Tools Collection

This document is a collection of tools used in the Learning Engineering Process.

Learning engineering tools refer to software applications or platforms that support the design, development, implementation, and evaluation of effective and efficient learning experiences. These tools are designed to assist learning professionals in creating and delivering high-quality educational content, such as online courses, training programs, simulations, and assessments.

Learning engineering tools can include a variety of different technologies, such as authoring tools, learning management systems, learning analytics software, adaptive learning platforms, virtual and augmented reality tools, and more. These tools help to automate and streamline various aspects of the learning process, from content creation and delivery to learner assessment and progress tracking.

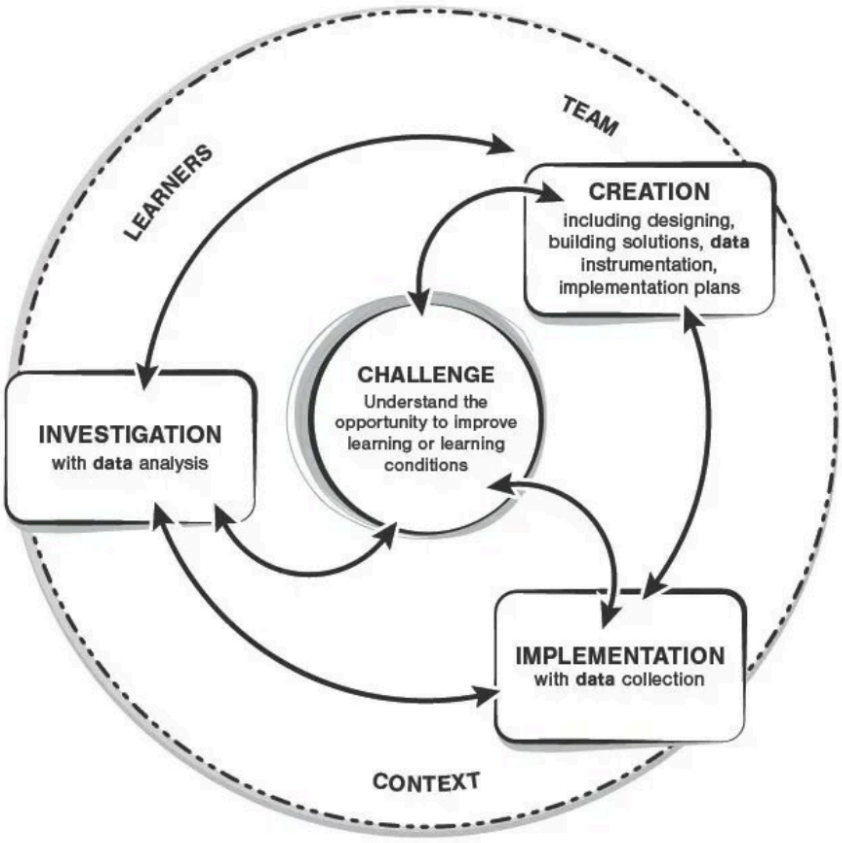

FIGURE 1.1. The learning engineering process

Categories:

- LMS
- LRS
- Learning design
- Data Analysis
- Assessment
- Instrumentation
- Repositories
- Research
- Testing
- Collaboration
- Learning (student use)
- Templates/checklists (shareable)

Information to collect about each: (use prompts in the field) - break into categories

- **Name of tool**
- Owner of the tool/publisher
- Open Source/proprietary/subscription
- Does it have a free trial/version
- website/where to find
- Associated Training resources
- Short Description
- **Categories/Descriptive? (align to toolkit)**
- Domain(s) - align to CCCs
- Contextual relevance to learning engineering/LE process
- Related research/publications
- Ease of use/efficacy
- Associated use cases
- Submitter information (name and affiliation)
- Authentication mechanisms
- Date last used/updated/release cycle
- How often used
- How many users
- Support
- Integrations
- Rank/use
- Is source code available
- Standard used
- Analytics available from the tool

Tools:

- Terracotta (connects with canvas to run experiments, A/B)
- Upgrade
- Assistments
- Datashop
- LearnSphere
- Caliper
- xAPI
- Articulate
- Yet Analytics
    - Yet SQL LRS Learning Record Stores
    - Yet LRSPipe Data filter-forwarders governed by xAPI Profiles
    - Yet Centriph Platform for xAPI Profile Authoring
    - Yet DATASIM for Synthetic xAPI Data Generation
- Eduworks

Survey design (see notes below):

Goal: survey the ICICLE community about existing tools they use. Collect data about the context in which they use it, in order to share these tools with the community, after getting feedback and outlining the main insights and how-tos.

