Pearson

Learner Profile Analysis: Exploratory and Confirmatory

Behavior & Learning Analysis
Impact Evaluation Team

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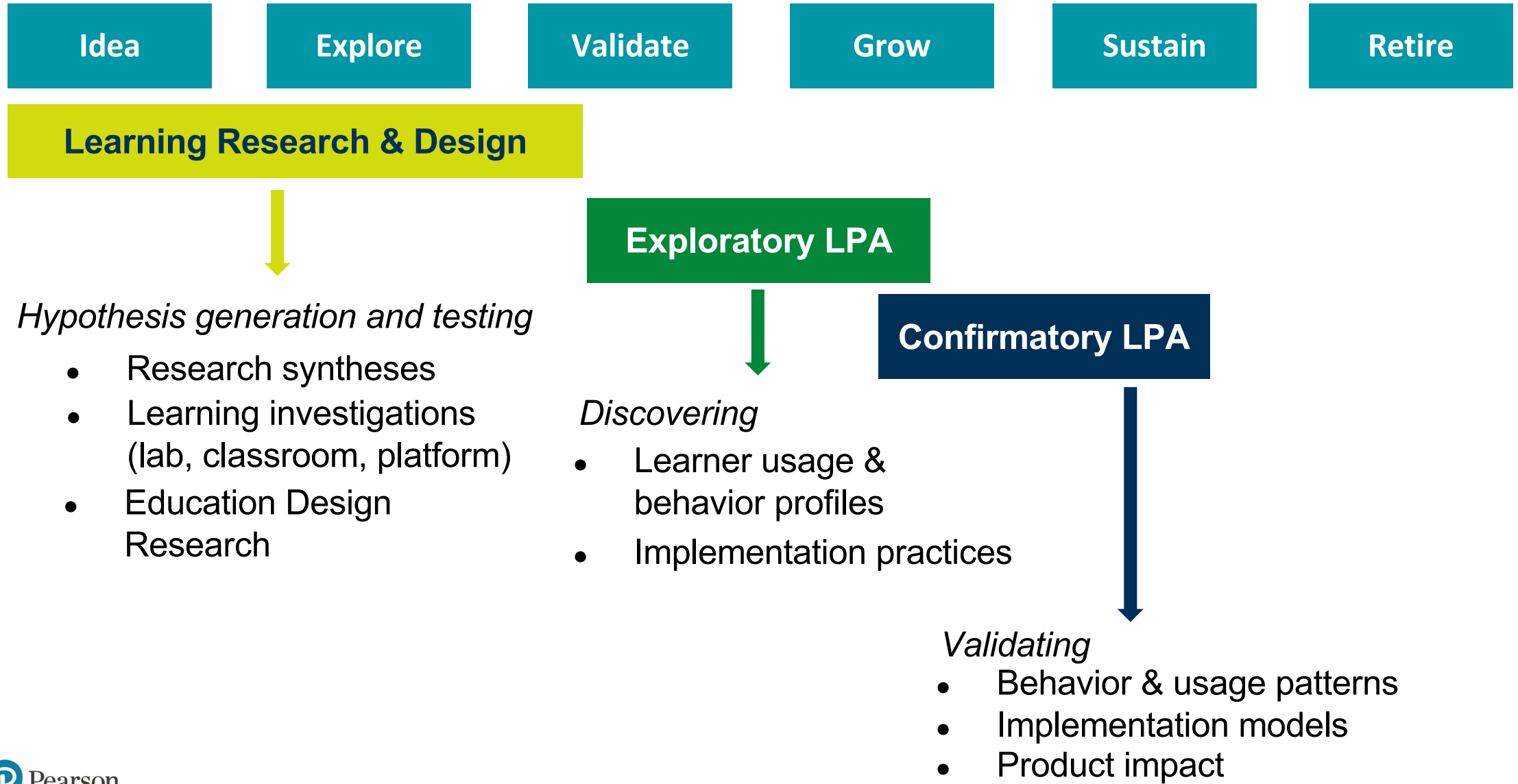
Why do we need learner profile analysis?

To better understand the product users in terms of 1) their product usage patterns, 2) problem solving and learning behaviors, and 3) course implementation and to evaluate the products

To inform our product management teams of the areas of improvement and strengths to help make data driven decisions about product design and improvement

To contribute to learning analytics research by developing innovative ways of measuring and testing learning

Learner profile analysis along the product lifecycle



Confirmatory study example

Study purpose:

The study examined the association between the use of Mastering Physics for homework assignments and students' achievement on their course exams and the Force Concept Inventory (FCI) test during the first semester physics course (General Physics Mechanics).

