

## *Labster Evaluation*

### **1 Purpose**

For this evaluation, we will give an overview of the Labster lab simulation platform and its pricing model. Labster is an interactive advanced lab simulation for STEM subjects. A trial account has been set up for IT Innovation Centre to test and run the virtual labs. Based on the testing, we will evaluate its potential applications in the university scenarios and see how students could learn and benefit from it. Finally, we will do the SWOP analysis and the evaluation matrix scores, and give our conclusion and recommendations as to how the university can use the lobster lab simulation platform.

### **2 The Labster Lab Simulation**

Labster is a company which develops interactive advanced lab simulations for broad range subjects including chemistry, sciences, medicine, and biology, etc. It aims to provide the educators various laboratory simulations which can be used in teaching the STEM students. Labster launched its lab simulation software back in 2013, so far it has created about 71 simulations, covering life science topics – from a basic introduction to acid and bases where students perform a simulation of handling corrosive chemicals and get to see the consequences of not following good lab safety protocol, to a simulation of using a confocal microscope.

All the 3D simulations include game and challenges are designed to keep students engaged and learning – such as mystery puzzles and multiple choice quiz questions, with text theory also available for students' references. The 3D environments are designed more like adventure games, meaning that lab equipment can be interacted with and the environments can be navigated by clicking around.

#### **2.1 Why use Labster**

Labster offers a great range of lab simulations, and the majority of the content currently available on the platform has been developed by Labster working with the educational institute customers, which include some high profile institutions, such as Massachusetts Institute of Technology in the US and Imperial College in London. Moreover, Labster has been used by the students and educators from more than 150 institutions globally, for example, Harvard medical school, University of Glasgow, University of New England, Roy Society of Biology etc.

The main reasons for so many users to choose Labster are:

- Improves student retention and outcomes
- Unlimited access to instrumentation
- Convenient laboratory access
- Fun and engaging 3D animations
- Easy tracking of progress & feedback
- Integrates with the LMS systems: Blackboard, Canvas, Moodle etc.
- Suitable for course re-designs
- Dedicated customer support
- Aligns with core science curriculum

According to Labster, they currently have 71 simulations available in total and should be on track to grow that number to about 150 by the end of 2018. Labster also has the vision of using virtual reality

in the lab simulation. Labster and Google have partnered together to develop the biology VR labs, which will be available at the beginning of fall 2018 using Google Daydream viewers.

## 2.2 Labster Pricing

There are two pricing models to use Labster: institution account and individual student account.

Institutions pricing model	Students pricing model
Pricing per semester Functionalities: <ul style="list-style-type: none"> <li>• Full access to all 60+ simulations</li> <li>• Access to all new upcoming simulations</li> <li>• Integrate with LMS systems such as Blackboard, Moodle, Canvas, D2L etc.</li> <li>• Full teacher and student dashboard with detailed grading</li> <li>• Learner’s learning insights and impact reports</li> <li>• Personal training with a Labster Teaching Instructor</li> <li>• Regional data storage compliance with FERPA, The Data Protection Act and more.</li> <li>• Potential Research Partnership</li> </ul> Bulk offers for multi-year student licenses	Price: \$19 per month  Functionalities: <ul style="list-style-type: none"> <li>• Full access to all 60+ simulations</li> <li>• Access to all new upcoming simulations</li> </ul> No risk: cancel anytime, valid until the end of the month

## 2.3 Trial of Labster Lab Simulation

IT Innovation Centre is in talk with Labster and has a trial account set up to get the first hand experience of using Labster. Before users can use the Labster, they will first have their user accounts set up. Then, they can login to Labster by the supported browsers. After login, users will see a list of courses subscribed. Select a course to begin, users will see the home screen like figure 1 depending on the account types- instructor or student account.

