



Pearson

# Blended Learning

The impact of MyLab Math on learner experience, behaviour & performance

## About MyLab

Pearson MyLab is a collection of digital learning resources designed for online homework, tutorials, and assessment. They have been designed with a clear purpose in mind: to improve the results of all higher education students, one student at a time.

Pearson have adopted a series of learning design principles that guide the continual process of refining MyLab in order to deliver even better learning outcomes. With input from more than 11 million student users annually, Pearson MyLab creates online learning experiences that are personalised and adaptive. A variety of question types can be studied independently or assigned by the lecturer as homework (for practice) or a test (for assessment). In anything other than a test, students will have access to a range of features to provide support and feedback. Independent study is completed in the Study Plan.

## Key Findings

- **Independent study:** The relationship between students' percentage of Study Plans mastered and overall scores rose steeply until about 20% of the sections are completed. A little goes a long way in self-directed study.
  - *There is a strong positive relationship of  $r = 0.79$  with overall performance on the platform and the Study Plan usage.*
- **Student experience of learning:** Students reported that MyLab Math both guided and consolidated their learning. Survey results showed:
  - *81% of students reported that MyLab Math had helped them to 'understand the topics on the course'*
  - *82% had 'enjoyed studying and learning' on MyLab Math.*
- **Attainment:** Student gained average scores over 75%, with a median score of 89.1%, indicating good overall foundational subject knowledge across a diverse cohort.
- **Learning behaviour:** Students were motivated to submit homework throughout the course: weekly student assessment submissions remained above 85% even at the end of the course. Of note is that 20% of the final course grade was awarded for the online homework scores.
- **Wellbeing:** Students reported MyLab Math helped to reduce pressure on them primarily by allowing multiple attempts at questions and removing a time limit in which to complete tests (aside from a due date). Students appreciated the opportunity to practise: *"...once I'd worked it out two times and found out what my problems were, I was able to write the right answer" – Student*
- **Future skills: problem-solving.** Students experienced MyLab Math as a tool which helped them to develop their skills in both mathematics and problem-solving. One student even commented that this will be useful for their accounting career in the future:  
<https://futureskills.pearson.com/research/assets/pdfs/media-pack.pdf>
- **Student satisfaction: accessible, digital resource enabling flexible and independent learning:** students reported that MyLab Math was a convenient tool with which to independently access and complete their work on their own terms.

## Overview

Undertaken at a post-1992 London University, this institution is a TEF silver-rated institution with high levels of student satisfaction, both with courses and the standard of teaching, according to satisfaction ratings in recent National Student Surveys and climbing up the 2020 Guardian League Table. The Business School and Pearson were keen to explore how blended learning was used to enhance mathematics, accounting and PPD courses across a suite of accounting and finance-related undergraduate programmes delivered to Level 4 students who predominantly entered their degrees following A Level study (62%). The remainder held BTEC qualifications, international school qualifications or professional qualifications e.g. Accounting.

The University implemented three individual MyLab platforms (MyLab Math, MyLab Accounting and MyLab Writing) to support their diverse student population with foundational mathematics, accounting and writing skills. Additionally, provision of MyLab was designed to enhance student experience, enable flexible learning opportunities and ultimately support student progression. The University purchased access codes institutionally to provide students with equal access to practice and to MyLab assessments which counted towards their final module mark.

The goal of this study was to understand how impactful MyLab Math was and how it contributed to both learning and the student experience at the institution. There is an additional Pearson study looking at MyLab Accounting and the academic team at this university had their study into the efficacy of MyLab Math published in April 2020: <https://www.emerald.com/insight/content/doi/10.1108/JARHE-08-2019-0210/full/html>. It found that:

*"...the blended approach increases academic self-efficacy in the area of mathematics, also enhancing the student experience. These benefits arise from the combination of allowing the individual mastery of technical skills in the private and stress-free environment provided by the online platform and access to social resources in the classroom setting."*

## Methodology

Following ethical approval from the University and student consent, data was collected and collated from focus groups, MyLab gradebook data and student surveys. The triangulation of data has allowed us to come to more robust reflections and recommendations. Students included were studying one of three financial accounting courses.

The findings presented here provide a snapshot of the experience of a small sample of students who used MyLab Math. Thus, the findings provide insights but are not intended to be generalisable. Illustrative quotes from the qualitative findings are included after each section to provide a richer understanding of students' views, describing more fully the trends emerging from the data analysed. Quotations are boxed for easier access to student opinions.

