

Learning Engineering Process
Strong Person
Produced by IEE ICICLE Design SIG
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What is Learning Engineering?

Learning Engineering is a [set of] **process**[es] and practice[s] that

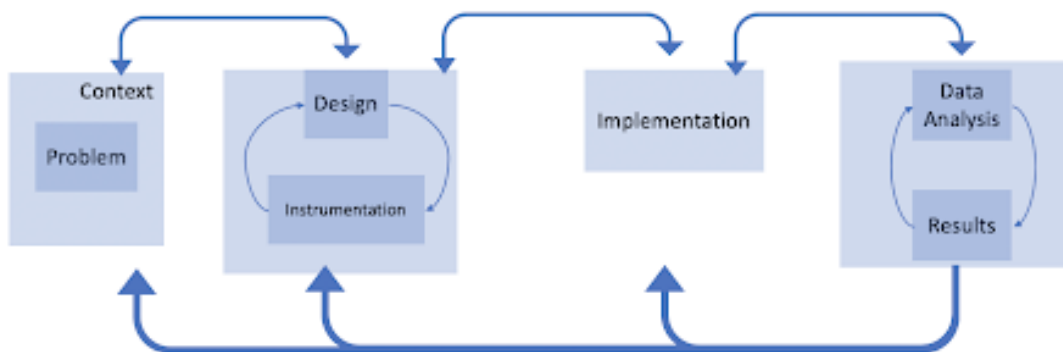
- applies the learning sciences
- using human-centered and engineering design methodologies and
- [Iterative] data-informed decision making

to support learners and their learning.

Some practices come from a tradition of learning design disciplines (UXD, ID/ISD, Cognitive/Ed Psych, learning sciences) other parts from science and engineering (systems engineering, feedback loops, computer science, data sciences, psychometrics, motivational sciences, learning sciences).

What does the Learning Engineering process look like and d

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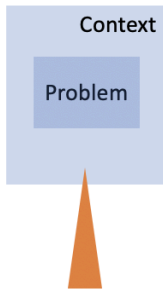
1. Start with a problem or challenge associated with learners and learning. These problems are often complex and will likely require decisions be made across multiple levels of the context system
2. Understand the context of the problem and problem space

- a. learner(s) (and other stakeholders)
 - b. contexts
 - c. Resources (pedagogies, technologies, modalities, learning sciences knowledgebase, modalities, tools, ...)
3. Select a team to solve the problem. The talents needed will depend on the kind of the problem to be addressed.
4. Engage in multiple rounds of design iteration focused on developing a solution in combination with,
5. Engineering the instrumentation (data definitions, measurement method, measurement instruments, measurement tech...)
6. Implement the designed solution and collect data through instrumentation.
7. Data analysis to explore outcomes
8. Results of data analysis bring to light gaps in the solution's ability to fully/ideally solve the problem and may result in more questions being asked from the data, the iterating on design decisions, or the need for more implementations
9. Filling in gaps can become a new problem to be solved or part of the previous processes iteration (return to step 1)

The representations that follow are presented linearly in order to better unpack and situate the different parts of the process. In reality, the parts of the process are likely considered and acted on concurrently. People engaging in this process might be contextually situated within very well defined and clearly articulated problem spaces, while others might be operating in diverse and ill-defined spaces. The key is that regardless of where you might fall on this continuum, the process used to develop solutions to enable learners to engage in learning experience are organized in ways that leverage the processes described above and represented below. What will differ, sometimes dramatically, is the specific sets of skills and knowledge necessary to solve

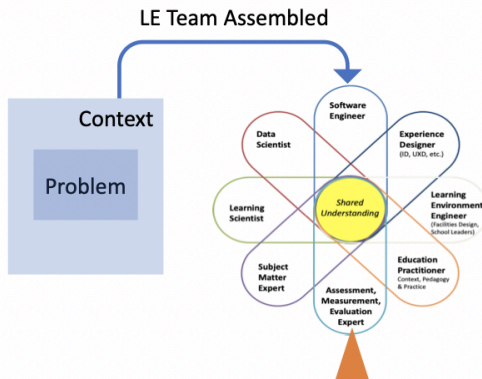
those problems (Goodell et al., 2020).

