



Pearson

MyLab Statistics

Efficacy Research Report

April 3 2018



Contents

- 03 Introduction
- 05 Findings in brief
- 06 Product design and development
- 08 Intended product implementation
- 09 Product research
- 14 Appendix
- 17 PwC assurance report

The corpus of research for this product includes research conducted by our in-house researchers in partnership with customers, and research conducted by third party researchers. All research included in this report meets the standards we have set out for our own efficacy research. These are informed by and aligned with guidance on educational research quality provided by organisations, such as the American Educational Research Association and the What Works Clearinghouse.

Efficacy statements in this report are subject to independent assurance by PricewaterhouseCoopers LLP (PwC). The PwC assurance report is on page 17 and further details can be found in the [Pearson Efficacy Reporting Framework dated April 3 2018](#)

Introduction

In 2013, Pearson made a commitment to efficacy: to identify the outcomes that matter most to students and educators, and to have a greater impact on improving them. Our aspiration is to put learners at the heart of the Pearson strategy; our goal, to help more learners, learn more. Part of our commitment was to publish research regarding the impact of the use of our products on outcomes, and to have the outcomes subject to independent audit. We call this efficacy reporting. There is no rulebook for how to do this, no model to follow. We've had to learn fast during this journey, we've sought guidance from others including external expertise, and we are now some, but not yet all of the way there.

The road taken and the milestone reached

In a first for the education sector, we have published audited efficacy reports on some of our most widely used products. Together, these products represent 18 million learners. This Research Report includes independently audited efficacy statements that have been prepared using the [Pearson Efficacy Reporting Framework dated April 3 2018](#) — which we have used consistently for the Pearson products we are reporting on.

We have sought to use the efficacy reporting process to amplify existing non-Pearson peer reviewed research about our products. We've also sought to foster innovation in efficacy research by conducting new research and placing value on a range of research methods — including implementation studies, correlational and causal designs — ensuring data is collected, analyzed and presented to agreed standards at the appropriate stages in each product's lifecycle. The research conducted for this report, and the efficacy statements produced as a result, are designed based on international best practices such as those set out by the American Education Research Association and the What Works Clearinghouse. We have synthesized these into a set of standards we hold ourselves accountable for in our research and reporting. These are set out in the [Pearson Efficacy Reporting Framework dated April 3 2018](#).

Furthermore, we adhere to the same peer-review processes as other high quality research in the education sector. Our work was independently reviewed and validated by SRI International, a well-known non-profit research center, and shared for discussion at research conferences organized by, among others, the American Education Research Association.

Our body of research contains evidence of statistically significant relationships between the use of our products and learner outcomes like student achievement. We want to be clear, though, that efficacy is not a quality a digital product can possess in and of itself. We recognize that implementation — the way a product is integrated into teaching and learning — also has a significant impact on the outcomes that can be achieved. Our reports do not yet capture the full range of intended product outcomes, nor the variety of different ways of implementing our products. What we do know is that the more we can engage with our customers about best practices that can support the integration of learning technologies into their teaching, the more likely they will be to achieve their desired outcomes.

We have commissioned PricewaterhouseCoopers LLP ('PwC') to audit the efficacy statements set out in our Research Reports. This is to demonstrate that the statements accurately reflect the research that has been carried out. PwC's audit report can be found at the end of this document.

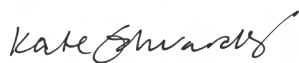
The journey ahead

Delivering on our reporting commitment has never been our ultimate goal; what matters most to us is helping more learners, learn more. Our aspiration is to explore what works, for whom, and why; and to encourage discussion about questions such as: What outcomes matter most to students? What should teaching and learning look like? What evidence should we apply to its design? And how should we evaluate impact?

We are excited to continue partnering with educators and others in the field in order to better understand how interactions between educators, students and learning technology can enhance outcomes. We have also been energized to see others in the education sector begin to focus on efficacy and research — though we recognize that their application in education is still nascent. In order to accelerate the emergence of its full potential we are already developing new ways of partnering with educators, researchers and institutions so we can advance this work together. In doing so, we will continue to advocate for the need to apply rigorous evidence to improve the outcomes of teaching and learning, while also seeking to ensure that evidence captures customers' experiences and is relevant and useful to educators in their practice.