In total, 138 students replied to survey 1; 86 survey 2; 43 respondents completed both Survey 1 and 2. Of the students included, 46 agreed to take part in the focus groups which were facilitated by a student to ensure anonymity and impartiality.

# MyLab Math: Implementation

Quantitative Methods is a large mathematics module which is taught across three undergraduate programmes, all in the general subject area of accounting and finance. MyLab Math was included in the module handbook and linked directly, week-by-week, to the lecture content. There was credit assigned to the online homework which counted towards the final course grade.

How were students encouraged to engage with MyLab Math?

- It was introduced to students as a part of their first lecture.
- Students were set clear reading requirements for every week of the module.
- At the same time, the required online homework was specified with a completion date.
- The online homework in MyLab Math accounted **for 20% of the students' final grade** (assessment of the remaining 80% was a closed book exam).
- Homework could be completed each week without a time limit, but there was a final due date for submissions (these were in weeks 9, 11 and 12).
- The same, familiar teaching structure repeated every week as shown in this example:

	Lecture	Reading & Homework
<b>Week 9</b>	Lecture 9: Breakeven Analysis. Linear equations. Simultaneous Linear Equations.	Chapter 4 Online Homework 7 (33 questions) available from 20th November 5pm
Seminar 9	Tutorial 9	Tutorial 9 Questions
<b>Week 10</b>	Lecture 10: Functions. Graphs of functions.	Chapter 5 Last online Homework 8 available from 30 November 5pm
Seminar 10	Tutorial 10	Tutorial 10 Questions

# Key Findings

## Attainment & skills:

Achieving a median overall score of 89.1% across assessments, the majority of students performed consistently well on the platform. This suggests scores were not reliant on previous academic merit or experience but enabled success for all pathways into the institution whether from A Level or elsewhere. The teaching team supported student success by enabling specific platform features such as: allowing multiple attempts in homework practice or access to 'Help Me Solve This' functionality.

Importantly, students in two focus groups reported that students saw MyLab Math as a tool which helped them to develop relevant mathematical and problem-solving skills.

*"It's a good resource for students who really want to benefit their own maths skills and push themselves more because there's a lot on there for us to use to help build our maths skills."*

**- Student**

One student commented that this would be useful for students' accounting careers in the future. As reported in 'The Future of Skills: Employment in 2030'<sup>1</sup>, problem solving is high (8th) on a list of 10 key skills for employment in 2030.

## Knowledge acquisition: motivating, accessible, supportive, enjoyable

Most students achieved an average score over 75% on MyLab Math platform activities, demonstrating that a **good foundational level of knowledge** was achieved by all students. Focus groups also identified the importance of scaffolding within the resource to help them bridge gaps in their knowledge. Students reported valuing the consolidation and being able to develop and deepen their level of understanding through the resource.

The questions in MyLab Math **scaffold learning**, data suggests. Students liked how the structure of questions meant that they started with easier questions and moved progressively toward a stronger understanding. It helped students to bridge learning gaps by giving them time to practise answering questions. Students liked having the option to look at a topic as many times as they wanted and liked being able to review each topic separately and having multiple questions to cover each subsection of a topic.

*"I think it's good having easy questions at the beginning as well because not everyone knows the stuff, maybe they're doing it for the first time, so they need that build up to the hard ones."* **- Student**

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<sup>1</sup> <https://futureskills.pearson.com/>

Having **multiple attempts to complete questions** helped students to better understand errors, and students find the examples provided in MyLab Math relevant and helpful, data suggests.

In two focus groups, students commented that they find the examples provided helpful. It reminds them of formulae and how to answer questions, which helps to improve their actual tests performance. There was consensus across the three focus groups that it is helpful to have multiple attempts to answer questions. This gives students an opportunity to figure out their mistakes and understand where or why they are going wrong.

*"I like the fact that it gives you an example and it helps you to solve a problem which is really useful. If you get stuck on a question with that you can help make your way through the question and you can potentially get it right from before." – Student*

There was consensus in focus groups that the resource was good for completing **practice** questions, supported by the survey results which showed that 82% of students enjoyed practising questions in MyLab Math.

