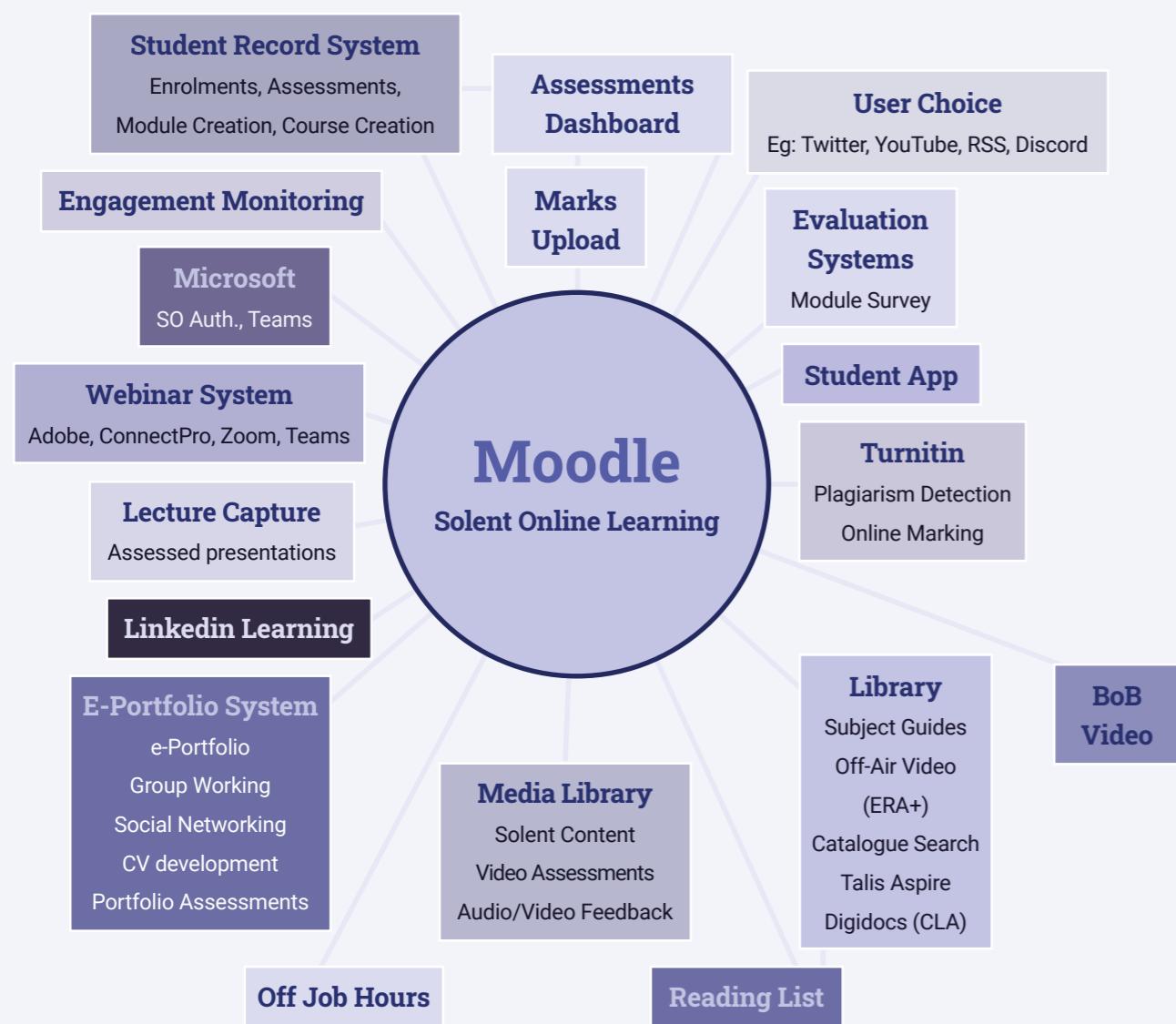
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A Annexe Solent Online Learning

A simplified diagram of the “eco-system” of solutions that together form the Solent Online Learning (SOL) platform.



B Annexe Student comments from Phase 2

Alternative and effective engagement tools

A widespread review of preferred online engagement tools across maritime provision at Solent at this time revealed Zoom to be the platform most common for content delivery and tutorials from an academic and student experience. Zoom was used regularly by most lecturers to good effect and yet is not necessarily reflected within the SOL activity reports despite having good levels of engagement.

The key benefits are seen to be its’ interactive and flexible features nature which can go some way to emulating the face-to-face experience.

The quotes below from lecturers and students illustrate the importance of professionalism, energy and duty of care for lecturers in creating engaging online environments:

‘...ZOOM is really good for orals prep delivery...’
Associate Lecturer in Nautical Science

‘I’m using Zoom for tutorials. Students will have watched a video, completed exercises and I get them to upload part of that homework to a blog activity so I can provide individual feedback. Students are also encouraged to use a forum to post questions that can be answered for all students to see. The Zoom tutorial is an opportunity to address common issues that arise in the homework.’