Special thanks

We want to thank all the educators, students, research institutions and organizations we have collaborated with to date. We are spurred on by the growing number of opportunities for us to learn from others in the sector who are beginning to tackle the same challenges. If you are interested in partnering with us on future efficacy research, have feedback or suggestions for how we can improve, or want to discuss your approach to using or researching our products, we would love to hear from you at efficacy@pearson.com. If we, as a sector, tackle this together, we will help more learners learn more.



Kate Edwards

Senior Vice President,
Efficacy and Research, Pearson
April 3 2018

Findings in brief

Pearson sought to explore whether the use of MyLab Statistics, a teaching, learning and assessment system used to teach statistics at the higher education level, is related to higher exam scores.

This Research Report presents findings from one research study: a correlational study we conducted at Maastricht University School of Business and Economics for students enrolled in the first-year course Quantitative Methods in the Fall semester of 2015. Our aim in using a correlational study design was to seek out possible relationships between the use of MyLab Statistics and students' exam scores, to identify areas of focus for potential future research using more rigorous causal study designs.

The findings appear alongside details of the research study, including a description of the sample studied, method of analysis, results, limitations and generalizability, and notes on possible future research.

The report also summarizes the context surrounding the findings, including the research that informed the design and development of the product, the history of the product in the market, how educators use the product, and its intended outcomes.

The findings are inseparable from their surrounding context and the design of the study that produced them. To learn more about these elements, follow the links to our Technical Reports in the **Research studies** section.

In the context of the study conducted at Maastricht University School of Business and Economics, Pearson found that:

- A 10% increase in the percentage of unique MyLab Statistics homework questions attempted is associated with a 2.3% increase in final exam scores.
- A 10% increase in average MyLab Statistics homework score is associated with a 2.5% increase in final exam scores.
- A 10% increase in average MyLab Statistics quiz score is associated with a 6.5% increase in final exam scores.

The complete statements are set out in the box titled "Efficacy statements" on page 11. These statements have been subject to assurance by PwC, whose report can be found at the end of the Research Report.

Product design and development

Product overview

MyLab Statistics is a teaching, learning, and assessment system for teaching statistics at the higher education level. MyLab Statistics provides a suite of multimedia instructional materials, interactive tutorials and demonstrations, example data sets, Pearson's StatCrunch software for performing statistical analyses, a personalized student study plan feature, and an assessment system for homework, quizzing, and testing. MyLab Statistics is designed to accompany a number of textbooks written in the statistics discipline.

MyLab Statistics is also designed to enhance and improve the following outcomes:

- Critical reasoning and problem solving skills that can be applied to everyday life
- Student achievement — in increasing their exam score and passing their course, as well as fulfilling the requirements of their major
- Students' progress to the next level course

The full list of the outcomes MyLab Statistics is intended to support, accompanied by a brief description, can be found in the appendix of this report.

Foundational research underpinning the design

MyLab Statistics assessments include pre-written items in various formats, including:

- Multiple choice
- Fill-in-the-blank
- Occasional free response items, requiring students to demonstrate mastery of statistical skills and understanding of concepts

The design of MyLab Statistics incorporates numerous principles from learning science, with the goal of helping students develop their ability to explore and analyze data, interpret statistics and graphs, and responsibly use and consume statistics in their everyday lives.

Practice testing and problem-solving

When trying to gain declarative knowledge (e.g., the definition of a key concept), being tested on information improves learning and memory more than simply re-studying that same information. This "testing effect" is a well-established psychological phenomenon, having been demonstrated in a large number of laboratory and classroom settings (Roediger & Karpicke, 2006). Testing is believed to support learning by requiring retrieval of information from memory, thereby strengthening the ability to recall that information again later.