*"...it helps you refresh on different courses. And it allows you to remember a lot about what you've learned in lectures instead of just having to go by what you remember from the lecture itself. It gives you something a bit extra to help you understand." – Student*

MyLab Math was seen as a tool to **reinforce and consolidate learning as well as deepening understanding of content** that students might have struggled with in lectures. Homework in MyLab Math was seen to help students refresh and revise content from lectures. One student noted that it offers a chance for those who were less good at maths to **revise anything they did not understand in lectures**. There was consensus across focus groups that MyLab Math helps students to reinforce what they have learned in lectures. One student commented that they use MyLab Math to understand more about a topic rather than relying solely on their lecture notes.

*"For people who are not as good at maths as others, it helps them to refresh on the homework... because it actually makes you go back and look through stuff that you might not have understood in the lecture. So I think that's really good and obviously, that's going to benefit us in the exam." – Student*

Students like the fact that homework is released immediately after covering a topic on the course: it is seen as helpful that questions were released immediately after a topic is covered in lectures or seminars. It gives students an opportunity to revise the topic before the next section is covered.

*"I think that's quite good, how the ones [questions] get released on the topics that we've just learnt in that lecture and seminar." – Student*

*"I like how on the same topic - even though there are a lot of question - it covers each subsection on the topic such as equations, etc..." – Student*

## Learning Behaviour

**Students found MyLab Math motivating**, data suggests. Some students saw MyLab Math as a tool that motivated them to revise more and do more work at home. One student reported that without MyLab Math, they might not be as motivated to practise topics after lectures and seminars. Student submission of assignments did not fall below 85%, suggesting this level of motivation was maintained throughout the course (see 'Performance & Participation' section on the next page).

*"I feel like if we didn't have MyMathsLab maybe we wouldn't be as pushed to practise the topics that we are learning in the lectures and the seminars." – Student*

Focus groups reported that the **accessible and self-paced progress, supported with relevant examples, and the flexibility / convenience of the resource are important to them**. In addition, the students enjoyed using the resource because it reduced the pressure they felt to perform well first time.

The student survey confirmed MyLab Math was viewed as a **convenient and enjoyable tool** for students to access, understand and complete their work, looking at the *Top 5 Agree statements*. Aside from confirming the importance of convenience and access, there were no clear trends among the *Top 5 Disagree statements*. See below for full survey results.

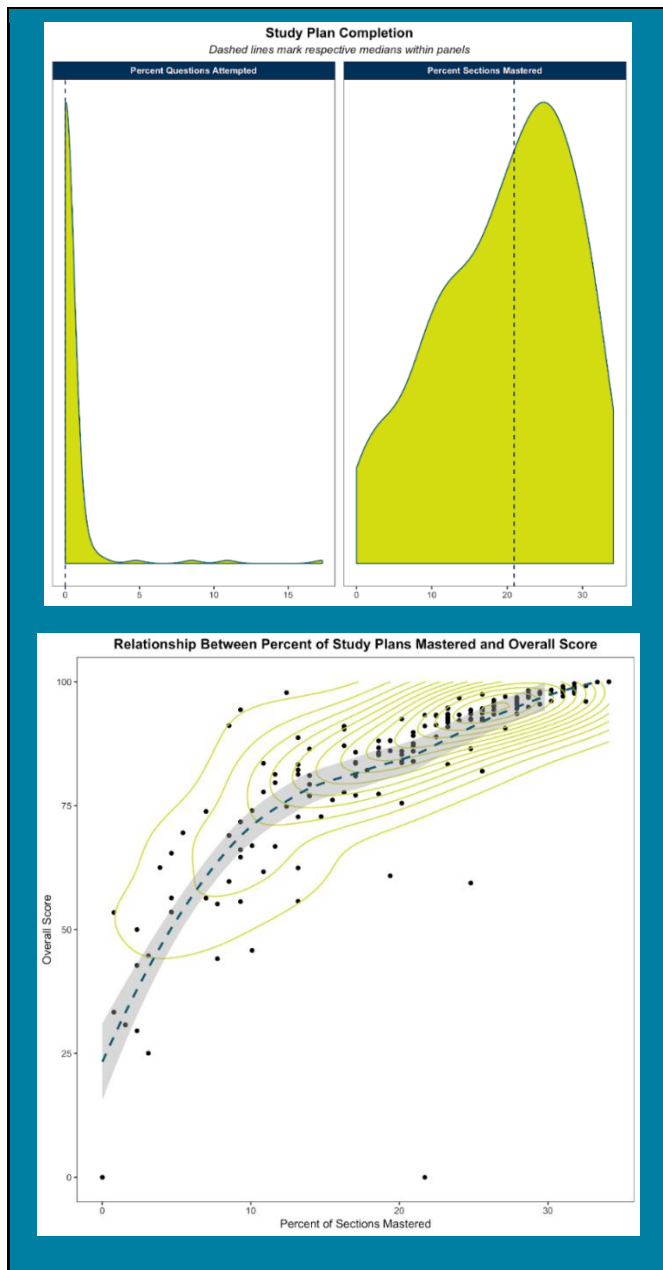
Valence	Question	%
<b>Agree</b>	MyLab Math is easily accessed through a PC/laptop.	89.5
	I liked using online resources because I could complete work around my own schedule.	89.3
	I enjoyed studying and learning using online resources.	82.1
	I was able to learn more independently.	82.1
	The content of MyLab Math helps me to understand the topics on the course.	80.5
<b>Disagree</b>	My aim is to pass the course while doing as little work as possible.	54.0
	I do not find MyLab Math beneficial.	60.9
	Because I can use MyLab Math to cover topics, I sometimes miss tutorials.	62.1
	I generally use MyLab Math when I am travelling between home/university/work.	70.1
	I am not able to access MyLab Math easily.	77.0

