WRIPA & SEPnet Joint Workshop
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Exploiting Discipline-Based Education Research and its impact on student engagement

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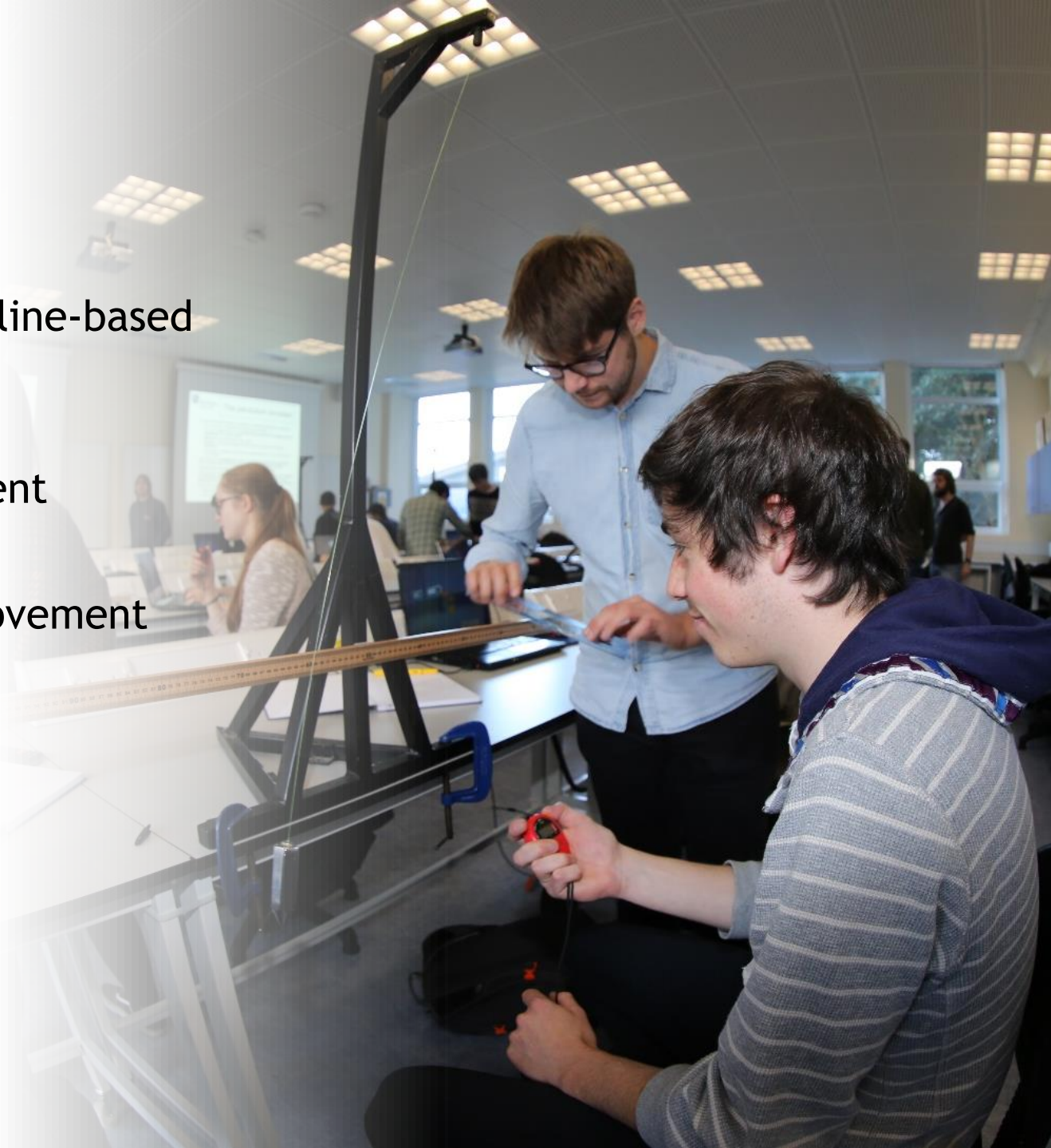
Overview

- Motivation- Discipline-based education research
- Student Engagement
- Approach of improvement
- Case study
- Conclusion



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“Quote”

“… universities should treat learning(and teaching) always consisting of not yet wholly solved problems and hence always in research mode.” (Humboldt, 1810 translated 1970, quoted by Elton, 2005, 110)