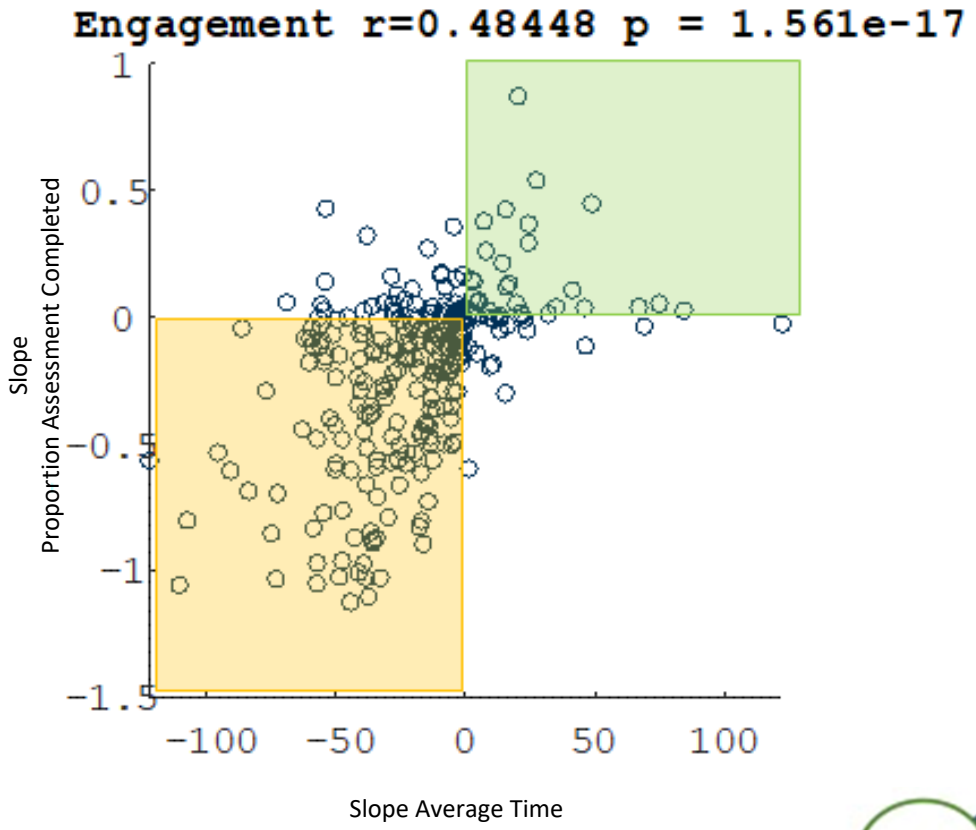
Course information:

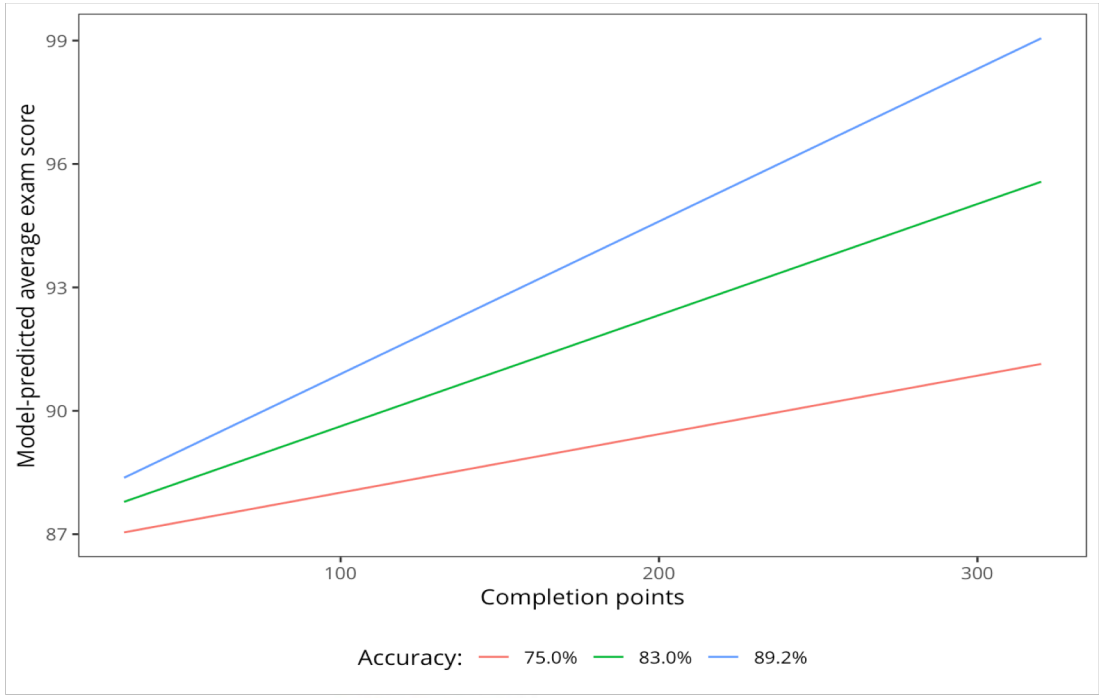
- There was a strong emphasis placed on homework as practice, not homework as summative assessment.
- All hints were free (no penalties or rewards)
- The textbook used in this course was Scientists and Engineers: A Strategic Approach, 3rd edition by Randall D. Knight.