## Performance & Participation

The MyLab Math Study Plan provides an opportunity for self-directed study. Students made only a little use of it overall but that said, a little went a long way. There was a strong positive relationship with overall platform performance when comparing 'mastery' rates between 0 and 20% ('mastery' rates indicate progressive completion of Study Plan sections).

This would suggest that reviewing those students *not* accessing the Study Plan would be helpful in order to monitor and/or support their progress, which would be enhanced by Study Plan completion up to 20%. After which students appear to gain less in terms of performance.

There was a strong relationship between the students' percentage of Study Plans mastered and their overall score. The correlation was  $r = 0.79$ .



### Self-study and Study Plan Completion

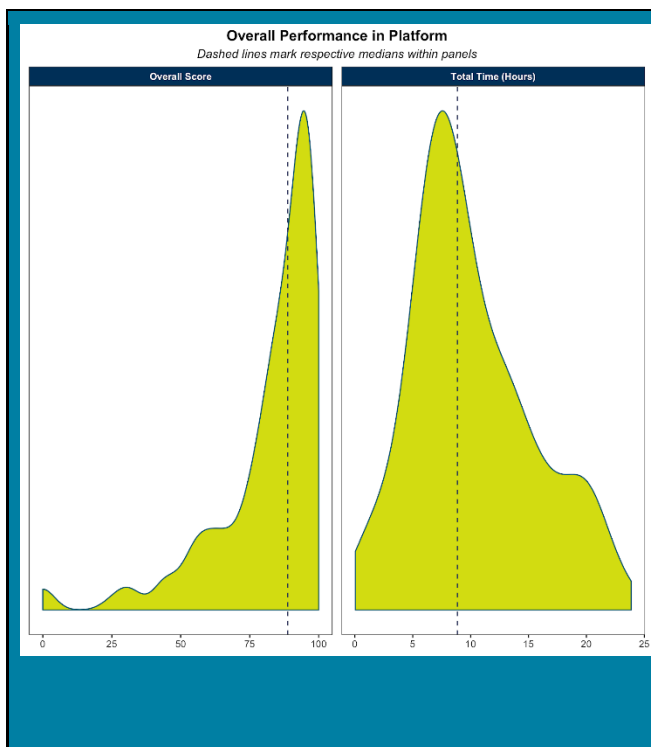
Most students attempted 2.5% or less of the questions in the Study Plan (self-study section of the resource).

When attempts were made on questions in the Study Plan, the bulk of students mastered between 20 and 25% of the Study Plan sections worked (i.e. successfully completed or 'mastered' between 20–25% of the total plan).

There was a **strong relationship between the students' percentage of Study Plans mastered and their overall score. The correlation was  $r = 0.79$**  although students did not seem particularly keen on using the Study Plans.

The relationship between students' percentage of Study Plans mastered and **overall scores rise steeply until about 20%** of attempted sections are mastered. At that point, the rise in overall scores tend to level off.





### Overall Score & Total Time

Students generally do quite well on platform activities, as indicated by a median overall score of 89.1%.