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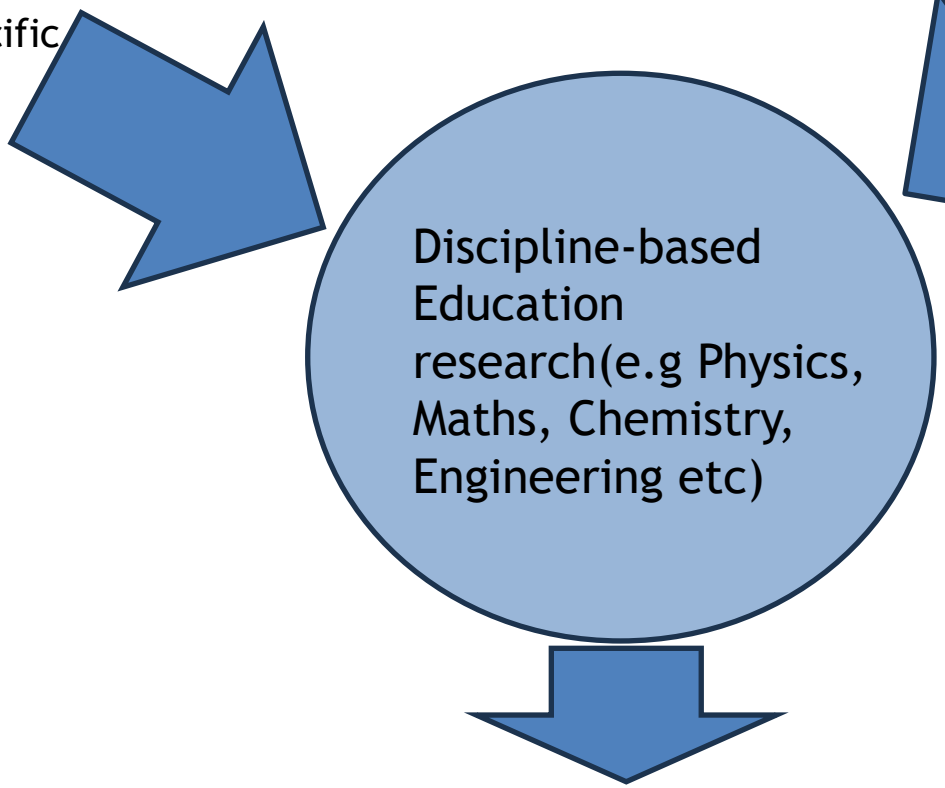
Elton, L (2005) Scholarship and the research and teaching nexus, in: R. Barnett (Ed.) Reshaping the university: new relationships between research, scholarship and teaching, 108-118. Maidenhead: McGraw-Hill/Open University Press

Discipline-based education research



Brookfield's lens

- Self
- Peer
- Student
- Literature

Brookfield, S. D. (2017). *Becoming a critically reflective teacher*. John Wiley & Sons.

- Evaluate teaching approach
- Understand the pros and cons
- Develop an effective teaching strategy
- Improve student engagement and learning outcome

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Student engagement

Engaged student demonstrates:

1. Interest
2. Motivation
3. Attention

- Student engagement: Involving students in their learning.
- Belonging and learning

High engagement → Improve academic performance

Kuzminykh, I., Ghita, B., & Xiao, H. (2021, August). The relationship between student engagement and academic performance in online education. In *2021 5th International Conference on E-Society, E-Education and E-Technology* (pp. 97-101).

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Approach to improve student engagement

Technology and simulators

Active learning techniques

- Enquiry-based learning
- Peer-led learning

Development of interactive activities

Continuous Assessment

Feedback mechanism

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Technology/Digital tools

Technology/Digital toolsAteş, H., & Köroğlu, M. (2024). Online collaborative tools for science education: Boosting learning outcomes, motivation, and engagement. *Journal of Computer Assisted Learning*.

Nielsen, W. (2015). Promoting engagement in science education. In *Student-generated digital media in science education* (pp. 4-12). Routledge.

Bond, M., Buntins, K., Bedenlier, S., Zawacki-Richter, O., & Kerres, M. (2020). Mapping research in student engagement and educational technology in higher education: A systematic evidence map. *International journal of educational technology in higher education*, *17*, 1-30.

