

Building towards inclusivity & diversity in marine science: awareness of digital twinning in marine scientists of the future



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Motivation

- Fieldwork is seen as entry-way into marine science career
 - Is this true for both incoming and established scientists?
- Limitations of fieldwork may create barriers
 - How can we raise awareness of alternative routes into the discipline?



Barriers to Fieldwork

Family

- Inaccessible to those with caring responsibilities (Giles et 2020)

Disability

- Intensity and long hours are physically and mentally demanding (Giles et al 2020)
- Physical mobility and negotiation of vessels (Stokes et al. 2019, Hall & Healey 2005)

Mental Health

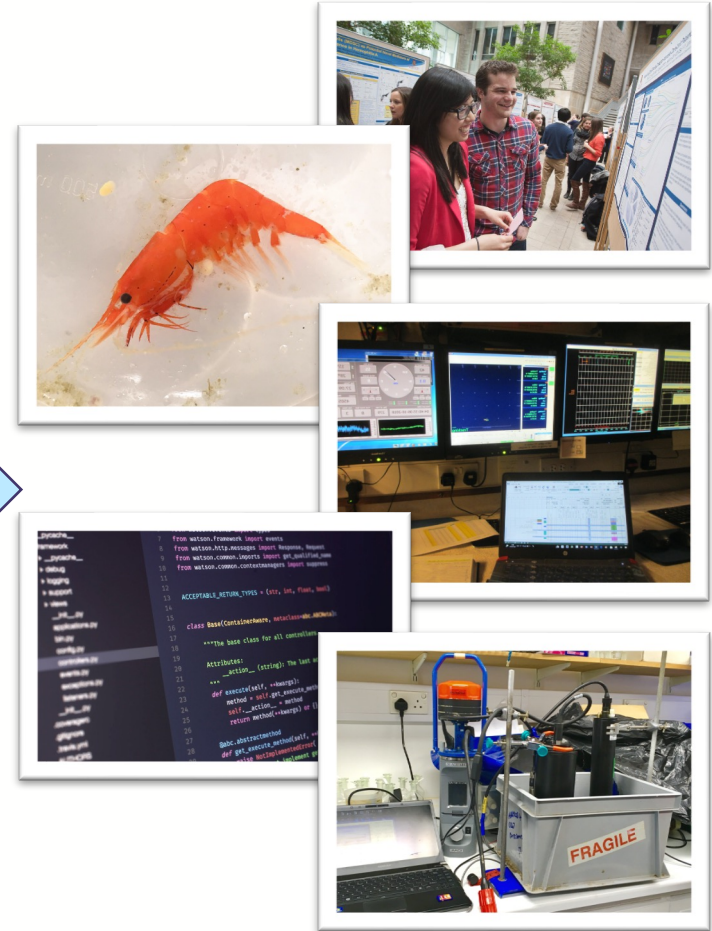
- Removal from familiar environments and support structures (Stokes et al 2019, Hall & Healey 2005)
- Hostile environment (extreme cold, isolated), social anxiety, fear of failure (John & Kahn 2018)



Perceptions of Marine Science



In reality...



Marketing of the discipline does not match up with the range of skills required [Mol & Atchison, 2019]



Study Themes & Outcomes

How does the field appear externally?

- Review of job adverts
- Image analysis of websites

What do people entering the field think is required?

- Student questionnaire & focus group

What do those IN the field expect for a career?