**Most students earned a 75% or higher in the course, with the median score being 89.1%.**

### Total Time (Hours)

The distribution of total time in the platform shows two peaks. The first is located between 5 and 10 hours; the second (and smaller peak) is situated around 19 – 20 hours. Overall, the median amount of time students spent in the platform was 8.9 hours.

**Overall Homework Performance**

	Class Average	Class Median	Percent Students Submitted
Homework 1.1	95%	98.3%	96.4%
Homework 1.2	92%	97.3%	95.2%
Homework 2	84%	88.1%	95.2%
Homework 3	86.3%	91.7%	94.6%
Homework 4	77.7%	81.2%	91%
Homework 5	84.2%	88.9%	91%
Homework 6	87.1%	95.8%	90.4%
Homework 7	86.6%	95%	88%
Homework 8.1	77.7%	89%	87.3%
Homework 8.2	81.9%	93.8%	86.1%

### Student Submissions & Practice

The submission rates for assignments were quite high throughout the course, not **falling below 85%** even though rates do taper off from Homework 1.1 to Homework 8.2.

Students appear to have been **motivated** to submit homework and it is noteworthy that 20% of the final course grade is awarded for online homework scores. Students also appreciated the **opportunity to practise** as part of that assessment:

*“The part that was helpful and useful in MyMathsLab was that it gave you three attempts so on the first attempt I tried working it out and if I didn’t get it right, I tried it again.*

*The third time, **once I’d worked it out two times and found out what my problems were, I was able to write the right answer ... If I didn’t get it at first and it wouldn’t have told me then I wouldn’t have understood where I went wrong.** – Student*

# Student Experience

The experience students had using MyLab Math is evident in all the preceding sections. However, as learner experience is central to this study it is worth reiterating the way in which digital resources are implemented to achieve the best possible outcome in terms of student experience. The survey and focus group students evidently enjoyed using the resource, and they reported that it benefitted their knowledge acquisition and understanding. Additionally, important learner behaviours were stimulated by the use. Data reports that MyLab Math provided a way to maintain learner motivation and that the way it was used helped to reduce student pressure/stress. The key themes are expanded below:

1. **Skills development:** MyLab Math helps students to develop relevant maths and problem-solving skills.
2. **Independent, flexible study:** Students liked the flexibility of MyLab Math and reported that they enjoyed working at their own pace and completing questions in their own time. They liked saving their progress and taking a break rather than having to complete a session in one go.

*"It's quite flexible as well, so you could do it in your own time when you want to do it, perhaps after work."*  
– **Student**

3. **Scaffold and support learning:** the questions in MyLab Math scaffold learning, data suggests, and it is seen as a tool to consolidate learning, as well as deepening understanding of content which students might have struggled with in lectures. Students also liked the fact that homework was released immediately after covering a topic on the course.
4. **Consolidate, practice subject knowledge:** having multiple attempts to complete questions helped students to better understand errors, data suggests. Students found the examples provided in MyLab Math relevant and helpful.
5. **Reduce pressure by removing the barrier of time:** The amount of time given to complete questions in MyLab Math is helpful and reduces pressure for students, data suggests. There was consensus across the three focus groups that students had a good amount of time to complete the questions assigned and liked having no time limit on the test, aside from the due date. The generous time limits meant that questions could be completed in manageable chunks.

*"I think the fact that they don't give us a time limit to answer the questions is also good because it doesn't put pressure on us. If we want to save it and go back to it later, we always have the opportunity to do that as well."* – **Student**

# Conclusion

This study into the impact of MyLab Math on student experience, behaviour and performance demonstrated how the resource can help to:

- motivate and sustain learner participation in practice and assessment
- demonstrate a parity of foundational and subject knowledge across diverse intakes
- provide learners with an enjoyable, flexible resource providing them with the opportunity to work at their own pace
- provide learners with a resource they found helpful in their learning as a tool for consolidation and revision of subject knowledge
- inspire confidence and activity knowing that a good performance in platform assessments correlates with using up to 20% of the study plan – a manageable amount of extra practice to achieve better grades
- develop skills, especially problem-solving, which will be useful throughout their course and possibly be useful as they progress through to employment.

Finally, there were clear indications from the data that a thoughtful implementation – particularly allowing multiple attempts at questions and removing time constraints – not only helped students to learn from their mistakes, but also removed pressure or stress for students.