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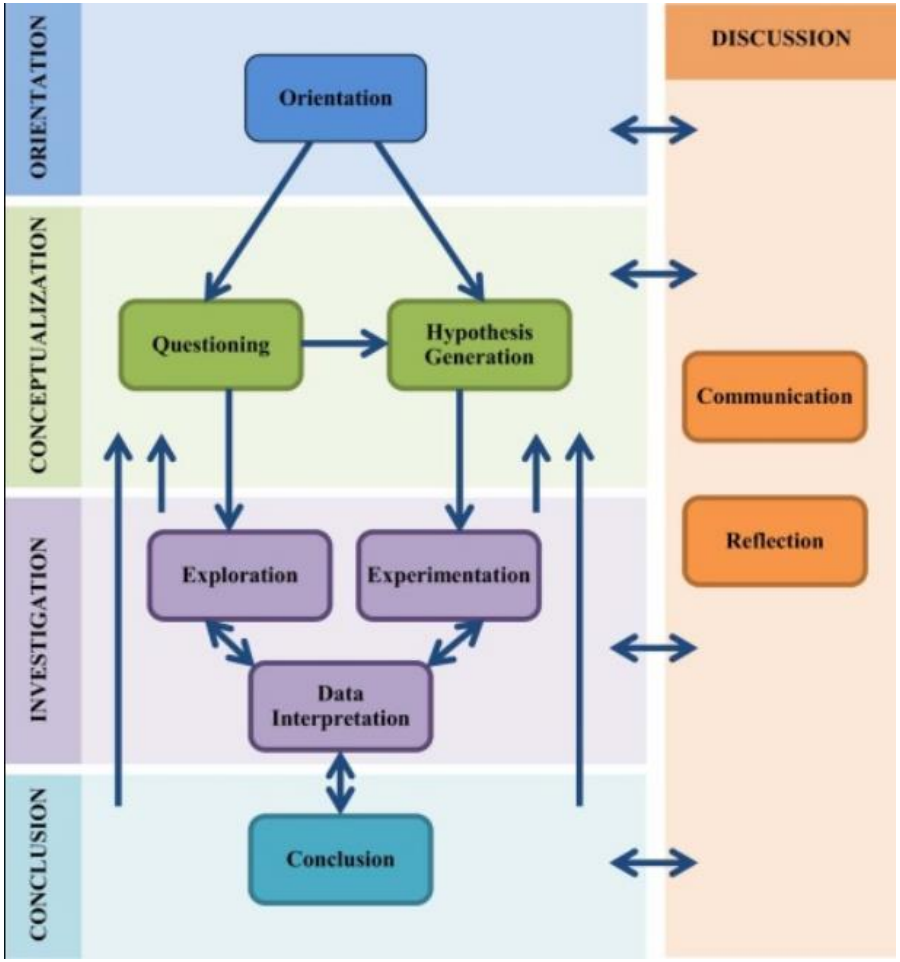
Active learning techniques

- Enquiry-based learning
- Peer-led learning

Enquiry-based learning



Pedaste, M., Mäeots, M., Siiman, L. A., De Jong, T., Van Riesen, S. A., Kamp, E. T., ... & Tsourlidaki, E. (2015). Phases of inquiry-based learning: Definitions and the inquiry cycle. *Educational research review*, *14*, 47-61.

Sachs, J., & Parsell, M. (2013). In *Peer review of learning and teaching in higher education: International perspectives* (pp. 1-9). Dordrecht: Springer Netherlands

R. Dalka and T. McKay, PERC 2019 Proceedings, 123-128.

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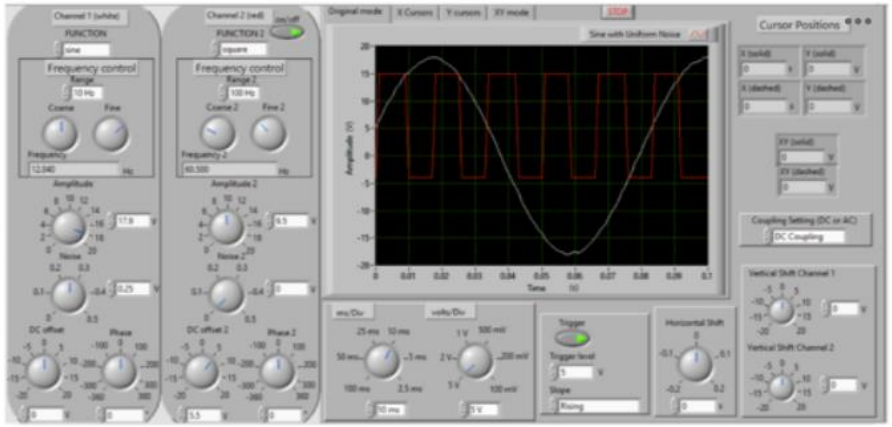
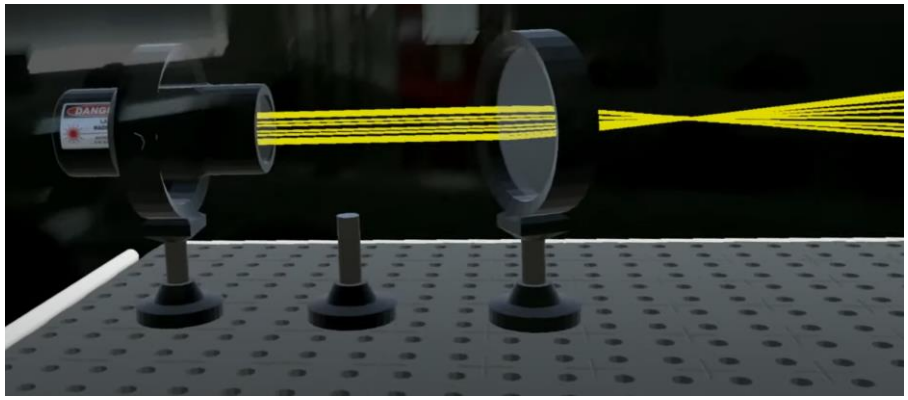
Interactive tools/activities

Virtual Oscilloscope-Prelab task



Virtual optical table



Nolan, S. J., Rees, S., & Rushall, C. (2016). Breaking Barriers: Overcoming Anxieties in Practical Science. *Widening Participation, Higher Education and Non-Traditional Students: Supporting Transitions through Foundation Programmes*, 73-88.