Lecturer in Nautical Science

Lecture capture as a key element of effective digital learning

Panopto is a specialist video solution widely used across higher education that allows the simultaneous recording of screens and various video and audio.

It, therefore, provides an effective and intelligent solution for lecture capture. Panopto will allow students to revisit lectures, search for content within the video, jump straight to the relevant section, bookmark a sector, make notes or start a discussion. At Solent University Panopto had already been used for several years to capture classroom-based lessons. However, the lecture capture tool Panopto, available in all online spaces, can also be combined with Zoom and Microsoft Teams to good effect, as the following quotes illustrate:

‘I tend to do a Panopto webinar lecture followed by a zoom tutorial. It works really well’
Senior Lecturer in Yacht Engineering

‘I have/am continuing to provide Panopto recordings which cover every topic on the syllabi for my timetabled units. These, in conjunction with other resources that I have uploaded to the various SOL pages, will enable all my groups to complete all units of study. The SOL material is supplemented by weekly online tutorial sessions using Zoom in which we discuss any problems that arise during the self-study periods. I encourage the cadets to email their class representative with these topic areas who in turn forward to me, so that we can make the best use of the online tutorial time’

Senior Lecturer in Maritime Engineering

‘I have been using Panopto to record Zoom tutorials, so they are available to those that haven’t attended the tutorial or for exam revision’
Lecturer in Nautical Science

‘I record Zoom live lectures and put them on SOL. Works very well’
Senior Lecturer in General Engineering

Such examples provide rich opportunities for students to engage in ways that facilitate deep learning should they wish to avail themselves of it. They are encouraged to attend these sessions or, if time-zones and circumstances do not allow them to fully engage with Zoom or Microsoft Teams, to access the material retrospectively. A lecture capture platform also provides lecturers with the ability to measure and analyse the student's engagement with the captured lecture.

It is important to note that student engagement is seen as being dependent on maintaining structure and purpose:

'I am continuing to provide Panopto recordings which cover every topic on the syllabi for MEN 406, MAE 403 and MAE 407 as per my timetabled units. These will be in conjunction with other resources that I have uploaded to the various SOL pages...SOL materials will be supplemented by a couple of Zoom sessions'

Senior Lecturer in Maritime Engineering

Evidence of impact from students

Student satisfaction remained high, despite the very rapid pivot, both when measured with Your Module Survey and Short Course Evaluation Questionnaires, which also manifested itself in the qualitative comments:

'Session was great ...'

2nd Year Yacht Engineering Student

'...the class really does appreciate and respect what you are doing for us and all do enjoy your lessons ...'

3rd Year Maritime Business Student

Whilst this phase, due to the rapid pivot mostly focusing on replicating the activity that had happened in the classroom into a digital format, there is evidence of the beginning of a more fundamental shift. One example thereof is adapting lecture capture to better suit revision of threshold concepts

for upcoming assessment which proved successful as the following feedback shows:

'Yes, the videos are especially useful and good for revision, as they are shorter than the lectures captures.'
Senior Deck Course Student

International students and students aboard can continue to learn

The development and uploading of new online study materials was greatly appreciated by those international students such as the one below who had needed to return to India:

'I went through the study material you have uploaded on our module and I just mailed you to thank you for the same. It's everything I need to start studying by myself in future. Thank you.'

Officer of the Watch Student

The importance of maintaining motivation

Digital learning requires a higher degree of self-motivation by the learner, not least due to the reduced direct interaction between peers and also between learners and lecturers. This situation would have been further exacerbated by the national lockdown, which was curbing human interaction by its very definition.

The motivational aspects of live sessions as part of online learning were therefore fundamental, as highlighted in students' comments below:

'Overall, I find the zoom meeting to be really helpful as you explain everything very clearly and help me understand it much better than I could alone. It's also refreshing as it adds a human aspect rather than just reading slides and PDFs all the time which can get tedious'

2nd Year Maritime Business Student

*'The Zoom session has come in very handy, especially in these times.
Visually connecting is the closest we can get to motivating ourselves again'*

Phase 3 Foundation Degree Nautical Science

However, it is vital to embed opportunities for discussion and asking questions within online spaces:

*'Thank you, a lot, for your answers'
'Thank you for your immediate response.
You have made it truly clear'*

Masters' students in Maritime in Maritime Science

More frequent and more detailed communication required

In the traditional model, most communication and discussion would have taken place in the classroom. All communication could be broadcast to all attendees simultaneously, and any questions could be discussed in a group. In an entirely digital setting, this situation changes, early and concise communication is more critical than ever. Ideally, this is done by utilising the online learning platform to keep all information together and also to be able to use the forum functionality for discussion, although that discussion now largely became asynchronous compared to the classroom setting.

Communication is vital and around assessments as shown by the student feedback below:

'Thank you for changing the format of the assignment and letting us know in advance'
3rd year Yacht Engineering Student

What appears to engage students most is clear and constructive feedback as to how they might improve in future endeavours:

*'Thank you for your feedback on sale and purchase.
.....You too stay safe and I highly appreciate your continued support'*

First year student in Maritime Business

The extent of individualised and personalised feedback is not necessarily captured via reports, yet students receive it continually via email and in Zoom tutorials

*'I will have a look at the case now.
Thank you for sharing'*

First year student in Maritime Business

What about those who do not engage?