- Questionnaire
- Workshops

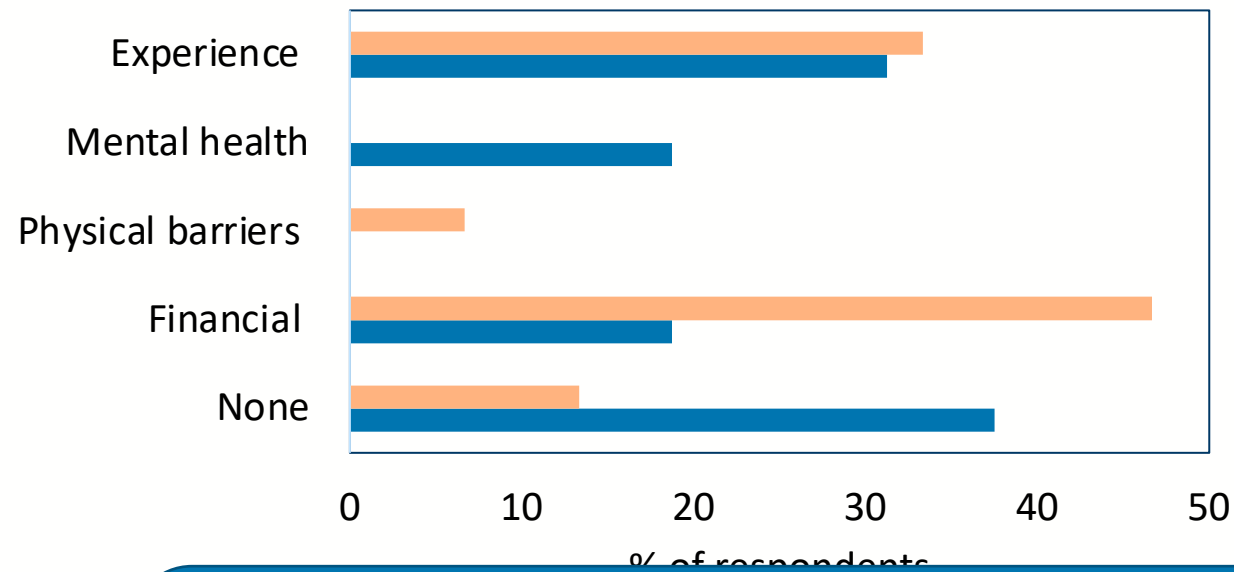
How do we raise awareness of other aspects of the career?