In subjects like statistics, students are also meant to develop problem-solving skills. Solving practice problems helps develop these skills, both by providing opportunities to learn general principles and their proper applications, and by enhancing problem-solving speed and accuracy (VanLehn, 1996).

Multiple choice and fill-in-the-blank homework problems in MyLab Statistics algorithmically generate new values each time a student attempts them. This targets both declarative knowledge and problem-solving skills by allowing students to repeat problems and practice their calculation.

These features are designed to enhance critical reasoning and problem solving skills.

Worked examples and scaffolding

It is common in education for instructors to demonstrate how to solve a particular type of problem. Research shows that such demonstrations, or “worked examples”, improve learning, particularly when presented alongside practice problems that students complete on their own (Atkinson, Derry, Renkl, & Wortham, 2000).

MyLab Statistics assessments include multiple Learning Aids that provide access to step-by-step guidance for solving individual problems. One of these Learning Aids, *Show Me An Example*, allows students attempting homework problems to access a worked example.

Learning Aids also offers a “Help Me Solve This” option, which provides a series of questions that guide the student through each step of the problem-solving process. This feature is a form of instructional “scaffolding”, in which a complex problem or task is given additional structure to make it more accessible to the student. Such scaffolding techniques are known to enhance learning (Reiser, 2004).

These features are designed to enhance students’ achievement.

Immediate feedback

Research into computer-based feedback systems has shown that feedback which explains or otherwise elaborates on the correctness of a response is more effective than feedback that only indicates whether the response was right or wrong (Van der Kleij, Feskens, & Eggen, 2015).

While research into the timing of feedback (i.e., immediate vs. delayed) has produced a wide range of results, there is research suggesting that immediate feedback improves learning of procedural skills in disciplines like mathematics and programming more than feedback presented after a delay (Shute, 2008).

MyLab Statistics assessments provide students with immediate feedback on their performance on a question-by-question basis. This feedback indicates the correctness of the response and, in some cases for incorrect responses, provides more information to help students identify and correct errors.

This feature is designed to enhance and improve students’ achievement.

History and reach of MyLab Statistics

MyLab Statistics had 652,167 users in 2017, up from 619,512 in 2016, a 5.27% increase. The product is used globally and serves students with a variety of majors and mathematical skill sets, though most introductory statistics courses assume an intermediate algebra prerequisite.

MyLab Statistics was first launched as a standalone product in 2010, following its previous life under the MyMathLab umbrella. Since its initial launch, MyLab Statistics has met the following key milestones:

- Integration of StatCrunch (SC)
- Addition of technology instruction card and video series for the most popular statistical software
- Development of HTML5 Applets and numerous videos series, including StatTalk and business Insight videos
- Expansion into Advanced Statistics courses, including Walpole et. al. Probability and statistics for Engineers and Scientists, 9e (c 2017), and Triola et. al. Biostatistics for the Biological and Health Sciences, 2e (c 2018)
- Addition of StatCrunch Question Library, Conceptual Question Library, Study Skills
- Addition of Excel Grader Projects
- Launch of fully digital Integrated Review Courses
- Winner of Pearson’s Product of the Year (with SC) for 2016

In the future, MyLab Statistics will continue to support Introductory Statistics courses, Business Statistics courses, select Biostatistics and Probability and Statistics for Engineers courses. This product will also expand into Business Analytics courses beginning with copyright 2020 projects. We are also exploring further integration of StatCrunch.

Intended product implementation

We aim to keep MyLab Statistics flexible enough to allow our customers to make their own choices on how they want to implement it, and to allow them to tweak their practice over time to improve the experience and outcomes.

Customers have told us that they have seen a greater impact when MyLab Statistics:

- Is available for formative and summative assessment, as well as instruction
- Supports student learning through self-testing by allowing for multiple attempts at homework questions
- Employs its adaptive learning features, such as the Study Plan, to make sure that students are practicing specific activities based on their current level of understanding
- Is able to support blended learning, in that instructors may ask students to complete assigned homework to supplement class lectures, and to complete MyLab Statistics quizzes that count towards their course grade

Instructors can also engage with a range of tools (such as search/email by criteria, gradebook dashboard, item analysis, and more) designed to further personalize the instruction and facilitate a one-on-one approach.