Dhar, P., Rocks, T., Samarasinghe, R. M., Stephenson, G., & Smith, C. (2021). Augmented reality in medical education: students' experiences and learning outcomes. In *Medical Education Online* (Vol. 26, Issue 1). Taylor and Francis Ltd.

Schneider, B., & Radu, I. (2022). *Augmented Reality in the Learning Sciences*.

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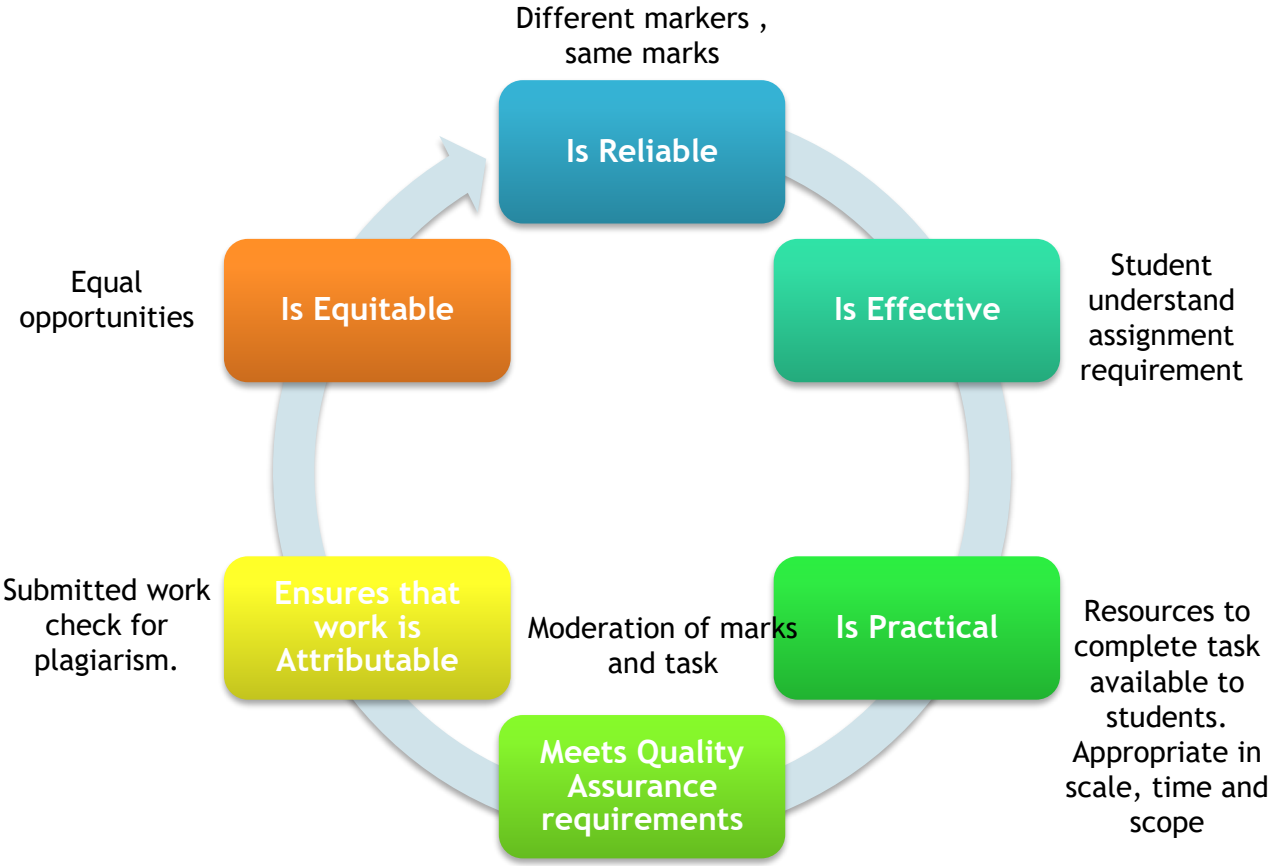
Assessment and feedback



Bloxham, S., and Boyd, P. (2007) *Developing effective assessment in higher education: a practical guide*. Maidenhead: Open University Press.