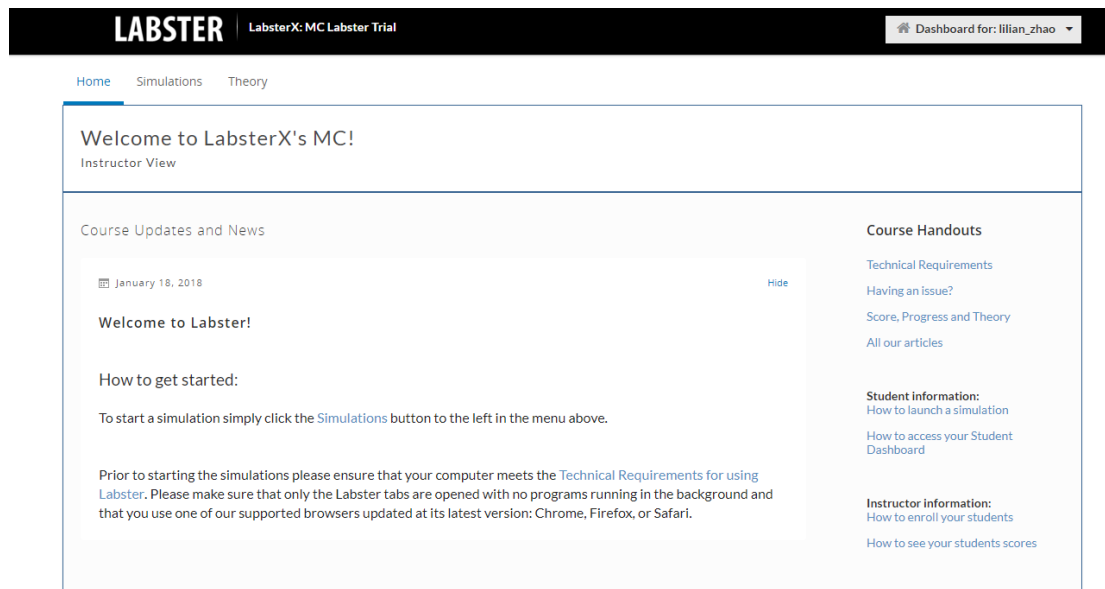


Figure 1. Home screen for instructor account

On the home screen, it introduces how to start a simulation. And it gives the minimum technical spec of the computers in order to run the lab simulations. In the full instructor account, users will

see a CCX Coach tab on the menu, and users with an instructor right will be able to enrol students using the students' email addresses.

Click on the "Simulation" hyperlink, users will see a list of lab simulations and the theory knowledge related to these lab simulations. Users will be able to bookmark the lab simulation, and the progress of the individual lab simulation is also automatically recorded in the users' account. Figure 2 lists all the lab simulations available to the users.

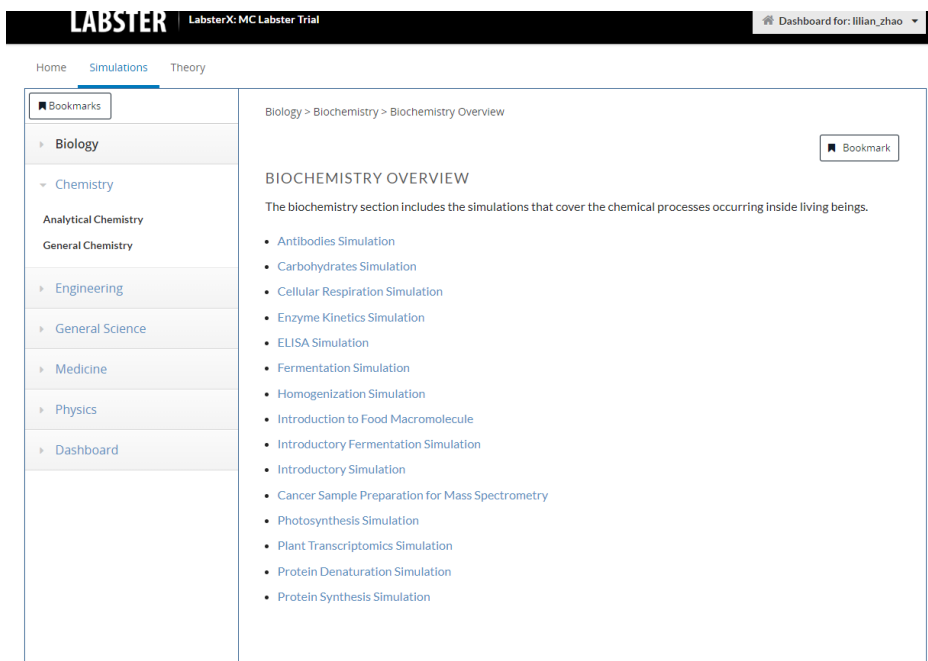


Figure 2 List of Lab Simulations

When users start the simulation, Labster will load the simulation on the browser. The loading will stop for a minute at 25%, then continue until the simulation are fully loaded. Figure 3 shows one of the lab simulation scenes. Through tackling the tasks and answering the quiz, users will be able to get an understanding of the lab and relevant knowledge.