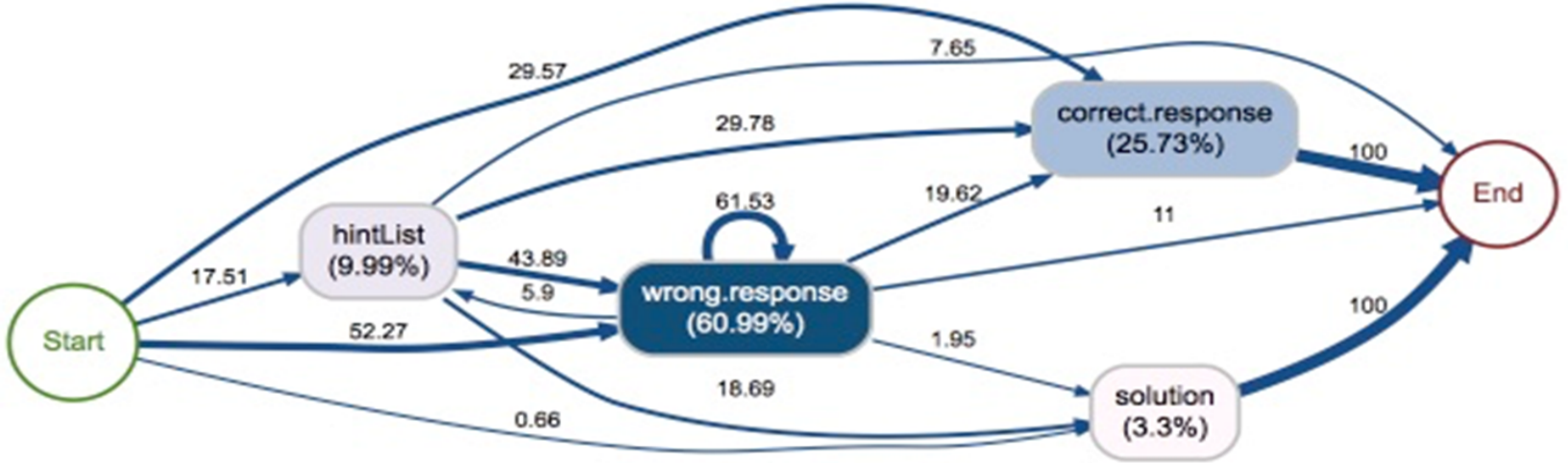
Efficacy statements (600 non-physics majors):

- A 10% increase in Mastering Physics homework grades is linked to a 4% increase in exam scores.
- A 10% increase in Mastering Physics homework grades is linked to a 2% increase in FCI gains.

Exploratory study example







Types of exploratory LPA

Descriptive analysis

(2 – 4 weeks)

To describe and summarize product usage and implementation by learners and instructors

Usage analytics is basic information for planning the next step analysis. Sometimes this level of information is enough for products that are early in the product life cycle. When there is not much existing information about product usage or if instructors use products for the first time, the descriptive analysis may be enough so that it can serve as baseline information.

Diagnostic analysis

(3 – 5 weeks)

To identify problematic areas or strengths so that the information can be used for product/implementation improvement or product design

The analysis methods can be determined based on the descriptive analysis to see what went well and didn't go well in what way for whom. For most products, both descriptive and diagnostic analyses will be conducted.

Predictive analysis

(4 – 8 weeks)

To predict potential future learner behaviors and performance

This type of analysis is only possible when there is sufficient data (external outcome measures) that allows predictive modeling (e.g. learners' assignment completion predicting their successful completion of course)

Recommendation:
data-driven
decision making
(1 – 2 weeks)

Research questions

Descriptive analysis

- How frequently do learners log in to the platform and submit assignments?
- When do learners complete their homework assignment (e.g. a week before the deadline or right before the deadline)?
- How and when do learners repeat questions?
- How long do learners take to complete questions and assignments?

Diagnostic analysis

- How can we categorize learners based on their problem solving patterns?
- Which groups of learners increase/decrease their test scores in the platform?
- Is using a feature/capability related to learner engagement patterns?
- How are different types of feedback related to learner outcomes?

