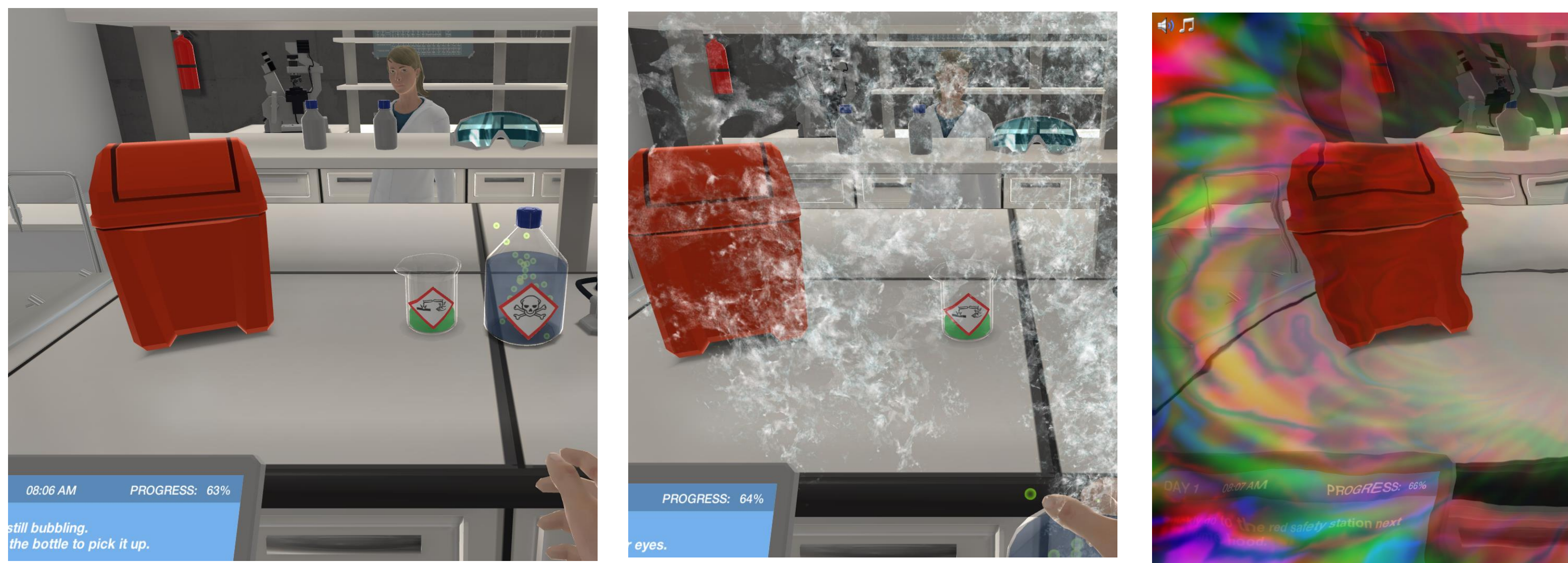


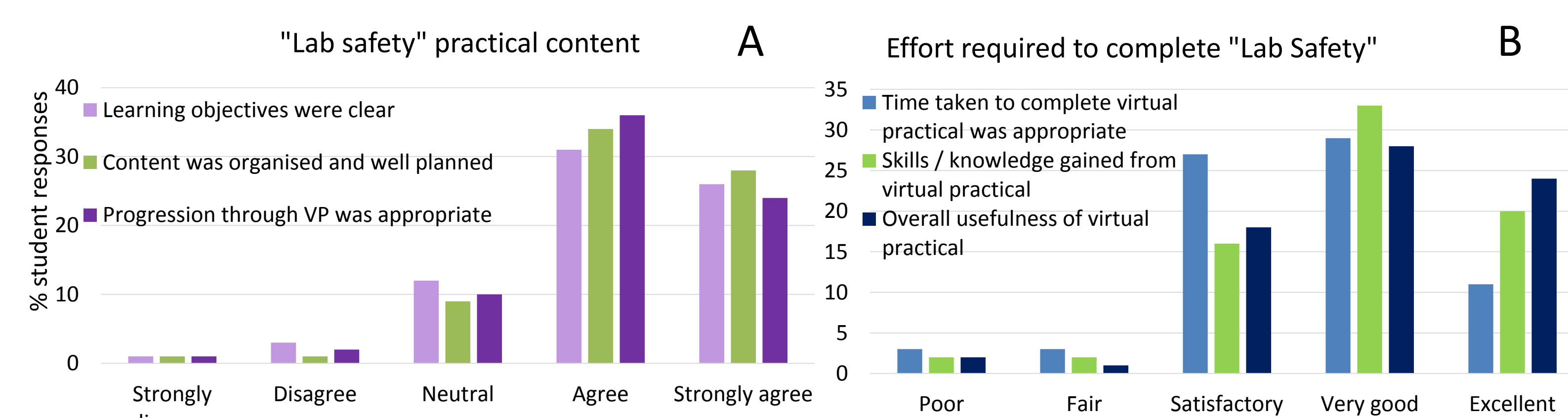
Virtual laboratory simulations can be used to provide students with an introduction to the laboratories; further they allow students to have safe and 24 h access to learn laboratories skills. The Labster simulations contain theoretical questions which must be correctly answered before the user can progress to the next stage. Further supplementary theory is available throughout the simulation. Following pilot studies last year; we now report on 2 cohorts of students who used the Labster simulations within core modules.