Constraints: short survey, couple questions (4-5 max). Has to be insightful too for survey takers (they should find value when completing the survey already).

Questions:

- Few questions to situate the responder:
    - Role? Organization? (research/industry/other) Manager?

- Here is the list of tools in our database - see LE Tools (high level view with usecases)
    - Please check all tools you are using on a regular basis / you've used once / you're an expert in.
        - Objective: get a sense of mostly used tools across the LE community

List of current tools: as examples of tools we're collecting… (spark ideas about context)
Terracotta, Upgrade, Assisstments, LearnSphere, xAPI, Caliper, Articulate, Eduworks, CourseTune, Datashop, Google Docs, CTAT, - Veracity, Watershed, Yet -, CASE?, CASS? MODSIM prototype? MOODLE, Learning Locker, GIFT (Generalized Intelligent Framework for Tutoring), Advanced Distributed Learning (ADL)
OLI
Canvas

Provide the list for now

Encourage everyone to at least fill out 1 tool

take about 10min - top of mind - last tool they touched in LE

- **Please add any other tools you are using as part of your LE tasks + details**
    - Tool name (1 line)
        - (underlying tools question: Which tool?)
    - Free trial/version? (1 line)
        - (underlying tools question: How easy to use?)
    - Platform? (1 line)
        - How easy to use? Potential audience

    - Do you use it with other stakeholders? If yes, who, and how do you collaborate? (~3 lines)
        - (underlying tools question: what is the collaborative context?)

    - How often do you use this tool? (1 line)
        - (underlying tools question: what is the timeline context ~ LE process?)

    - Provide a detailed example of how using this tool look like (feel free to refer to parts of the Instrumentation flow: Planning - Goal setting - methods - metrics - data collection - analysis - reports - iteration)
        - (underlying tools question: How do you use the tool in context?)

- How do you share results from the tool? Please detail stakeholders you're sharing results with, and how smooth the communication is (4-5 lines)
    - (underlying tools question: Adapted language or communication skills needed?)

- One lesson you've learned with this tool? Something unexpected when using this tool?
    - Tool's specific usage features - multiple MIGs could be interested

- If you can share examples/links of case studies, worked examples of the tool for LE
    - Document specific use cases of the tool - be used by multiple MIGs

Sending to our list for the Tools SIG -
Agenda community meeting - larger group at the community meeting?
Introduce it and Jodi send it out in the newsletter
Sending it out x times

Send Another survey later to get

Notes

Notes from the October 2023 meeting:

- **LLM as part of the LE process? Definitions should be worked (Is it a tool itself or is its integration a tool?)**
- **Invite speakers to the Tools SIG meeting**
- **Tools info collection survey to be sent out to the community to gather information**
- **How to best share the tools with the diverse ICICLE community?**

LLm? Classify in terms of technology? Research around it now? Looking at papers, possible LLMs, if becoming a real tool?
Data collection or data generation?

Environment has functionalities associated? Is the model the tool or is it the LLM? Tools SIGs: future of LLM and Learning Analytics - CMU, Stanford, MIT, etc.
Papers – is it a tool, for learning
LEs need to be aware of the advancements in LLMs -

strategies, segments

→ names, list potential people talk about their research, then decide

- List of researchers in the field from the google learning engineering group
- **Start a document** and share to collect data about potential invitees around LLMs and their use cases, limits, etc.
    - UC Irvine professor - Empowering Learners conference - recordings
    - Discuss tools at the conference

- Tools database - LLMs, let conversation spark around that
- Google potential databases? Teaching tools - google teaching machine?