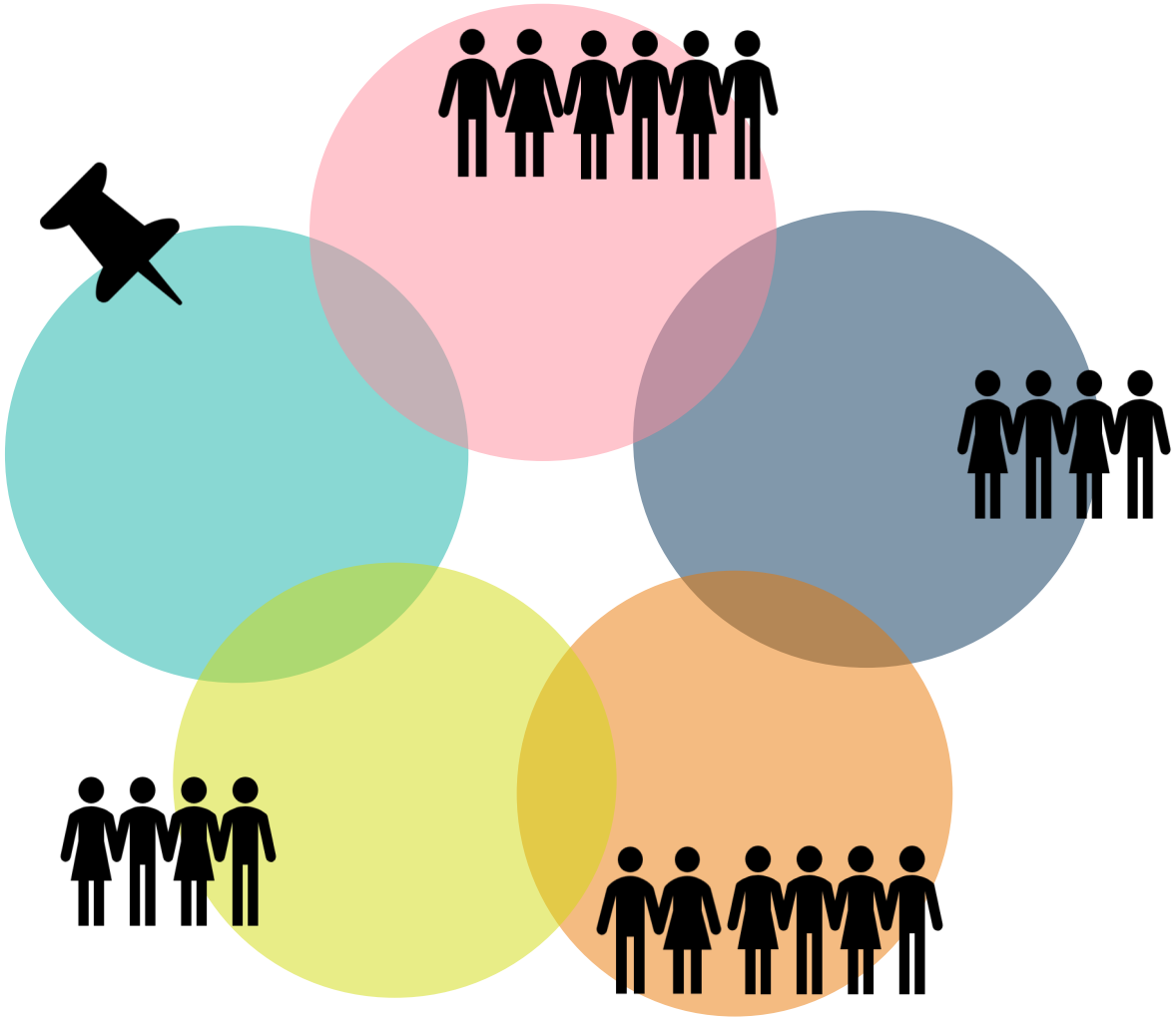
Predictive analysis

- What are the significant predictors of learner's successful course grades?
- What is the predicted success rate of learners based on their interactions with products?
- Who has a higher or lower chance to successfully complete the course?

Top-down & Bottom-up

Top-down approach

Starting from looking at all users per product (e.g. discipline and title), our users (both instructors and learners) can be clustered into distinct groups in terms of
- course implementations (e.g. course settings)
- learners' activities and their patterns of activities in the platform. This information will be used as reference data to locate which market segment individual courses/learners belong to.



Bottom-up approach

Without baseline information about the product users, we can analyze individual courses/learners first. And we replicate the analyses for a broad range of samples which can represent all of our users well enough. The information from the analyzed samples will be used to create the reference data representing all possible market segments.

ALWAYS LEARNING