**Case 1: 1<sup>st</sup> year core Biochemistry module** (350 students) used the Labster “Lab Safety” simulation as a formative exercise, which introduced safety equipment and good laboratory practice (images from the simulation below). The “Lab Safety” learning outcomes aligned with one of the Biochemistry module learning outcomes (LO).



207 students started (197 completed) the simulation. All students were invited to complete a survey. This cohort had not previously used Labster.

**Results:** 89.0% of students surveyed (n=73) in this cohort agreed that the Labster virtual simulation had prepared them for the actual Biochemistry module practical class with students agreeing or strongly agreeing that the simulation had made them more aware of safety hazards in the laboratory, safety equipment and how to work and act in the laboratory.



Students agreed that the Labster LO were clear; that the content was well organised and planned with appropriate progression at each stage through the simulation (panel A). Students thought that they had gained skills and knowledge from the simulation and that overall it had been useful. There was a left shift to satisfactory / very good when asked about the time required to complete the virtual practical (Panel B).

The benefits of Labster may be exaggerated as the surveys are biased towards more engaged students completing them, compared to the number registered on the module and attempting the Labster simulations.

#### Future work:

Labster simulations have been favourably reported on by students in both level 4 and 5. However a challenge remains to encourage all students to complete the simulations. Participation was greater in the level 4 module where the Labster Learning Outcomes aligned more closely to the module Learning Outcomes.

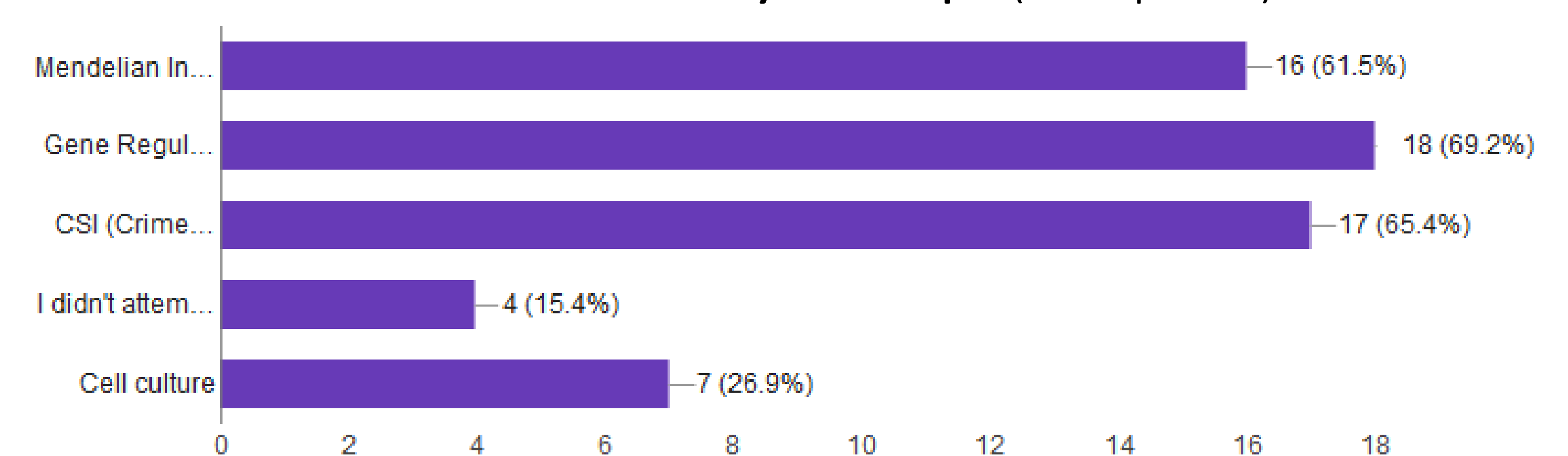
**Case 2: 2<sup>nd</sup> year Molecular Biology & Genetics module** (68 students). Students were given access to Labster “Gene Regulation” and advised that this could be on the summative in-class test. They were also given access to Labster “CSI”, “Cell Culture” and “Mendelian Genetics”.