Product research

The purpose of the research done to date was to explore the relationship between MyLab Statistics usage and course achievement, as measured by final exam performance. Given the alignment of MyLab Statistics with the learning science principles discussed in the **Product design and development** section above, we hypothesize that usage of MyLab Statistics will have a positive relationship with learner outcomes, particularly in terms of problem-solving skills, progression to the next course, and achievement (see Appendix for the full list of intended outcomes).

For this first phase of our efficacy journey, we mainly focused on exploring correlational rather than causal relationships between our products and learner outcomes. Demonstrating causation is complex and requires significant investment; our correlational studies identify relationships that may be worth investigating further with causal study designs in future research.

Existing research

In 2018, Pearson researchers completed a systematic search and review of research articles published since 2012 that assessed the impact of MyLab Statistics on learner outcomes. Our criteria for the review and inclusion of existing published research on our products were designed based on US Department for Education What Works Clearinghouse guidance. Based on these guidelines, in order for research to be included in this Efficacy Report on MyLab Statistics it needed to meet a number of criteria, including that the study was published in the past five years, examined at least one intended learner outcome category, and reported results in enough detail that the research could be properly evaluated. For more information on this see the [Pearson Efficacy Reporting Framework dated April 3 2018](#).

In the initial screening, we discovered 44 studies. After an initial review we found that six contained information relevant to MyLab Statistics. Following an in-depth review, we discovered that no existing published studies met the necessary criteria to be included in this Efficacy Report. For the initial screening list and a list of the subset of studies that contained information relevant to MyLab Statistics but did not meet the criteria to be included here see the [Pearson Efficacy Reporting Framework dated April 3 2018](#).

Research studies

There is one new study, conducted by Pearson, that forms the basis of the Efficacy Report for MyLab Statistics. The research questions and findings for this study are set out in detail below, including the efficacy statements generated by those studies.

Study 1

Study citation	A correlational study of MyLab Statistics in a combined math and statistics course (March, 2018), Pearson Education, Impact Evaluation — Higher Education Courseware, Efficacy and Research
Research study contributors	Anne Pier Salverda, Dirk Tempelaar, Ross Metusalem, Dan Belenky
Research question	<ol style="list-style-type: none">1. What is the relationship between student homework activity, measured as the percentage of homework questions assigned that the student attempted, and performance on the final exam?2. What is the relationship between performance on formative assessments (homework assignments in MyLab Statistics) and performance on the final exam?3. What is the relationship between performance on summative assessments (quizzes in MyLab Statistics) and performance on the final exam?
Related intended outcomes category	Standard of achievement or level of competence

Study design	<p>Relational (correlational, not predictive)</p> <p>This study examined the association between the use of MyLab Statistics with <i>Business Statistics</i> (3rd edition) by Sharpe, De Veaux and Velleman (2015), and students' achievement on an independently administered final exam in an undergraduate math and statistics course.</p>
Metrics studied	<p>— Score on the statistics portion of an independently administered final exam</p>
Description of sample	<p>The study is limited to participants at one institution: the School of Business and Economics at Maastricht University, in the Netherlands. Educators at the school use a combination of lectures, labs, individualized learning, online and written assessments to help students understand and apply statistics topics.</p> <p>The study sample included students enrolled in the first-year course Quantitative Methods in the Fall semester of 2015.</p> <p>The sample included students from 48 different nationalities, including Dutch (24%), German (46%) and Belgian (12%).</p> <p>The course required intermediate algebra as a prerequisite, and focused on conceptual understanding and application of knowledge. Throughout the course, students were assigned seven homework assignments (176 questions in total) and three quizzes.</p>
Sample size	<p>Total sample: 1,085 students Analytic sample: 957 students</p> <p>The analytic sample is what remained after excluding students who had previously taken the course and students for whom important data (final exam scores, gender, level of prior math education or score on a math pre-test) was missing.</p>
Analysis	<p>Hierarchical Linear Modeling (HLM), which accounts for the clustering of students in tutor groups, was used to examine the relationship between students' use of and performance in MyLab Statistics and their performance on the statistics portion of an independently administered final exam.</p> <p>We adjusted for available student background characteristics that could have an unintended impact on the findings of the research. The statistical analyses in this study take into account three such student-level variables:</p> <ul style="list-style-type: none"> — Gender — Level of prior math education — Ability in mathematics <p>Separate HLM analyses examined the relationship between performance on the statistics portion of the final course exam and:</p> <ul style="list-style-type: none"> — Homework activity (percentage of unique homework questions attempted) — Performance on homework assignments (averaged across the seven homework assignments) — Performance on quizzes (averaged across the three quizzes)