Learning Engineering Process - Defining the problem



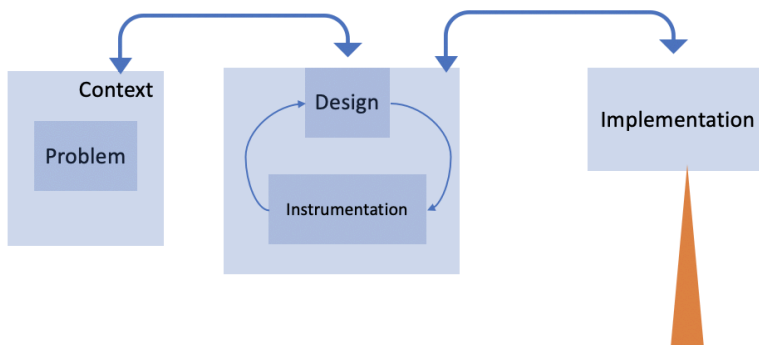
Define the problem to be solved and the contextual setting in which that problem is situated. This should include consideration of the learners, resources, and cultural settings in which the problem will be solved.

Learning Engineering Process – Establishing LE Team



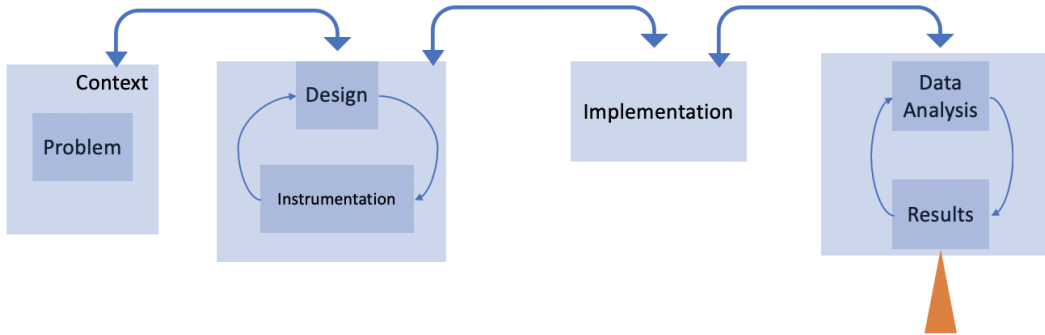
The problem to be solved will dictate the human resources that need to be utilized in during the next step of the process. In some instances problems might be solved by a single person with a broad set of skills. More likely a team of professionals with deep expertise in varying range of areas will need to collaborate in order to design, produce, and implement viable solutions.

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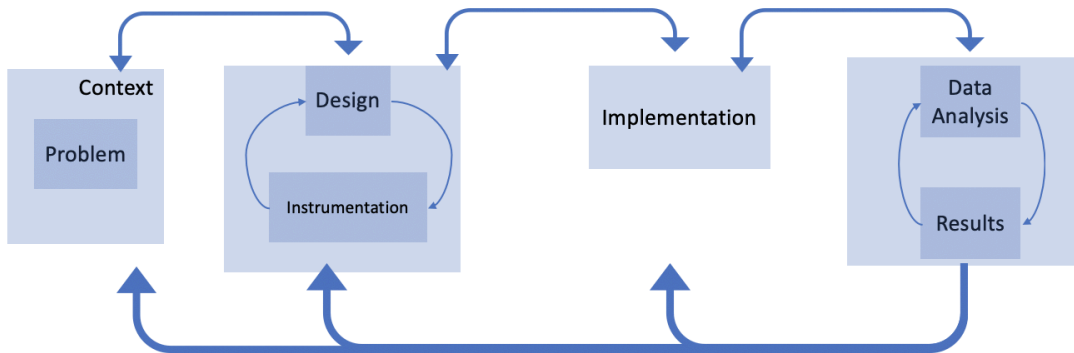
The designed solution is implemented with learners in authentic ways. Data is collected throughout the implementation using designed instrumentation

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Data is analyzed with results likely informing other data analysis. This whole evaluation informs the understanding of the problem and solution. Often the process as a whole, and this part specifically, will be completed at scale.

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Insights from the Evaluation feed, inform, and help identify problems and the iterative solutions used to address them

Why call this a StrongPerson - A “straw man” proposal is one intended to elicit feedback and discussion of the limits of the work in order to generate a more refined and better structured argument or idea. The development of many of the ideas associated with LE have already gone through that process. This document and the representations within is intended to bring all of that work together into a more well-formed version of this work, which is still open for further

feedback and development. Thus, we are putting forward a “strong” argument that our vision will hold up. Finally, I am hoping the change to “person” does not require much justifying in this community.

References:

Goodell, J., Kessler, A., Kurzweil, D., Koldner, J. (2020.) Competencies of Learning Engineering Teams and Team Members. In IEEE ICICLE proceedings of the 2019 Conference on Learning Engineering, Arlington, VA, May 2019.