#### Results:

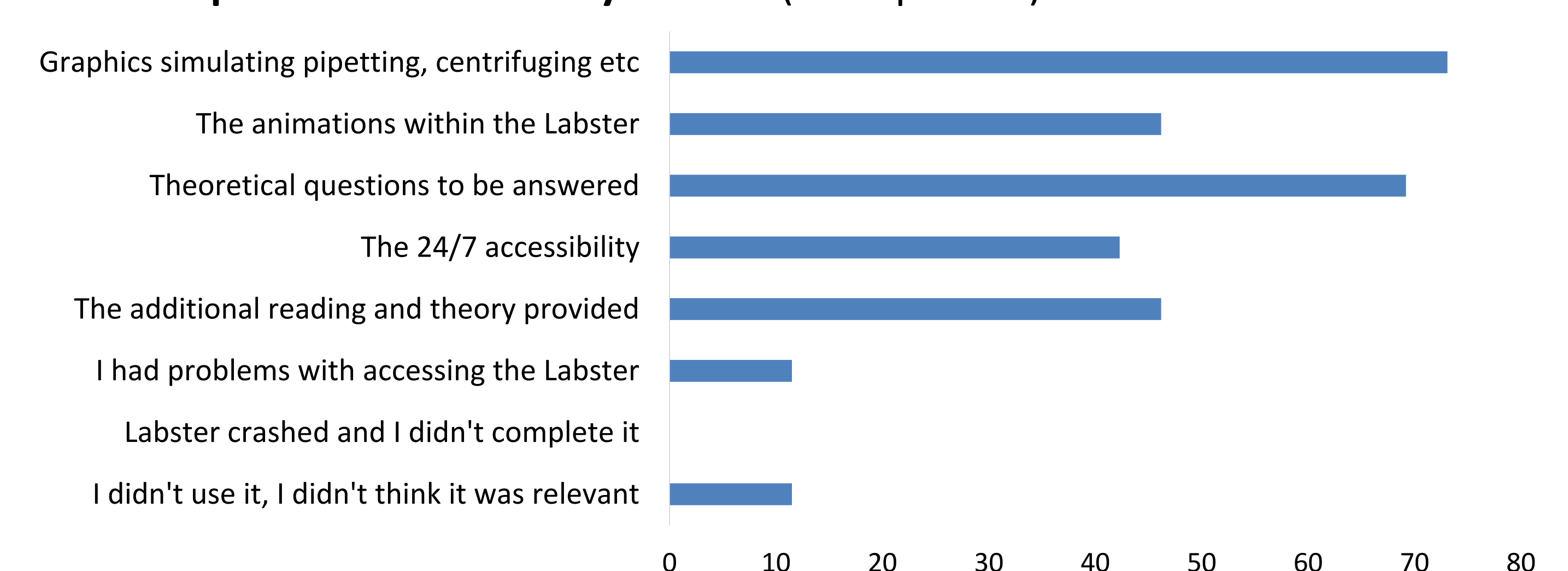
26 students completed an end of module survey about the Labster simulations, 11.5% of those completing the survey had not attempted any Labster simulation.

88.4% of students agreed or strongly agreed that the Labster had increased their understanding of the applications of the molecular techniques with 88.4% agreeing that the simulations had increased their understanding of the theory behind the molecular techniques.

#### Which of these Labster simulations did you attempt? (26 responses)



#### Which aspects of Labster did you like? (% responses)



Students reported that they liked the graphics (73.1%) and theoretical questions (69.2%), with 42.8% of students liking the animations and additional theory and 42.3% appreciating the 24h access. No students reported the system crashing. 4 students had not attempted Labster, this may have been because they were demotivated by accessing it or that they didn't see the relevance.

There were initial glitches getting students access which were caused by students having registered for Labster in other modules, without realising that each module required a Labster login.