Results

- Students who attempted a larger percentage of unique homework questions tended to achieve higher scores on the final exam
- Students with higher average homework scores tended to achieve higher scores on the final exam
- Students with higher average quiz scores tended to achieve higher scores on the final exam

Our findings suggest that doing more unique homework questions in MyLab Statistics, better performance in homework assignments, and better performance in quizzes in MyLab Statistics are each associated with better performance on the final exam.

This relationship was substantially stronger for quiz scores than for homework scores. The difference in degree of positive association with final exam scores may suggest that quiz scores are better measures of learning than homework scores.

This is not surprising, since homework scores are likely less valid measures of learning than quiz scores. The format of homework assignments was such that students were allowed to attempt each question as often as they liked, and each further attempt had the potential to improve their homework score (which corresponded to the highest score obtained). This format typically results in high levels of performance, but not necessarily in equally high levels of learning — depending on what type of homework activities and strategies students used to improve their performance.

Efficacy statements

In the context of this study, conducted at Maastricht University School of Business and Economics for students enrolled in the first-year course Quantitative Methods in the Fall semester of 2015, Pearson is able to make the following relational (correlational, not predictive) statements about the efficacy of MyLab Statistics:

- A 10% increase in the percentage of unique MyLab Statistics homework questions attempted is associated with a 2.3% increase in final exam scores.
- A 10% increase in average MyLab Statistics homework score is associated with a 2.5% increase in final exam scores.
- A 10% increase in average MyLab Statistics quiz score is associated with a 6.5% increase in final exam scores.

It should be noted that these statements reflect a relationship between MyLab Statistics and performance above and beyond students' prior achievement. Therefore, it is not simply the case that high-achieving students tend to perform well on multiple aspects of the course. The relationships expressed above were calculated across all students in the sample and capture the contribution of MyLab Statistics to course performance once prior achievement has already been accounted for.

Limitations and generalisability

Results are correlational and not causal:

The study used a correlational research design, which does not allow us to make causal claims.

Limited statistical controls

Student level data was limited, and statistical controls did not include some variables that are known to affect learner outcomes. For instance, although we did control for performance on a math pre-test, data on prior achievement was unavailable since this was a first-year, first semester course with students from a wide variety of nationalities (48 nationalities in total) and associated education systems. Data on student demographics, such as degree of education of parents, was also unavailable. This data would have allowed for a more robust analysis.

Available data:

The study was also constrained by limitations on the amount of relevant MyLab Statistics data that was available at the time of this research, for the course under study.

Future research

Future research could explore whether these findings can be replicated at other schools, so we can understand more about what works, when, where, how, for whom and why. Future research could also examine more detailed aspects of students' use of MyLab Statistics and how those aspects relate to performance on the final exam. This could allow us to test more specific hypotheses about the relationships between students' use of MyLab Statistics and problem-solving skills, progression to the next course, and achievement.

For instance, we may want to examine whether the degree to which students improve their performance on homework questions with repeated attempts is associated with better performance on the final exam. Future research could also uncover ways of using MyLab Statistics that are associated with poor performance in the course; this information could be used to improve the effectiveness of MyLab Statistics for student learning.