McDowell, L. (2012) *Handout used in PGCert in Higher Education Practice*, Northumbria University

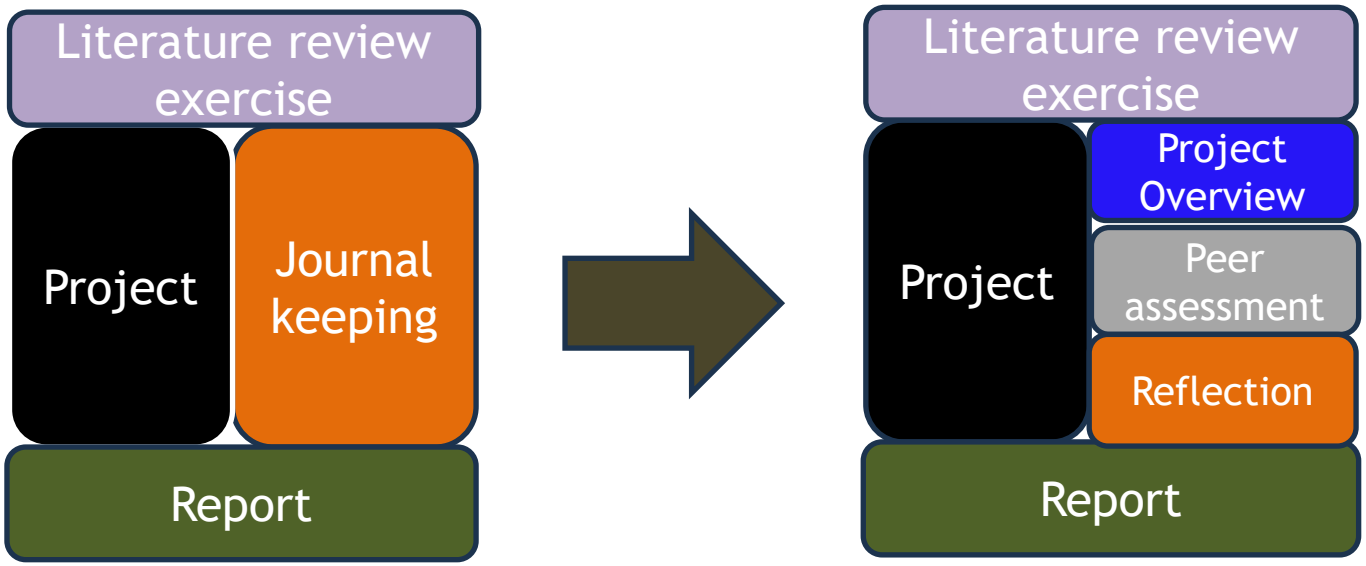
QAA (Quality Assurance Agency) (2012) *Understanding assessment: its role in safeguarding academic standards and quality in higher education: a guide for early careers staff*. Second edition. https://dera.ioe.ac.uk/id/eprint/12286/7/UnderstandingAssessment_Redacted.pdf[last accessed on 08June,2024]

Case study: Lab project

Module section information:

- Open-ended project
- 12 projects available
- Contributes to 32% of total module mark
- 6 weeks project period -3 hours per week

Model of delivery



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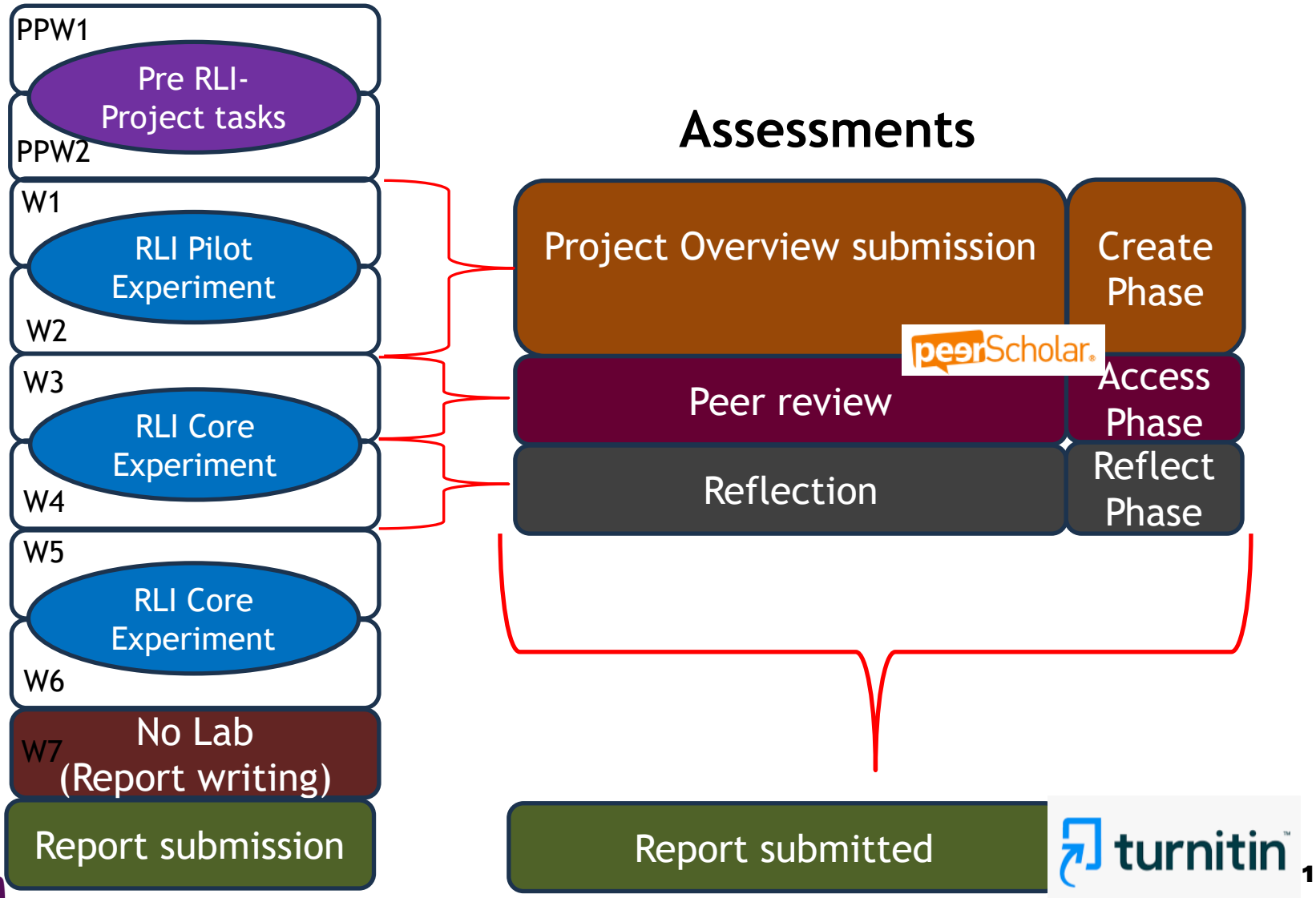
Schedule of Activities



