

Should virtual learning mean on-screen learning?

What are the implications of providing virtual learning entirely through on-screen learning resources?

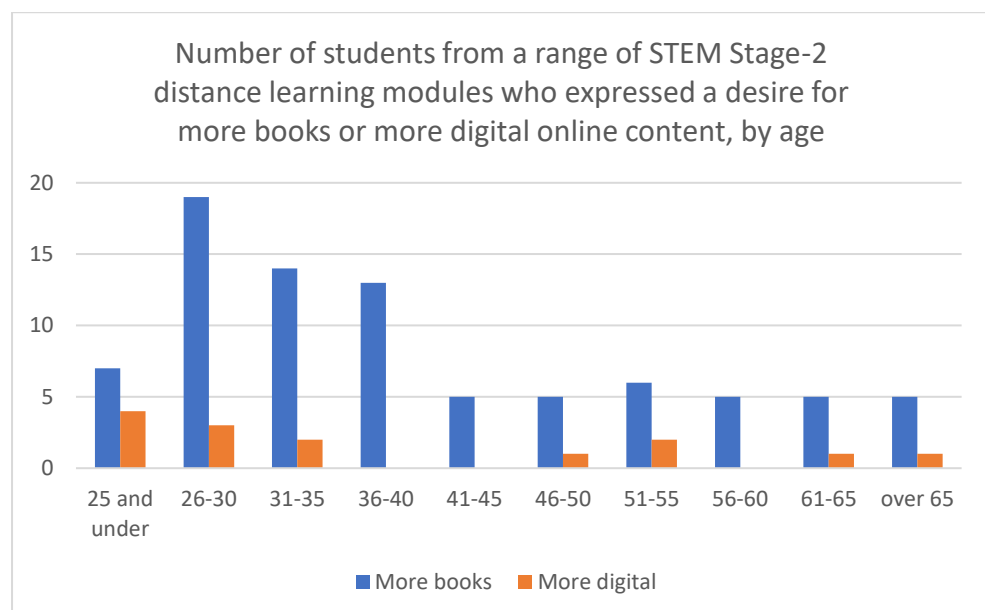
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A study was carried out looking at how Open University distance learning STEM students use on-screen and paper-based learning resources on a range of Stage-2 (second year undergraduate) modules. 1198 students were invited to participate, and 18.8% responded.

Data from this study is used to investigate the impact of having to move to entirely on-screen study for second year undergraduate Physics students, taking advantage of the introduction of a new entirely on-screen Stage-1 module to make comparisons. Based on this, the importance of including paper-based resources in the design of a course for virtual study is considered.

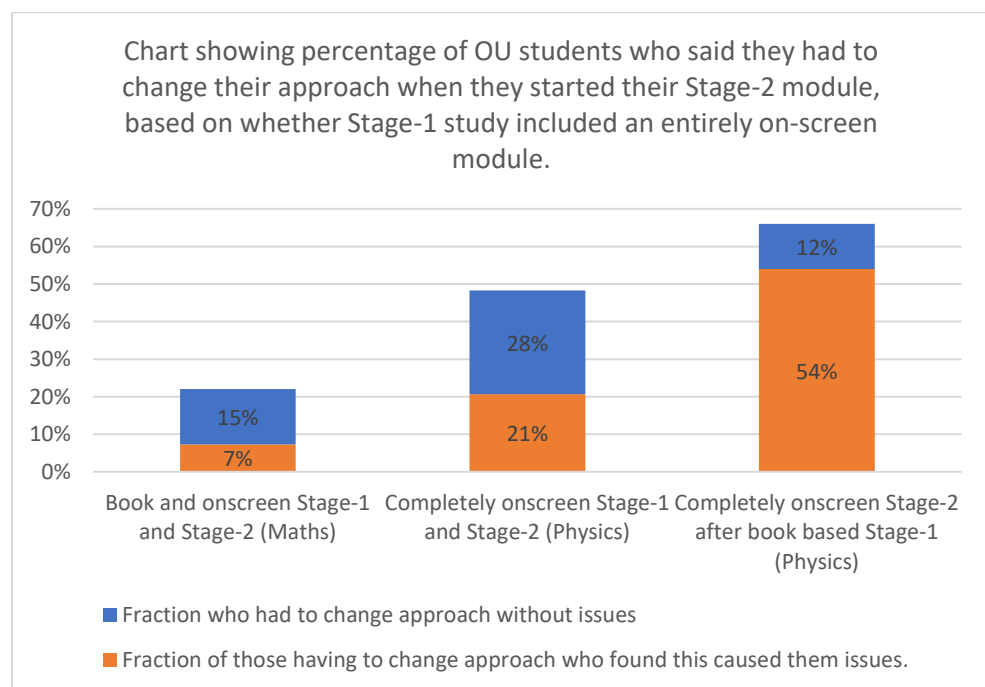
What do students say they want?