Finally, future studies could make use of more rigorous research designs. For example, an experimental or quasi-experimental research design could assess whether use of MyLab Statistics leads to better learner outcomes — that is, whether the relationship we observed is causal in nature.

Research began in Fall 2017 to replicate and extend this study with a higher education institution in North America.

Read about this research in more detail in our [Technical Report](#)

References

Atkinson, R. K., Derry, S. J., Renkl, A., & Wortham, D. (2000). Learning from examples: Instructional principles from the worked examples research. *Review of Educational Research, 70*(2), 181–214.

Reiser, B. J. (2004). Scaffolding complex learning: The mechanisms of structuring and problematizing student work. *The Journal of the Learning Sciences, 13*(3), 273–304.

Roediger, H. L., & Karpicke, J. D. (2006). The power of testing memory: Basic research and implications for educational practice. *Perspectives on Psychological Science, 1*(3), 181–210.

Shute, V. J. (2008). Focus on formative feedback. *Review of Educational Research, 78*(1), 153–189.

Van der Kleij, F. M., Feskens, R. C., & Eggen, T. J. (2015). Effects of feedback in a computer-based learning environment on students' learning outcomes: A meta-analysis. *Review of Educational Research, 85*(4), 475–511.

VanLehn, K. (1996). Cognitive skill acquisition. *Annual Review of Psychology, 47*(1), 513–539.

Appendix: full list of intended outcomes

Outcomes related to learner access and experience

Intended outcome 1

Learners can successfully register/login at first attempt.

MyLab Statistics functions with standard operating systems and hardware, so that students are able to access from their home or lab computer successfully.

Intended outcome 2

Learners can successfully register and use MyLab Statistics with little technical support.

MyLab Statistics is designed with web standards and usability in mind. New features and functionality are designed for ease-of-use and tested prior to release into production.

Intended outcome 3

Learners are confident in stats ability and are motivated to learn.

There are a variety of motivations, beliefs, and attitudes that may prevent students from achieving their potential. Specifically, three areas of importance are: dealing with anxiety, personal relevance, and mindset. These are areas where MyLab Statistics is aiming to help students, and mindset is a key outcome validated by instructors as being of importance to them and their students.

Intended outcome 4

Learners have a positive learning experience and are motivated to learn.

MyLab Statistics is designed to provide students with a positive learning experience. A variety of multimedia resources are available as assignment learning aids. Students can link to the ebook, video clips, and animations to improve their understanding of key concepts. All content in MyLab Statistics is derived from, or correlated to, an author's textbook, thereby building towards a seamless experience in class, in the book, and in MyLab Statistics.

Intended outcome 5

Learners can access content at their level.

MyLab Statistics is designed to support students at their level of learning. Features such as worked examples and the assessment system, which includes multiple choice and fill-in-the-blank activities, helps students to understand key concepts at their own pace.

Intended outcome 6

Learners can access digital learning materials including StatCrunch from personal computer, tablet or smartphone anytime.

MyLab Statistics aspires to the outcome that it can be accessed on any device, anywhere and at any time. It is designed with web standards and usability in mind. New features and functionality are designed for ease-of-use and tested prior to release into production.

Outcomes related to timeliness and completion

Intended outcome 7

Learners complete assignments on time.

MyLab Statistics students benefit from self-paced tutorials featuring specific, wrong -answer feedback and hints that emulate a human tutor with the aim of making them more likely to complete assignments on time.

Intended outcome 8

Learners complete the course at first attempt.

All of the resources in MyLab Statistics are intended to support students to persist to completion: multiple attempts; automatic, instant feedback and guidance on errors, and resources to guide learners to correct errors and resubmit; assignment calendar views; instructor reports to allow for early intervention with students who are falling behind, as well as item analysis to show which assignments/questions students may be struggling with.

Outcomes related to standard of achievement or level of competence

We have evidence related to this category of intended outcomes for MyLab Statistics. Find it under “Product Research”.

Intended outcome 9

Learners’ pass rate overall.

