LECILA

Special Track on
Learning Engineering: Courseware Instrumentation and Learning Analytics

eLmL 2021

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About the Chair: Erin Czerwinski

Erin has deep expertise defining and using learning science methodologies, best practices, and product quality guidelines to deliver impactful learning experiences, with over fifteen year's of experience effectively designing, implementing, evaluating, and improving online courses, curricula, and platforms. Erin has also provided curriculum leadership at Western Governor's University, and was the Director of Learning Engineering at Acrobatiq, Inc. after serving in a Learning Engineering position with CMU's Open Learning Institute. She serves on the IEEE Industry Consortium on Learning Engineering Steering Committee and chairs the Maturity Standards for Learning Solutions & Tools Special Interest Group.

"Improvement in post-secondary education will require converting teaching from a solo sport to a community-based research activity."

DATA EMPOWERED LEARNING

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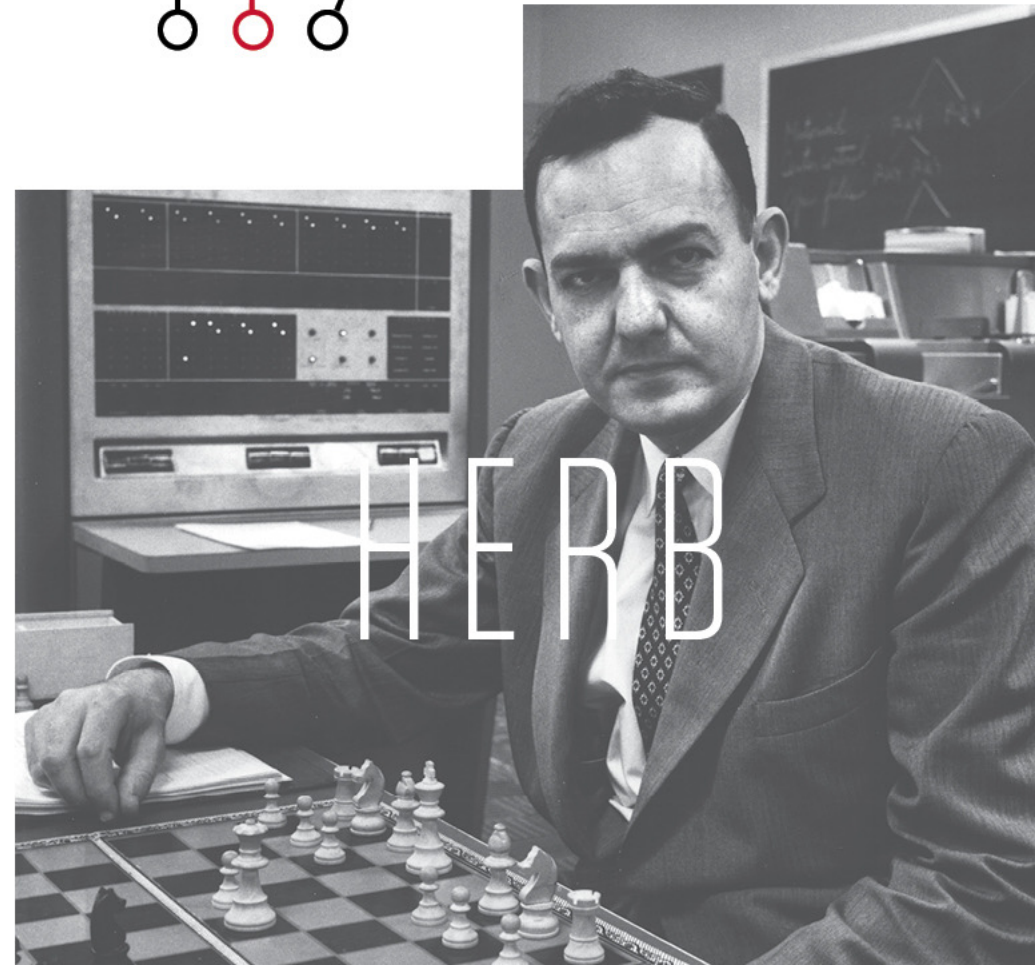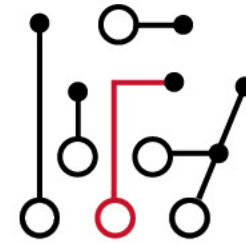
Learning Engineering

The IEEE Standards Association's Industry Connections Industry Consortium on Learning Engineering (ICICLE) definition[1]:

A process and a practice that applies the learning sciences using human-centered and engineering design methodologies and iterative data-informed decision making to support learners and their learning.