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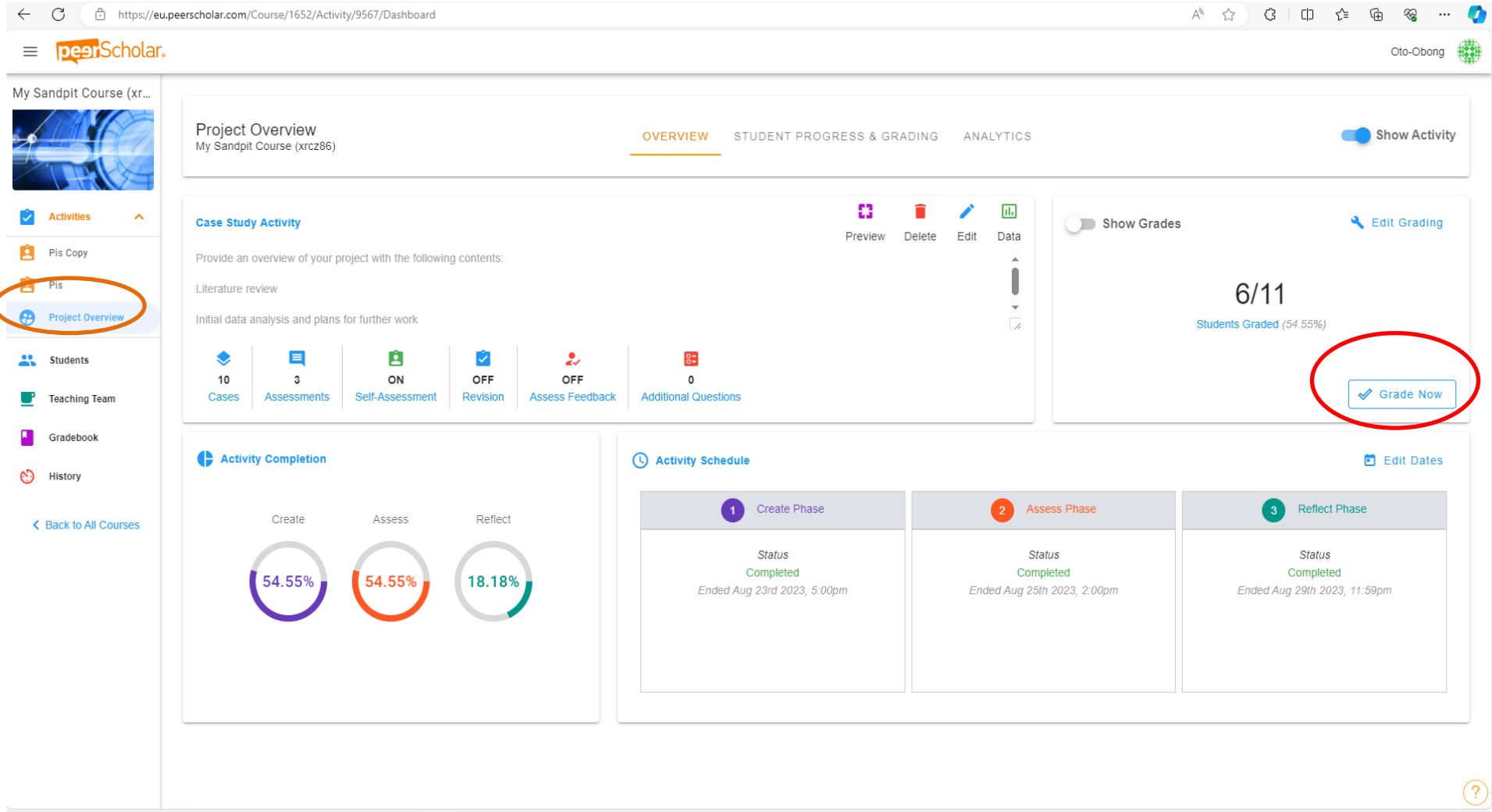
