



# IITSEC 2024



NTSA

## A Machine-readable Narratological Approach to the Design of Human Performance Descriptions for Synthetic Training Environments



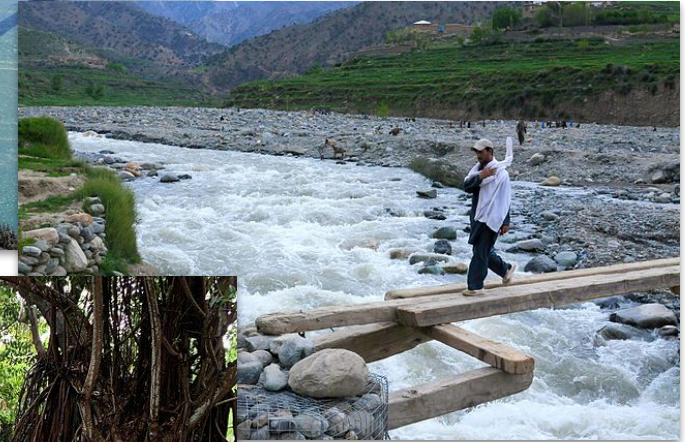
**Shelly Blake-Plock, Yet Analytics**  
**Andy Johnson, Advanced Distributed Learning**  
**Cliff Casey, Yet Analytics**



# Introduction

Not all **xAPI Profiles** are designed in the same way.

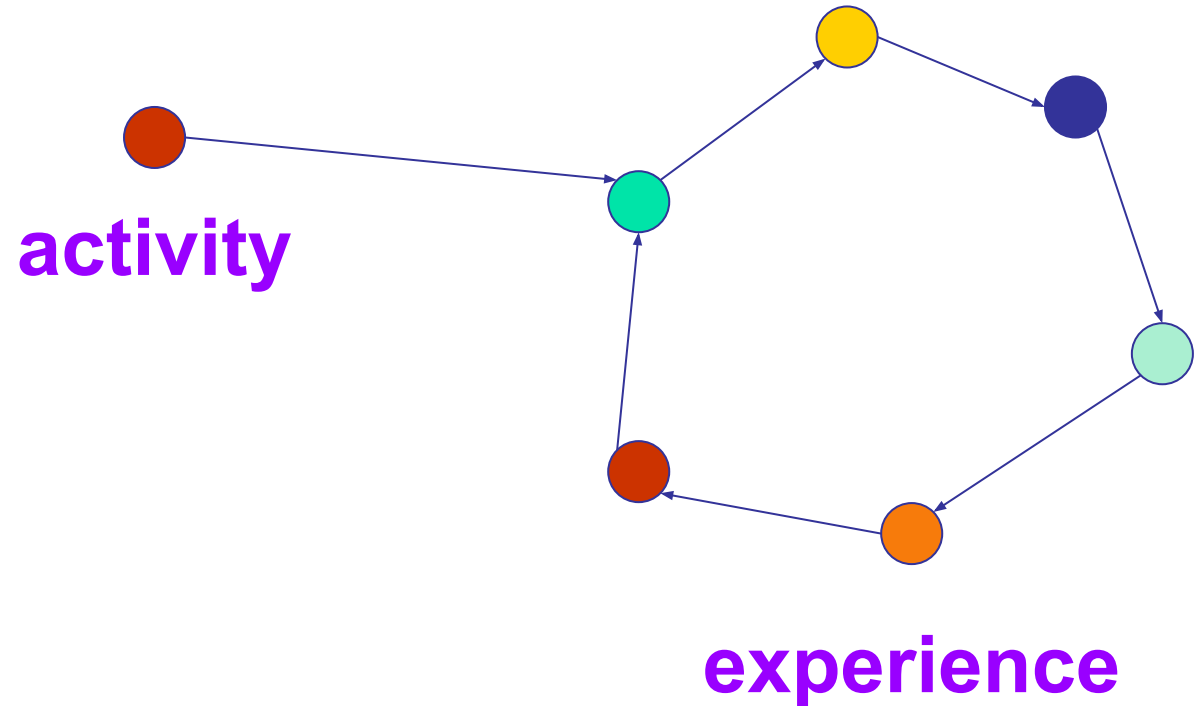
Because not all **xAPI Profiles** are used in the same way.



