Case Study: Learning Economy Foundation Competency Graph

Jim Goodell

Competency Graph | Component | learning engineering

The Learning Economy Foundation's LearnCard is a lifelong learning passport that empowers learners to collect, own, and share their skills and experiences. The Foundation asked INFERable's learning engineering team to develop a prototype skills graph that would (1) integrate into LearnCard to visualize learning trajectories and mastery learning progress, (2) use IEEE standards, (3) display real-time predictions about a learner's likelihood of success on the next attempt at a task based on prior attempts, and (4) be released as open source code. Our team applied a sample of learning sciences and data science methods in an iterative learning engineering process to develop a prototype codebase and web component. The resulting code was published as open source by the client. More research is needed for adapting this approach to other platforms and contexts.

Introduction

In this project, our team applied a sample of learning sciences and data science methods in an iterative learning engineering process (Goodell & Kolodner, 2023) to develop a prototype codebase and web component. The solution:

1. draws a skills graph using IEEE 1484.20.3-2022: IEEE Standard for Learning Technology: Data Model for Sharable Competency Definitions (SCD) (IEEE, 2022),
2. a separate web service predicts the learner's success on the next attempt using a Bayesian Knowledge Tracing method and data instrumented from prior attempts at a skills-based performance task and stored in a Learning Record Store using IEEE 9274.1.1-2023: Standard for Experience API (xAPI) (IEEE, 2023), and
3. updates each gauge in the skills graph with the prediction from the web service.

The resulting code was published as open source by the client (Goodell & Meizen, 2025). The poster in figure 1 shows an image of the resulting graph.

Discussion and Conclusion

The technical approach and open source resource was successfully demonstrated as a reusable resource. In addition to meeting the client's requirements, the modular prediction service used and the graph visualization has been repurposed in a Moodle plug-in that supports mastery practice (INFERable, 2025). More research is needed for adapting this approach to other platforms and contexts.

Figure. 1.

Poster presented at LERN26 showing the Learning Economy Foundation Competency Graph case study.

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INFERable, a Public Benefit Corporation; jim@inferable.app

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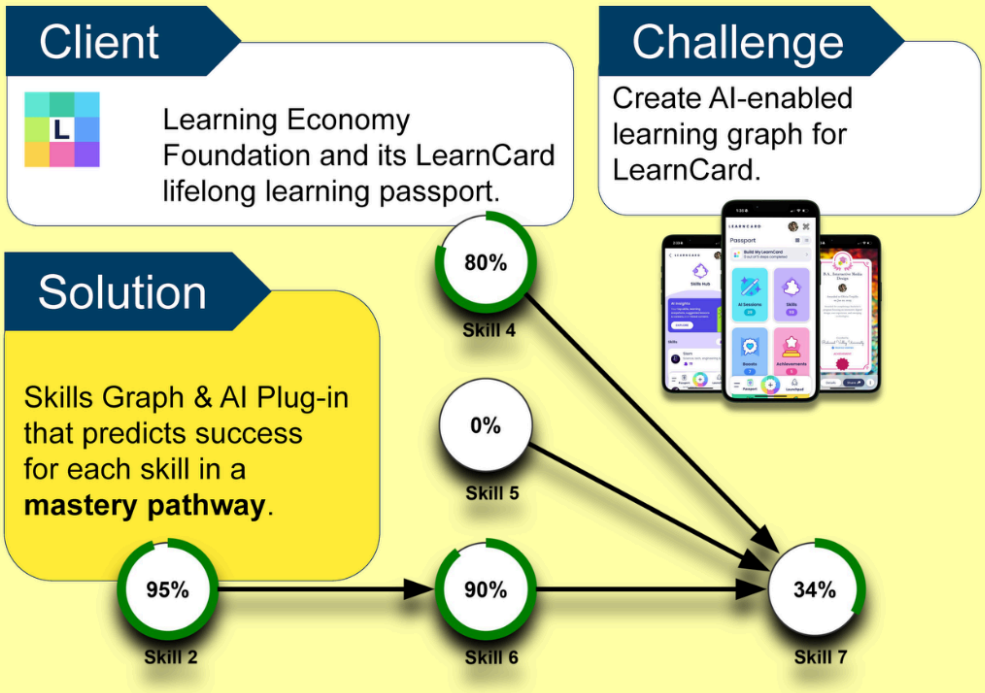

References

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