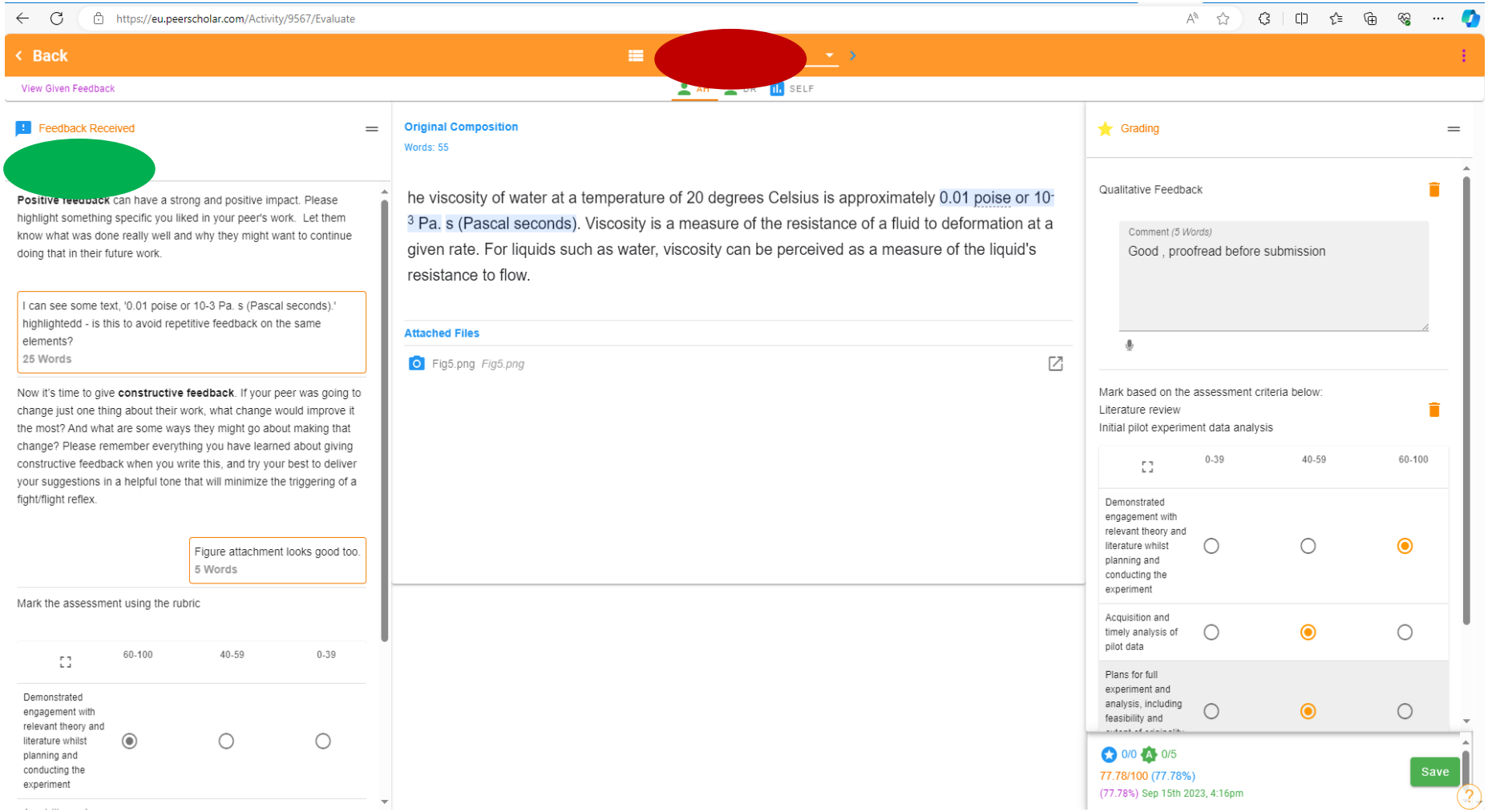
Project Overview- PeerScholar