- Online course

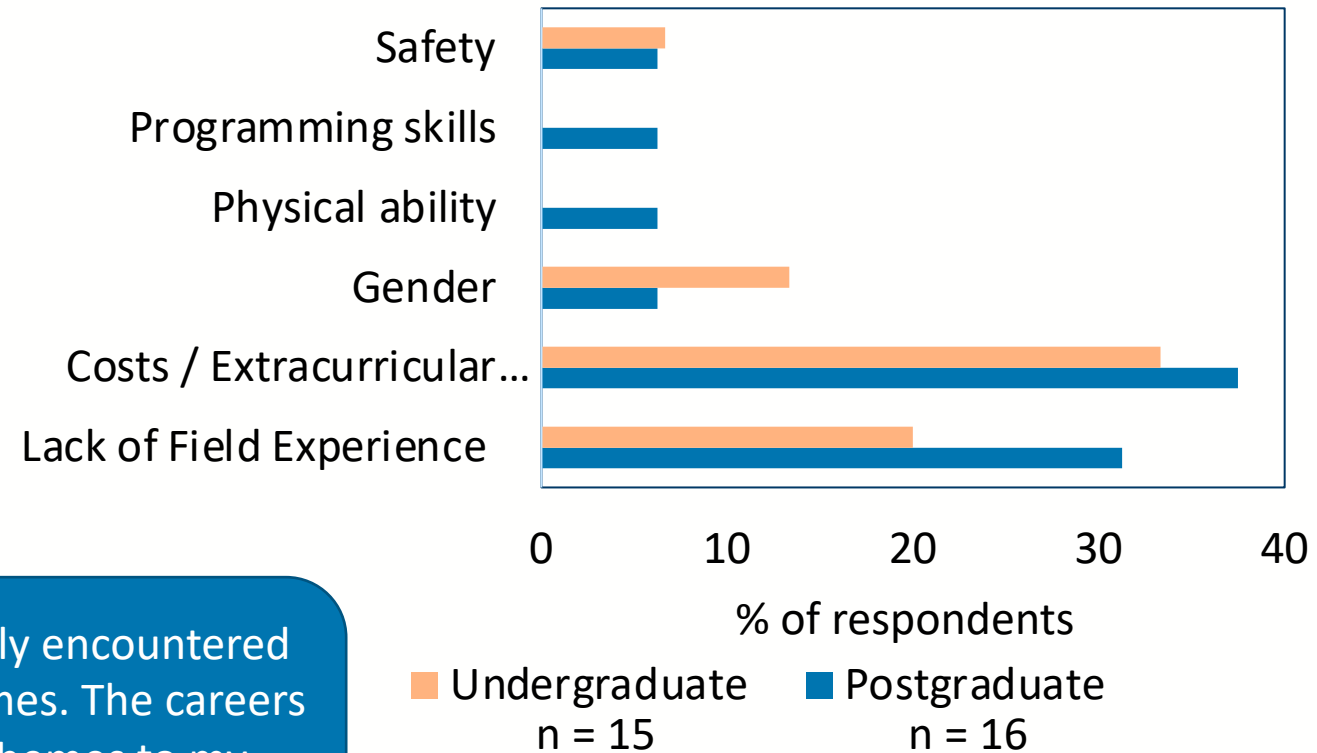
Thematic analysis

Student perceptions - barriers

Do you feel you would or have you ever experienced any barriers to participating in fieldwork?



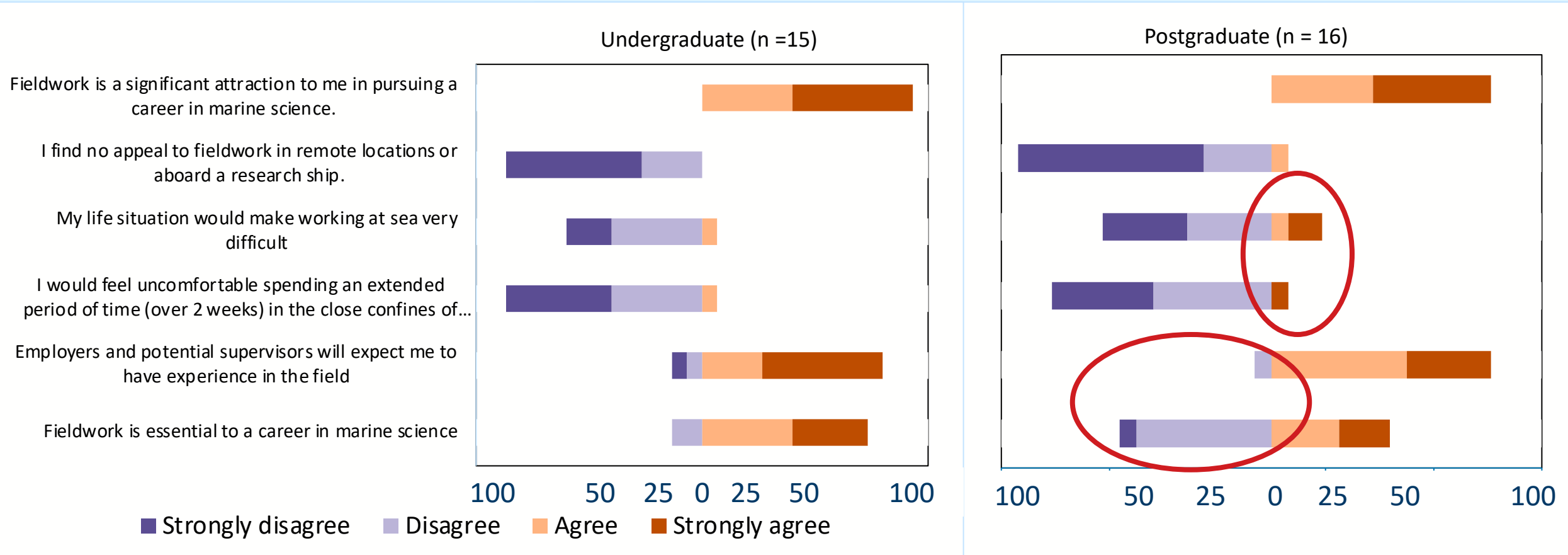
Do you have any concerns related to field work in the marine science?