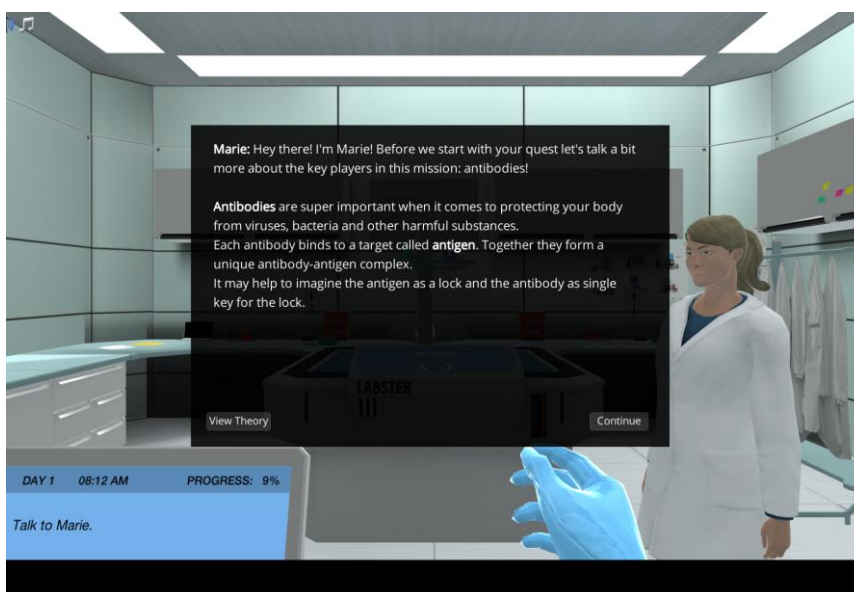


Figure 3 Lab Simulation Scene

### 3 Impact on Organisation

Labster's target audiences are university administrators, professors, students and those who are looking for better ways to teach their students STEM courses with technology.

For university administrators, Labster offers full integration with VLE, which can be embedded with relevant STEM subjects. For teaching staff, Labster offers a big range of lab simulations, which can be used as pre-lab, post-lab or even to completely replace the real lab in certain situations. It is an enhancement to the course content, and will motivate and engage students with interactive games and fascinate material. It also provides great accessibility because students can just access the virtual lab anytime and anywhere with an internet browser.

Students in science, biology or medical subjects will find a great resource in the Labster lab simulations. Labster allows students to attempt new techniques while making mistakes that won't cause safety issues or budgets. Further, as Labster introduces the lab procedures thoroughly, so students get practice with details too. Labster can be used as a pre-lab to get students familiar with the lab procedures and content, thus to increase the success rates in the real lab. Or, use Labster as post-lab, to get students to review the lab and answer the questions, which will help to establish the connections between labs and theory knowledge.

As discussed earlier, Labster offers two pricing models, student pricing model or institutional pricing model. With the institution pricing model, Labster can be integrated with VLE, thus provide a better track of the student's progress in the lab simulation as well. It is more cost effective for students as well. Overall, it is worth to try Labster, particularly for STEM subjects.

#### 3.1 SWOT Analysis

STRENGTHS	OPPORTUNITIES
<ul style="list-style-type: none"><li>➤ Great lab practice as an introduction, a review, or (sometimes) even a wet-lab replacement</li><li>➤ A good enhancement to the lecture content for students in STEM subjects</li><li>➤ Lab practices cover a broad range of subjects, including chemistry, physics, biology etc.</li><li>➤ Lab practices without the need for expensive equipment or an open flame</li><li>➤ Web based user interface provides good accessibility</li><li>➤ Improve learning through fun and engaging ways as well as substantially reduce costs</li><li>➤ Integration with LMS system such as Blackboard, Canvas and Moodle etc.</li></ul>	<ul style="list-style-type: none"><li>➤ Scalable online platform for teaching STEM subjects</li><li>➤ Growing demands for VLE and its supporting tools</li><li>➤ Diversified teaching requires teaching staff to adopt innovative methods to engage with students</li><li>➤ Increasing numbers of remote students</li><li>➤ Further development of the virtual reality technology can expand the Labster platform to mobile devices</li></ul>