Project Overview- Marking



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Statistics

Previous model:

- Over 67% of the students added to the journal in the last week of the project(i.e 33% engaged as expected).

New model

- Create Phase – 99%
- Assess Phase- 89%
- Reflect Phase- 59%

Merit:

- ❖ Better understanding of the proforma
- ❖ Draft of Report introduction
- ❖ Timely feedback to improve work

Demerit: No reward for participating in the reflect phase

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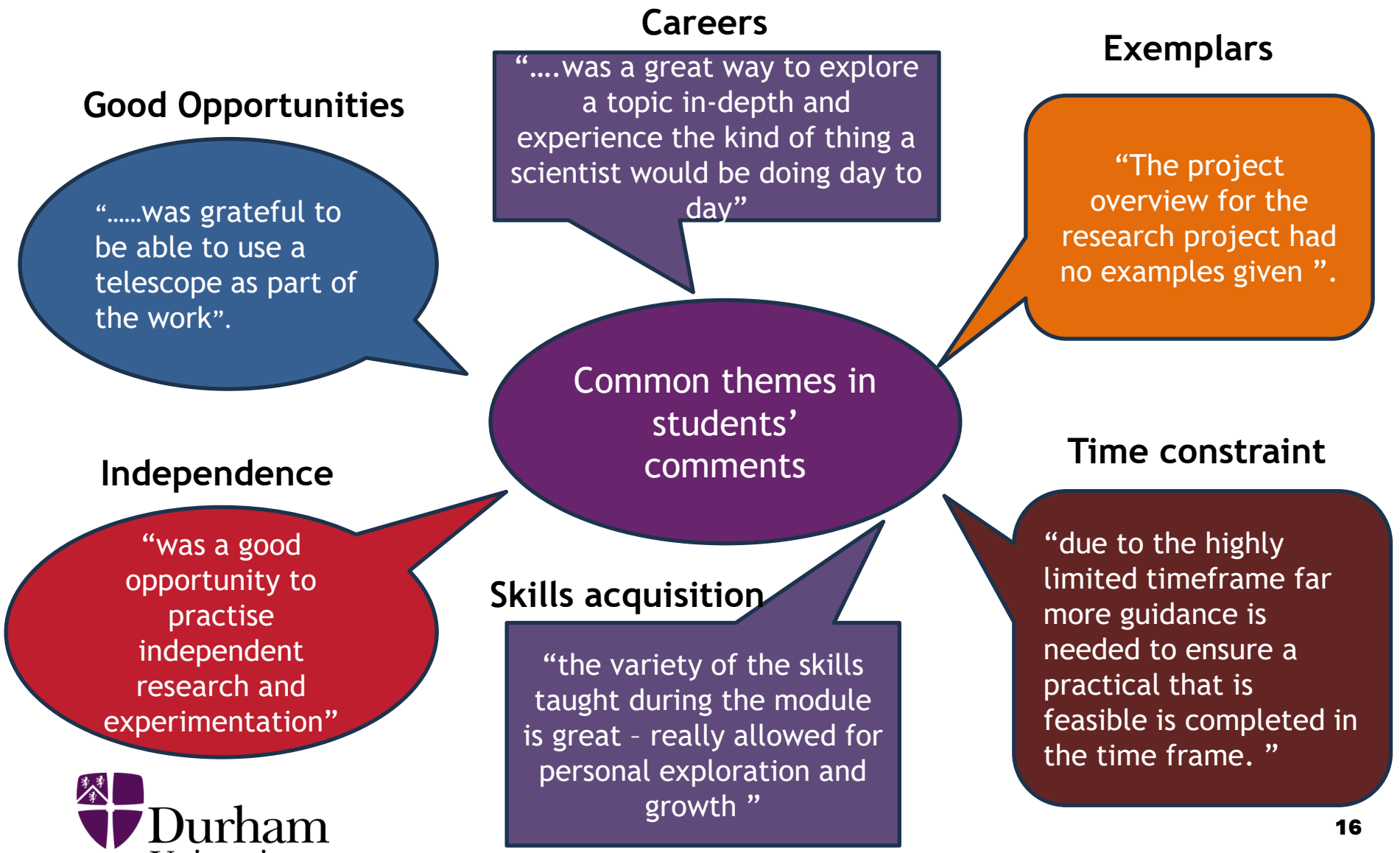
Students' comments



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Conclusion

- DBER has positive implications in today's Physics classrooms and laboratories.
- The application of a suitable approach to teaching and learning can significantly improve Student Engagement
- Teaching and learning are still in research mode! Hence the research continues☺

THANK YOU

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Questions/Discussion and Food for Thought

Questions for discussion:

1) What active learning strategies have you used to improve student engagement in
   a. Lab-based module
   b. Teaching module
2) In your department/School how have you utilised feedback and continuous assessment as effective tools to enhance student engagement?
3) What factors do you consider, when selecting a tool to enhance student engagement?
4) What are the indicators of improved student engagement?

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