I feel expense is a big barrier when the most commonly encountered opportunities online are often pay to participate schemes. The careers department of my institution has promoted such schemes to my cohort, and allowed them to advertise at careers fairs too. I think such schemes can be highly exploitative.

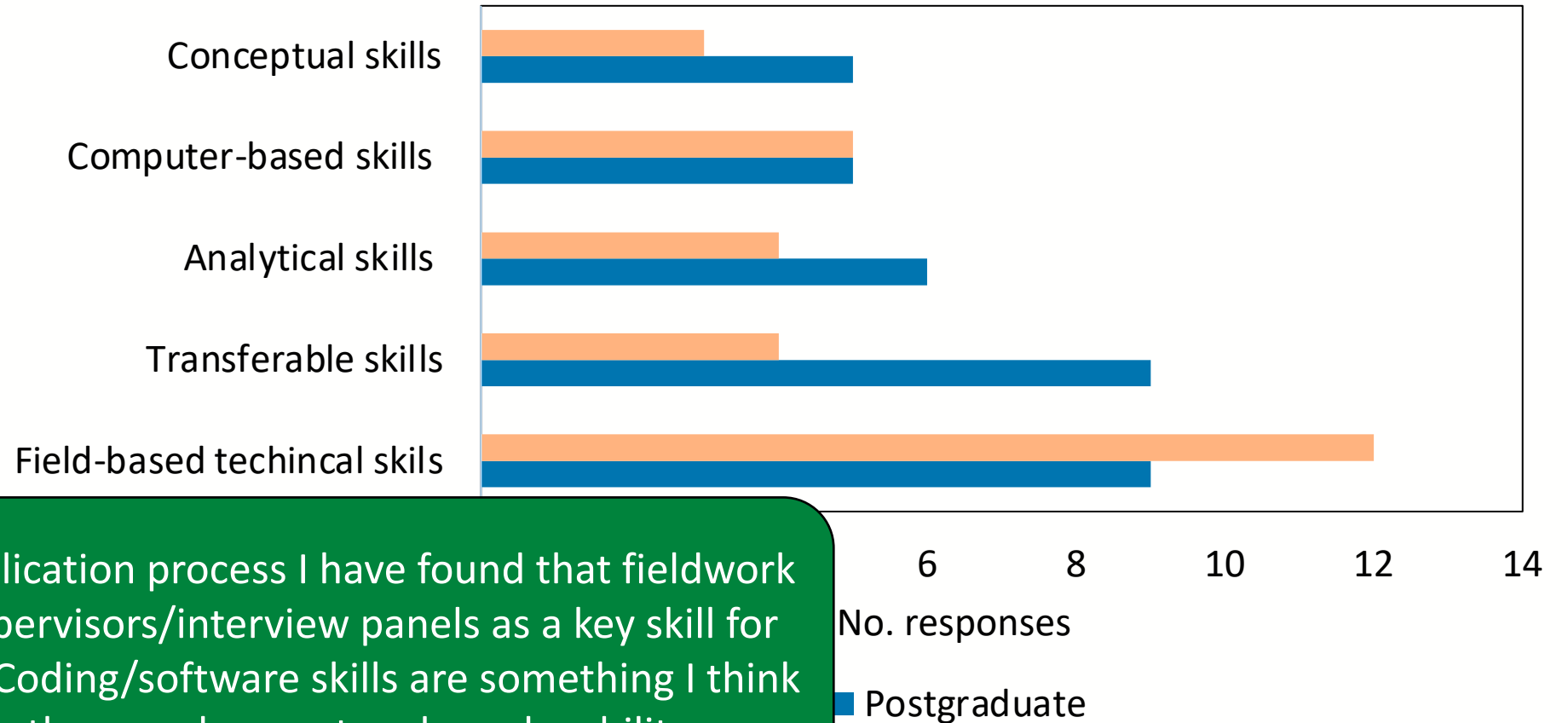
Osiecka et al. 2021

Student perceptions - fieldwork



Open-ended questions

What skills do you see as important?