# Machine-readable: xAPI & xAPI Profiles

**xAPI** describes discrete learning activities.

**xAPI Profiles** describe learning experiences.



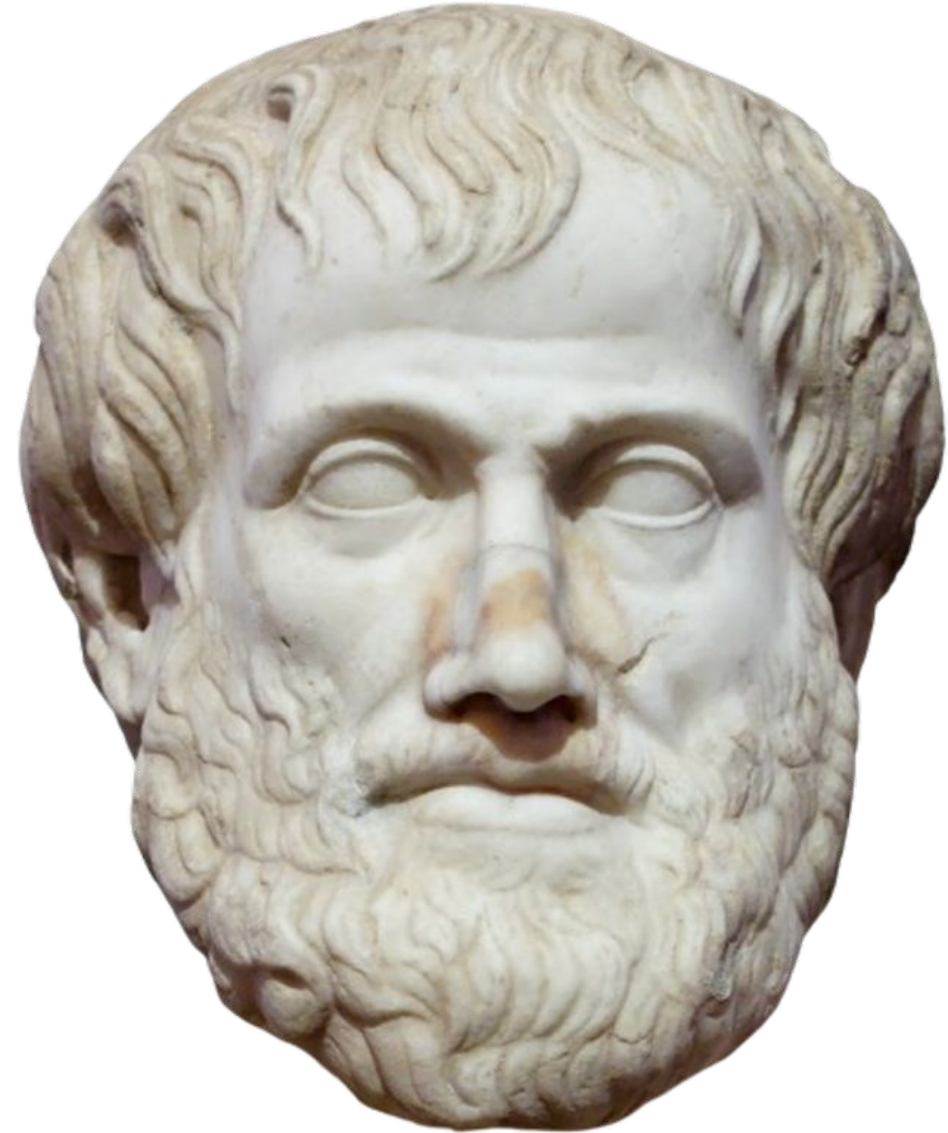