1. Kessler, A. & Design SIG Colleagues. (2020). https://sagroups.ieee.org/icicle/learning-engineering-process/.

Learning Engineering at Carnegie Mellon University Simon Initiative
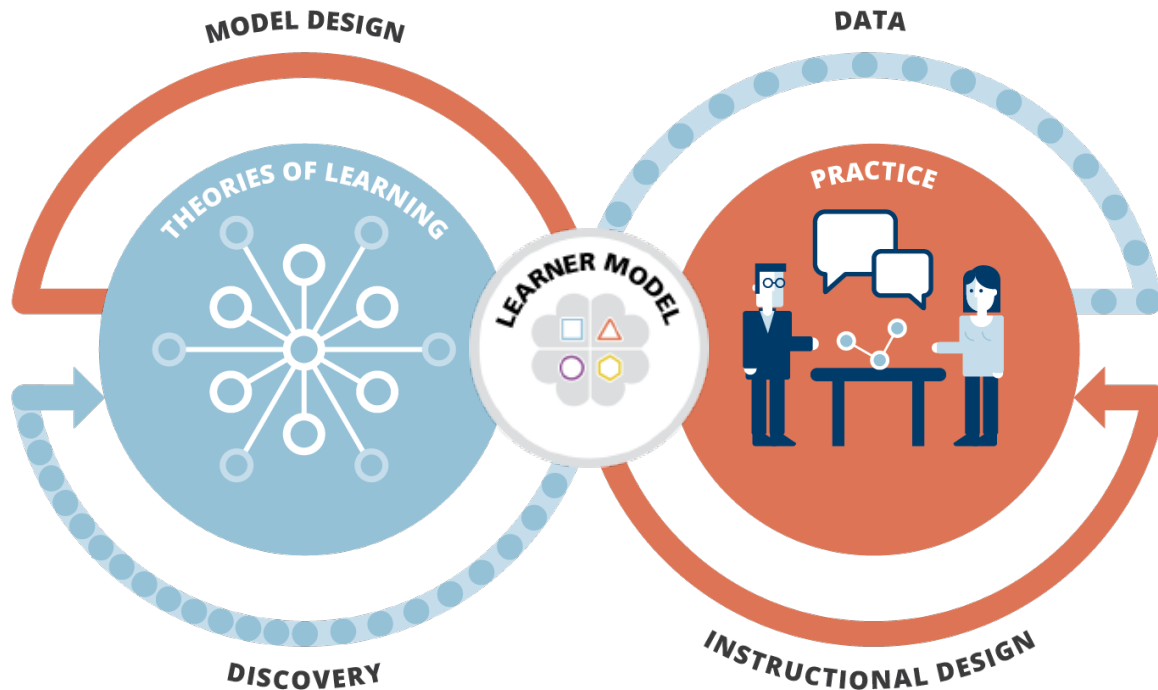
- Learning science informs educational practice and learning model design.

- Data from instrumented educational practice informs the model and new insights in the learning sciences.

- Courses intentionally designed for data collection and analysis lead to better learning outcomes for students from any background or place.

Key Ideas in Learning Engineering

- Focus on how learning is designed and improved
- Move from intuition-based design toward data-informed design
- Incorporation of learning sciences and key ideas, like "learn by doing[2]"
- Making learning something that can be observed
- Learning design as hypothesis
- Data drives feedback loops to students, instructors, learning designers, and the learning sciences
- Instrumented content drives learning analytics

2. Koedinger, K. R., Kim, J., Jia, J. Z., McLaughlin, E. A., & Bier, N. (2015). Learning is Not a Spectator Sport: Doing is Better than Watching for Learning from a MOOC. Proceedings of the Second ACM Conference on Learning@Scale (pp. 111-120): ACM.

Imagine more robust Learning Sciences through the application of Learning Engineering…

- Know what designs, technologies, and processes work best for which learners

- Have repeatable, science-based, processes necessary for development and implementation of learning products

- Follow a code of ethics

- Replicate previous studies and develop a body of knowledge

- Scale effective strategies

Consider all topics in Learning Engineering

- Learning platforms and development of learning technologies
- Quality courseware design and design for learning analytics
- Learning principles to implement good design in an online learning environments
- Learning Engineering Ecosystems
- Evidence-based courseware improvement
- Courseware product development
- Courseware development project management
- Courseware Instrumentation, data collection, and analysis
- Curriculum design and development
- Learning analytic analysis and interpretation

LECIA 2021 Contents

- *The Doer Effect: Replicating Findings that Doing Causes Learning*
Rachel Van Campenhout, Benny G. Johnson, Jenna A. Olsen

- *A Learning Engineering Ethical Framework: Keeping the Learner Centered*
Rachel Van Campenhout

- *Advances in Gamification in Education*
Reza Hajari, WonSook Lee

Future Challenges in Learning Engineering

- Developing standards for learning portability and interoperability across technologies

- Attention to diversity, Equity, and Inclusion

- Ethical considerations for learning data and analytics

- Use of learning analytics to solve learning challenges

- Building the body of knowledge for application of Learning Sciences

- Learning asset development processes and management