WEAKNESSES	THREATS
<ul style="list-style-type: none"> <li>➤ Although designed to be user friendly and relatively easy to use, sometimes there are glitches in operation</li> <li>➤ Depends on the network speed, there is some delay when first loading the lab scene</li> <li>➤ No voice illustration available to visually impaired users</li> </ul>	<ul style="list-style-type: none"> <li>➤ Other competitors in the virtual lab simulation development</li> <li>➤ Teaching staff may provide resistance in using this tool, as they may prefer their own methods.</li> <li>➤ Virtual labs based on Virtual reality headset may provide better user experience</li> </ul>

## 4 Conclusion and Recommendations

Labster is an interactive lab simulation platform for a broad range of science subjects including biology, chemistry and medicine, etc. The Labster lab simulation incorporating games, challenges and 3D animations in the design to keep students engaged and learning, but also with text theory available for students' references. It can be used as pre-lab, after-lab and even replacement of lab in some situations. By practising the Labster interactive lab online, it provides students with unlimited access to instrumentation and convenient laboratory anywhere and anytime.

Labster offers two types of accounts: student account and institution account. Student account allows individual subscription, while institution account allows the Labster lab simulation set up at the institution level. The institution account allows integration with the LMS system such as Blackboard, Canvas and Moodle, which provides great convenience to track the students' progress and get feedback from the students, which in return improve student retention and outcomes.

The majority of the content currently available on the Labster platform has been developed by Labster working with the educational institute customers, which include some high profile institutions, such as Massachusetts Institute of Technology in the US and Imperial College in London. Moreover, Labster has been used by the students and educators from more than 150 institutions globally. It is worth for University of Birmingham to try the Labster platform at some selected courses first. IT Innovation Centre are in talk with Labster, and is going to organize a workshop to introduce Labster to the potential interested parties such as our eLearning support team, lecturers from chemistry, biology and medical school, etc. The workshop is to get an initial understanding from the academics, and any further trial will be negotiated with the elearning team and the teaching staff.

## 5 Evaluation Matrix Scores

Area	Scoring System	Score	Reason
Maturity	1 = Idea 5 = Mainstream Product	4	Adopted by students and staff from over 150 institutions globally
Technology	1 = > 3 years	5	Online platform, ready to be used either by integrated

(Adoption Timescales)	5 = < 3 months		with VLE or by individual subscription.
Business Process (Adoption Timescales)	1 = > 3 years 5 = < 3 months	4	Integration with VLE may take some time, as well as to identify which department or school will need to use the tool.
Adoption Overview	1 = v long time 5 = very short	4	Identify the department or school, which will use the product and integration with VLE will be the major challenges to adopt the Labster.
Existing Technology (Impact)	1 = v large impact 5 = very little	5	It is an enhancement to what university is currently using, but not a replacement.
Resources Required	1 = v large impact 5 = very little	4	Resources need to be assigned for Integration with VLE and ongoing support.
Scope	1=very difficult 5=very easy	5	Labster has 71 online experiment and is aiming to provide 180 experiment by the end of 2018. Labster can be easily expanded to other subjects.
Usability	1=very difficult 5=very easy	4	Easy to use interface, occasionally with some glitches
Security	1 = very poor 5 = excellent	4	Student account can use the individual email address to register and login, institution account can be integrated with LMS logins
Innovation Value	1 = low innov. 5 = high innov.	5	Labster provides greater accessibility for students to practise lab in a fun and engaging way
Cost Effectiveness	1=very expensive 5=very cost effective	4	Comparing with the real lab instrument, facility and resources, Labster is a good saving for these resources and improve the success rate when in real experiment.
Adoption Readiness Score	<20 - not ready 20-29 - emerging 30-39 - Adoptable >39 Fully Ready	<b>39</b>	<i>Labster provides lab simulations for a broad range of STEM subjects, it is a great enhancement to the learning and teaching. It provides greater accessibility and saves on resources. It helps to engage students and improve student retention and outcomes.</i>
<b>Note:</b> Rows that have no highlight colour indicate the score value is not added to the adoption readiness total. Instead, the overview score for that area is used as part of the total score.			