**Proairesis** – a rational choice of potential actions

- Aristotle

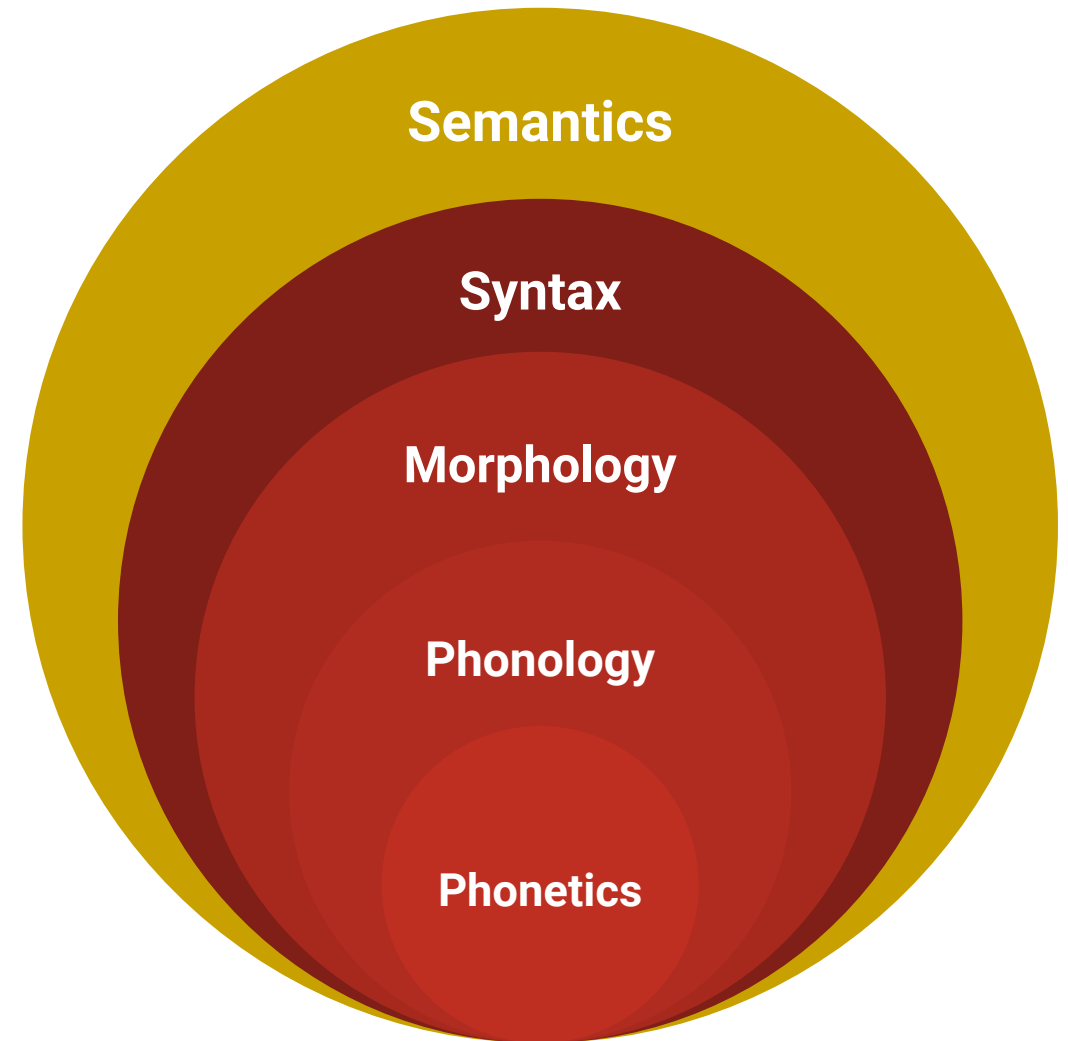
**Narratology** – all narratives share organizational features