Most students still prefer book-based resources, and this is not dependent on age.^{2, 4}



What do students think causes them problems?

Students perceive that moving to entirely on-screen study causes them issues⁵



What does the data show?

a) Results indicate that having to move to entirely on-screen study suddenly has an impact on student success^{1,3}

Students who had completed an entirely on-screen Stage-1 Science module before the entirely on-screen Stage-2 Physics module were more likely to pass the Stage-2 module. This was despite the content of the entirely on-screen Stage-1 module offering less physics and less opportunity to apply maths skills to science questions than the alternative Stage-1 Science module which had books supported by online resources. (Both sets of students had also completed a book-based Stage-1 maths module supported by online resources).

This appears to indicate that having experience of studying entirely online at Stage-1 is a better preparation for entirely online Stage-2 study than covering more relevant content at Stage-1. Due to the high number of part time students at The Open University it is difficult to apply statistical tests to this data, and alternative methods of confirming the robustness of this finding are currently underway.

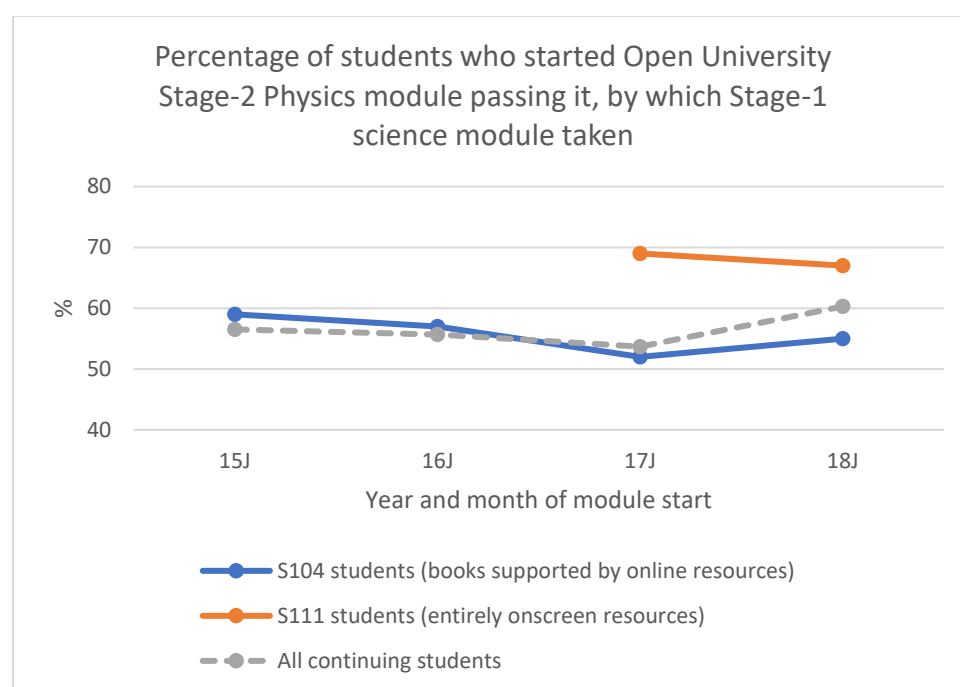


Chart showing percentage of students passing entirely on-screen Stage-2 Physics module, split by whether they had completed an entirely on-screen Stage-1 module. The entirely on-screen stage-1 module S111 was introduced from 2016. In 17J around 22% of students had taken S111 rather than S104, in 18J 58% of students had taken S111 rather than S104.

What does the data show?

b) Students suddenly expected to switch to entirely on-screen study seek alternative paper-based study resources.

In the OU study students were asked what methods they used to study their distance learning modules. Online quizzes and computer marked assignments were the most used on-screen method, doing exercises/ taking notes on paper was the most common off-screen method. This was true regardless of whether the module was entirely on-screen, or a combination of books and on-screen material.

The results also indicated that those suddenly expected to study entirely on-screen compensate primarily by:

- increasing their use of printed pdfs of the on-screen content
- making more use of books acquired from elsewhere
- and to a lesser extent by using more external digital resources

Students do not react by taking more notes digitally, or by annotating digital resources more.

Conclusions

- Students of all ages need time to learn how to study online
- Paper based resources are an important part of a Physics virtual learning package.

Next steps

In 2019 the OU chose to provide printed copies of all the module material for the Stage-2 Physics module. Covid-19 will have an impact on the final results, but preliminary indications are that doing this increased retention and grades in module assignments. This will be monitored again in 2020.

References

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- ³ Novak, Daday & McDaniel, (2018), 'Assessing intrinsic and extraneous cognitive complexity of e-textbook learning'
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- ⁵ Sidi, Shpigelman, Zalmanov, & Ackerman, (2017), 'Understanding metacognitive inferiority on screen by exposing cues for depth of processing'