A crucial role is played by academic staff in the school is reaching out to those who have not engaged:

'I have been busy with a lot of things including family matters I will switch gears in regards to my studiesthank you for your concerns'

Second year student in Maritime Business

Several students are completing final year individual projects in specialist areas which whilst SOL provides the resources and guidance require their supervisors to respond on a one-to-one basis inappropriate for general forums. The quotes below show how responses from lecturers encourage further effort:

'I really appreciate your help, this seems both interesting and useful to my project's progression and I shall give [the lecturer] an email, many thanks'

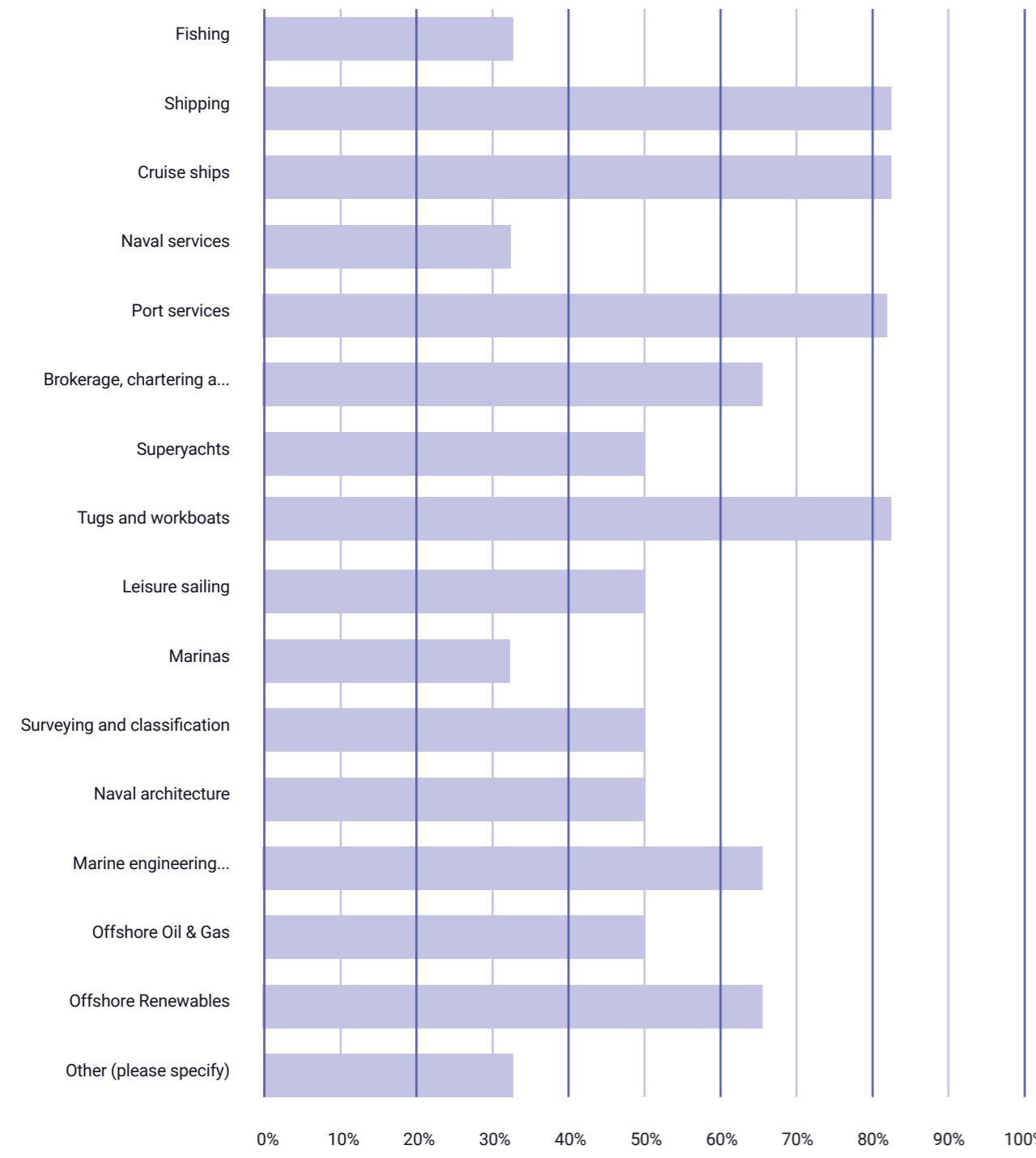
'Thank you for your reply ... I'll get researching'

'Please find attached my reworked discussion with the three cases in'
Final year students in Maritime Business

C**Annexe****Maritime sectors served by surveyed providers**

Which maritime sectors do you serve (choose as many as apply)?

Answered: 6 Skipped: 0





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