- Roland Barthes



**xAPI Profiles** contain the semantic information to describe what activity occurs during a learning experience.

**Synthetic environments** are perfect sandboxes for activity-based semantic data profiles.



# Systems-based approaches

**Goal:** Capture all activity available and defined within a closed system.

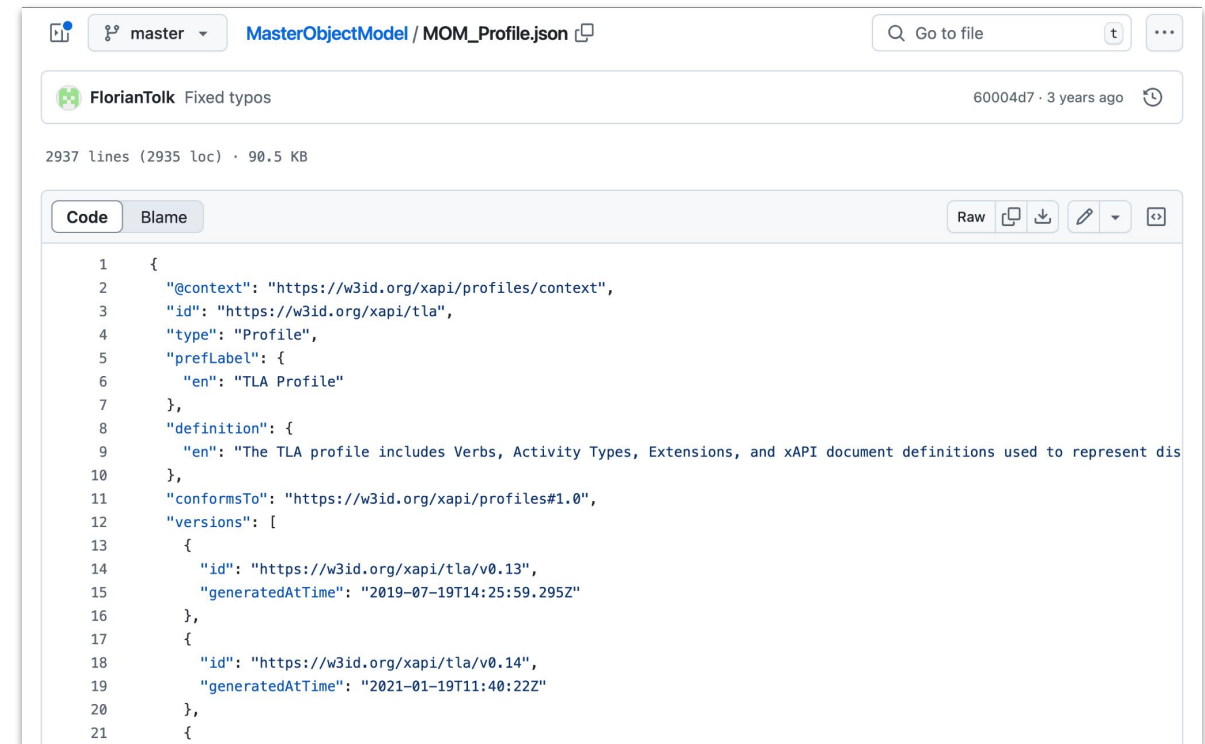
**Example:** The xAPI Profile for Video is built to capture activity present in the mechanics of a video player regardless of the content played.



# Systems-based case study: MOM

**In 2018**, ADL created the **Master Object Model (MOM) xAPI Profile**.

**MOM** identified the completion of an event within a defined system. “What” the event meant or “how” it happened was out-of-scope.

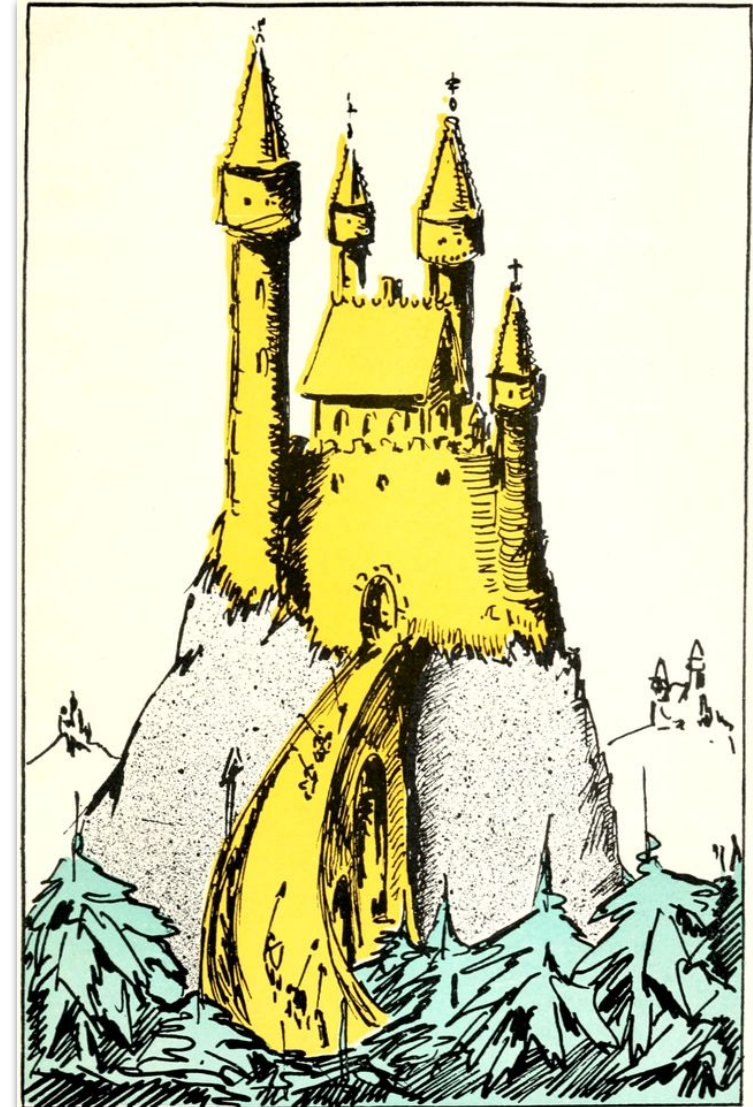


```
1 {
2   "@context": "https://w3id.org/xapi/profiles/context",
3   "id": "https://w3id.org/xapi/tla",
4   "type": "Profile",
5   "prefLabel": {
6     "en": "TLA Profile"
7   },
8   "definition": {
9     "en": "The TLA profile includes Verbs, Activity Types, Extensions, and xAPI document definitions used to represent dis
10  },
11  "conformsTo": "https://w3id.org/xapi/profiles#1.0",
12  "versions": [
13    {
14      "id": "https://w3id.org/xapi/tla/v0.13",
15      "generatedAtTime": "2019-07-19T14:25:59.295Z"
16    },
17    {
18      "id": "https://w3id.org/xapi/tla/v0.14",
19      "generatedAtTime": "2021-01-19T11:40:22Z"
20    },
21  ]
22 }
```