Throughout the PhD application process I have found that fieldwork is discussed by most supervisors/interview panels as a key skill for what I am applying for. Coding/software skills are something I think are important for further employment and employability.

Conclusions

I think [digital twinning] is an important part of fieldwork but worry about it making in person fieldwork redundant...[I find it] less appealing however integrating the digital knowledge with in-the-field observations is a vital part of marine science one can't survive without the other

Potentially, it would depend on where I was in my career. As I am quite young and want to be outside currently, the idea of being stuck behind a computer all the time is not as appealing, but later on I might prefer digital twinning, particularly if I have a family.

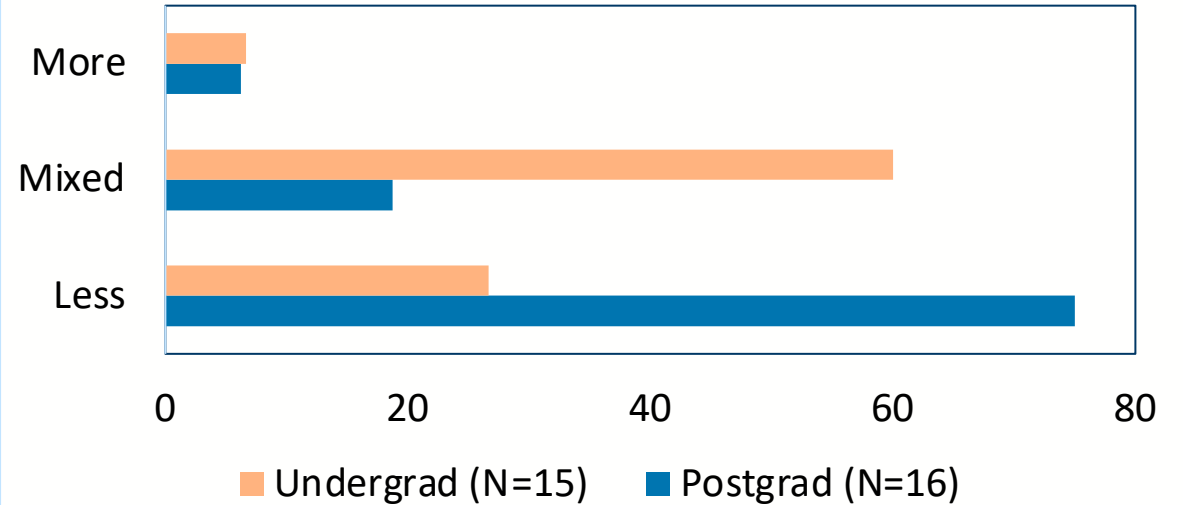
Way less. I love the relationships you build with others whilst on a cruise. You all rely on each other and work towards a common goal. I deeply enjoy being at sea and being a part of a team. I am more than happy to be on board and provide information virtually for those on shore however!



In summary

- Majority view is barriers are financial
- Good appreciation for digital skills, but not motivator to join discipline
- Importance of teamwork link & knowledge exchange needed

Would digital twinning be a more or less appealing career option to you than field-based marine science?





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Staff Survey



Student Survey



Thank you!