All of the resources in MyLab Statistics are intended to support students to persist to successful course completion, including automatic, instant feedback and guidance on errors, and resources to guide learners to correct errors and resubmit; assignment calendar views; and instructor reports that inform them of students falling behind to allow for early intervention. Data from institutions regarding passing rates is used to measure this outcome.

Intended outcome 10

Learners have the skills to analyze and explore data (Generate Stats).

Assessments in MyLab Statistics incorporate numerous learning science principles to help students develop their ability to explore and analyze data. For example, homework questions may ask students to work with data and to practice performing statistical analyses, either computing by hand or using MyLab Statistics’ built-in StatCrunch software.

Intended outcome 11

Learners have the skills needed for statistical analysis: creating, understanding, reading and interpreting graphs (Consume Stats).

Assessments in MyLab Statistics incorporate numerous learning science principles to help students develop their ability to create and interpret graphs. For example, homework questions may ask students to use Pearson’s StatCrunch software — an integrated part of MyLab Statistics — to create statistical reports containing live datasets, commentary and graphs.

Intended outcome 12

Learners gain course credit.

Students will gain not only an understanding of key Statistics concepts, but an understanding of the skills required to achieve course credit.

Intended outcome 13

Learners become informed consumers of statistics, able to use stats in their everyday lives.

MyLab Statistics helps students to have a full understanding of critical reasoning and problem solving skills, which they can apply to everyday applications. Assessments in MyLab Statistics also incorporate numerous learning science principles to help students develop their ability to responsibly use and consume statistics in their everyday lives.

Outcomes related to learner progress

Intended outcome 14

Learners progress to next course.

As the courseware administrator, we are able to see which learners have progressed on to other Pearson systems (such as MyLab Economics, Accounting, Finance, and Computer Science; Mastering Physics, Chemistry, and Engineering) after using MyLab Statistics.

Intended outcome 15

Learners fulfill course requirement for their major.

MyLab Statistics students are taught skills in the context of scientific principles that relate to more advanced courses. Knowledge gained from MyLab Statistics should encourage students to progress to the next course.

Intended outcome 16

Students are satisfied with the course.

Learners have the opportunity to provide feedback through Pearson sponsored surveys on the MyLab platforms. Using this data, their satisfaction is measured using Net Promoter Score (NPS) and other metrics. In addition, customer technical support data is used to measure decreases in tech support questions and issues from students.

Intended outcome 17

STEM and Non-STEM majors gain value for their careers.

The ability to explore and analyze data requires students to acquire a range of skills, such as the ability to create and understand statistical graphs, and the ability to perform statistical analyses on data. In a wide variety of professions, these skills have become vital as technological developments have resulted in an increasingly strong influence of data on many aspects of the modern world.



Independent limited assurance report to the directors of Pearson plc

The directors of Pearson plc (“Pearson”) engaged us to provide limited assurance over the efficacy statements clearly identified by the box titled ‘Efficacy statements’, including reference to the study design type, in the Pearson MyLab Statistics Efficacy Research Report dated April 3 2018 (“Research Report”).

Our conclusion

Based on the procedures we have performed and the evidence we have obtained, nothing has come to our attention that causes us to believe that the efficacy statements set out in the Pearson MyLab Statistics Research Report have not been prepared and reported, in all material respects, in accordance with the Pearson Efficacy Reporting Framework dated April 3 2018.

This conclusion is to be read in the context of what we say in the remainder of our report.

Efficacy statements

The scope of our work was limited to assurance over the efficacy statements clearly identified by the box titled ‘Efficacy statements’, including reference to the study design type, in the MyLab Statistics Research Report. Our assurance does not extend to other information presented in the Research Report.

Professional standards applied and level of assurance

We performed a limited assurance engagement in accordance with International Standard on Assurance Engagements 3000 (Revised) *Assurance Engagements other than Audits and Reviews of Historical Financial Information*, issued by the International Auditing and Assurance Standards board. A limited assurance engagement is substantially less in scope than a reasonable assurance engagement in relation to both the risk assessment procedures, including an understanding of internal controls, and the procedures performed in response to the assessed risks.