How do you use it
With whom
How often
Examples

Need to know how many other people use these
Constrain the submissions
Use case library

Different roles tracing through a day in the life

- Survey:
    - Put their name in too
    - Check off the tool they have expertise in - less centralized management
    - Check off the ones they have been using casually → crowd source

- Tools information -
    - Name
    - Author
    - Description: case study or metadata associated? Market segment / use cases / searchable
    - Categories → MIGs could be related, audience, platform, free trial
        - Other ideas:
    - Price - free trial?
    - Technology behind the tool? Learning analytics - if LLMs, which ones?
    - Crowd usage of the tool? Proportion of people using it
    - Platform?

- List of tools collection processes

    - Google Teaching machine -
    - Google forms
    - Airtable? Set up a form, for use case. Added to db. User friendly process

- Tools for different MIGs:
    - Classified under different MIGs - preK12, platforms, etc.
    - Take the information, use it in particular contexts
    - Add it to their particular use cases - higher ed, etc.
    - Work supporting the other MIGs, exploration for particular contexts
    - Overlapping tools - Jody on standard format case studies
    - Case studies vary across contexts, we would focus on tools use cases, parameters of our own unique features in LE
    -

Survey questions:

This might be a great question for a mini-survey of the ICICLE and/or SOLAR communities: "Name one lesson about instrumentation you've learned the hard way."

December 2023 survey

Tools survey draft improvements - Jim's feedback

- 2 parts:
    - The tools we currently have: software tools and platforms for engineering learning experiences
    - The tools we want to collect: all others from the list

Tools being part of the following key processes:

Knowledge Domain Modeling

Root Cause Analysis

Activity Modeling

Learner Modeling

Instrumenting

Design and Development

Data Analytics

Implementation and Iterative Improvement

Jim's feedback:
The definition of "learning engineering tools" in the draft survey is ***dangerously too narrow****, i.e. "Learning engineering tools refer to software applications or platforms that support the design, development, implementation, and evaluation of effective and efficient learning experiences. These tools are designed to assist learning professionals in creating and delivering high-quality educational content, such as online courses, training programs, simulations, and assessments."*
We've worked hard to counter the ideas that learning engineering is just about edTech silver bullets or just about learning experiences. There are so many other factors that impact effective learning and we do the field a disservice to signal that we agree with the naive community that believes edTech silver bullets can solve ALL of the challenges. Learning engineering includes engineering solutions to challenges that don't necessarily use software, and solutions other than learning-experiences---such as donkey carts to get students to school or physical or social learning environments conducive to learning, such as meta and micro motivational constructs that help learners persist. Learning engineering is about improving learning, using human-centered engineering methodologies, learning sciences, and data-informed decision-making ...no matter what it takes and no matter what the nature of the challenge is. Learning engineering is not limited to eLearning.

Tools may include, but are not limited to:

- *process tools that help LE teams better define challenges*
- *reusable design patterns*
- *reference tools that help LE teams better identify and apply learning sciences principles pedagogies (or andragogies) in solutions*
- *learning analytics methods, algorithms, ...and software tools*
- *knowledge ontologies and data models*
- *instrumentation components (including hardware sensors and human-computer interfaces--not just software and platforms)*
- *research methods*
- *human-centered design tools (e.g. persona templates, process frameworks) and techniques*
- *interoperable components that may be used in modular solutions (broadly defined--may include hardware, e.g. sensors, and software, but may include lower tech components supporting improved learning conditions e.g. sound insulation in a noisy learning environments*
- *AND yes, software applications or platforms that support the design, development, implementation, and evaluation of effective and efficient learning experiences*

If all we care about for this survey are software tools and only for learning experience delivery then please relabel the survey as "software tools and platforms for engineering learning experiences" AND put in strong disclaimer language that this is a very narrow category within a broader set of tools used by learning engineering teams.

These tools may include, but are not limited to:

- Process tools helping Learning Engineering teams better define challenges

- Reusable design patterns, and human centered design tools (persona templates, frameworks) and techniques

- Reference tools related to the identification and application of learning science principles in solutions

- Learning analytics methods, algorithms, software

- Knowledge ontologies, data models

- Instrumentation components including sensors, interfaces, platforms and software

- Research methods — maybe leave this one for now

- Components used in modular solutions (can be hardware e.g. sensors or software, or lower tech improving learning conditions e.g. sound insulation for learning environments)

- Software applications or platforms that support the design, development, implementation, and evaluation of effective and efficient learning experiences