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References

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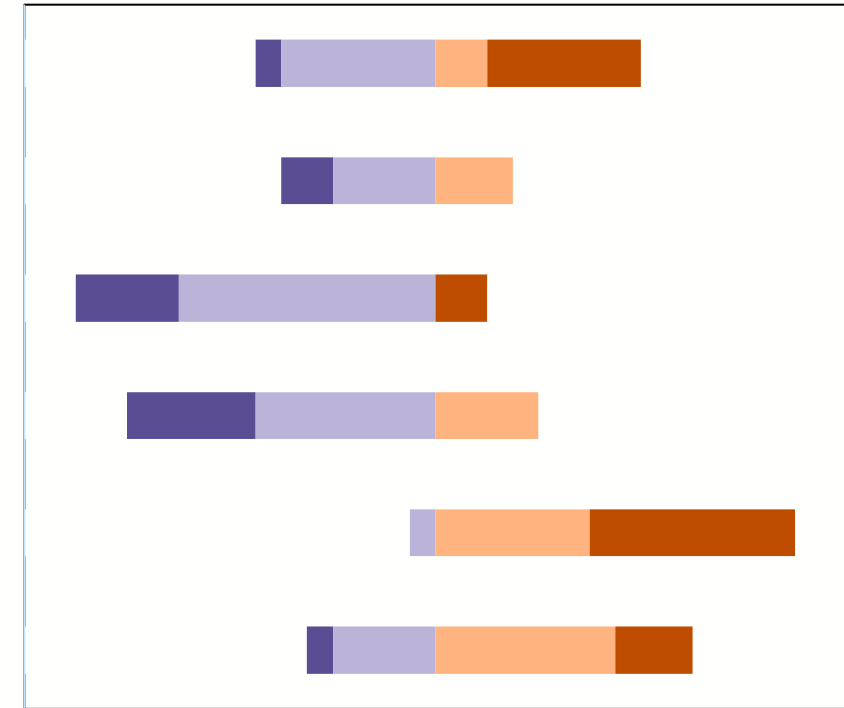
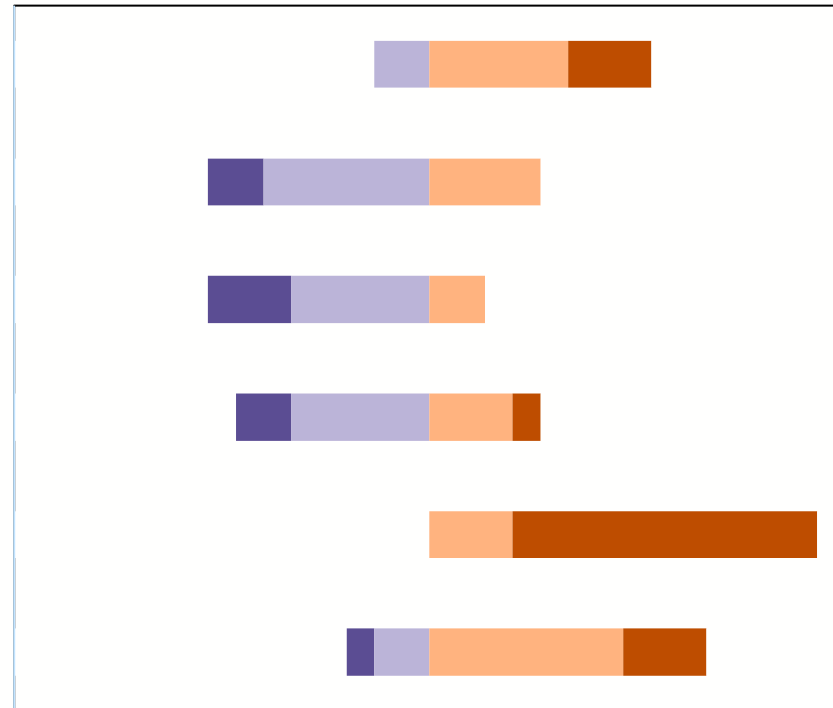
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Student perceptions - digital twinning

Undergraduate (n = 15)

Postgraduate (n = 16)

- A career with few overnight stays or travel would be a significant attraction to me.
- I find no appeal to research that consists of largely of computer-based work.
- The most motivating part of a career in marine science is remote techniques and modelling.
- I would feel uncomfortable spending an extended period of time doing computer-based work.
- Employers and potential supervisors will expect me to have experience in remote techniques and/or computer skills.
- Computer modelling is essential to a career in marine science



100 50 25 0 25 50 100 100 50 25 0 25 50 100

Strongly disagree Disagree Agree Strongly agree