Our independence and quality control

We applied the Institute of Chartered Accountants in England and Wales (ICAEW) Code of Ethics, which includes independence and other requirements founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

We apply International Standard on Quality Control (UK) 1 and accordingly maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Our work was carried out by an independent and multi-disciplinary team including educators, statisticians, and experts in reporting and assurance.

Reporting and measurement methodologies

The efficacy statements need to be read and understood together with the Pearson Efficacy Reporting Framework dated April 3 2018 (the “Framework”), available on Pearson’s website at <https://www.pearson.com/efficacy-reporting-framework>.

The absence of a fully comprehensive set of generally accepted rules for identifying learner outcomes and defining, assessing and reporting the efficacy of educational products allows for different, but acceptable, ways of measuring product efficacy

and reporting findings as efficacy statements. This could affect comparability between Pearson’s efficacy reporting and that of other organisations.

Work done

We are required to plan and perform our work in order to consider the risk of material misstatement of the efficacy statements. A material misstatement would be an efficacy statement that does not reflect the study design and quality of underlying research or the omission of key information from a relevant study.

In doing so, we:

- made enquiries of relevant Pearson management;
- evaluated the design of the Framework including key structures, systems, processes and controls for managing, generating and reporting the efficacy statements;
- tested all 19 controls across the 8 stages of the Framework;
- confirmed that all management reviews were performed by at least two members of Pearson’s Efficacy & Research team;
- performed substantive testing on a sample basis of the data that underpins the research studies and the resulting efficacy statements, and the controls over the completeness and accuracy of that data (supported by Pearson Internal Audit in those instances where student data was subject to confidentiality restrictions);
- assessed the quality and conclusions of the underlying research studies;
- inspected the statistical analysis to assess whether the efficacy statements are valid, supportable and consistent with the underlying research studies;
- independently re-performed screening of relevant external public research studies and compared to that done by Pearson;
- assessed the efficacy statements and underlying Technical Report(s) for consistency with the Framework; and
- reviewed the product’s efficacy web page, Research Report, and Technical Report(s) for alignment of research studies and efficacy statements.

Pearson responsibilities

The directors of Pearson are responsible for:

- designing, implementing and maintaining internal controls over information relevant to the preparation of efficacy statements that are free from material misstatement, whether due to fraud or error;
- establishing an objective framework for preparing and reporting efficacy statements;
- preparing and reporting efficacy statements in accordance with the Framework; and
- the overall content of the Framework and the Research Report.

Our responsibilities

We are responsible for:

- planning and performing the engagement to obtain limited assurance about whether the efficacy statements are free from material misstatement, whether due to fraud or error;
- forming an independent conclusion, based on the procedures we have performed and the evidence we have obtained; and
- reporting our conclusion to the directors of Pearson.

Inherent limitations

Efficacy research, and the resulting efficacy statements, reflect the implementation and use of a product in a particular context. It would not be appropriate to assume a product would always generate similar outcomes in other contexts and/or in the future.

Intended users and purpose

This report, including our conclusions, has been prepared solely for the board of directors of Pearson in accordance with the agreement between us, to assist the directors in reporting Pearson MyLab Statistics efficacy statements, in accordance with the agreement between us dated 9 August 2017. We permit this report to be disclosed onlineⁱ at <https://www.pearson.com/corporate/efficacy-and-research/efficacy-reports> in respect of the MyLab Statistics Research Report to assist the directors in responding to their governance responsibilities by obtaining an independent assurance report in connection with the efficacy statements. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the board of directors and Pearson for our work or this report except where terms are expressly agreed between us in writing.



PricewaterhouseCoopers LLP
Chartered Accountants
London
3 April 2018

ⁱ The maintenance and integrity of Pearson's website is the responsibility of the directors; the work carried out by us does not involve consideration of these matters and, accordingly, we accept no responsibility for any changes that may have occurred to the reported efficacy statements or the Framework when presented on Pearson's website.



Pearson