# Narratological approaches

**The narratological approach** begins in storytelling.

**The story** guides how the elements are eventually broken down and placed into the appropriate sections of the data model.



# Important to note

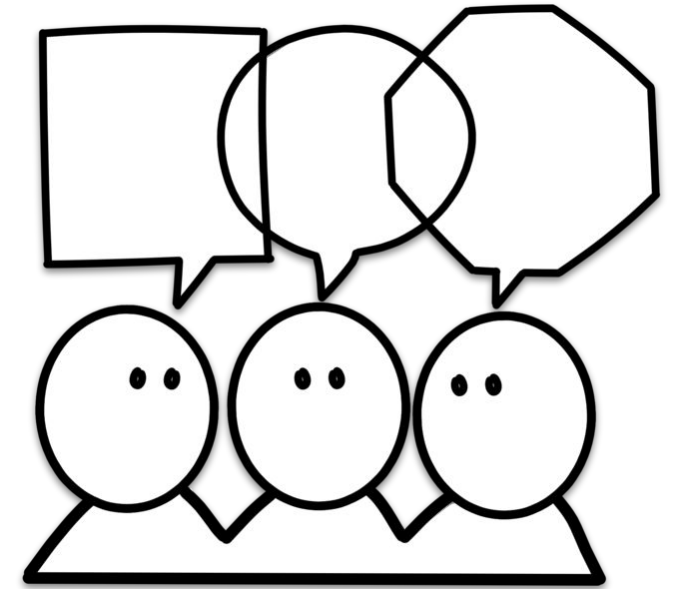
**Note** that one approach is not “better” than the other. Rather, each approach has an appropriate application.

**The narratological approach** is specifically intended to ensure that the actual learning journey – the path – is not lost in the effort to capture whatever data the system can offer.



**In synthetic training**, communications between participants can be tracked in real-time to add to the description of a learner.

**So, we began by ignoring that xAPI existed.** Instead, we wrote the “story”. The xAPI design then fleshed out the “rational choice of potential actions” comprising that story.



# Types of questions to ask

## “Play-by-play”

- Who were the key characters?
- How did they relate to one another?

## “Color commentary”

- How do we distinguish the experience of the learner from random noise?
- How do we separate intent from chance?

# Comparison of approaches

	Step 1	Step 2	Step 3	Step 4
<b>Systems-based</b>	Brainstorm verbs related to activity	Disambiguate collected verbs	Associate verbs with trackable activities	Place into Profile
<b>Narratological</b>	Write a story	Identify actions in the narrative	Render actions: verbs & context	Place into profile

**A narratological approach to xAPI Profile design can support the design of learning experiences that increase the ability to understand things through the learner's eyes.**



# Conclusions

**System-based design** produces models and variables that are more abstract – therefore they can be applied widely, but may introduce unintended ambiguities.

**Narratological methods** retain the shape of the story – and outlying or unintended info can be identified by anyone who knows the story. But it can be demanding as a data designer to cover all of the potential pathways of a story.

**Expand the narratological approach** to include linguistic-symbolic and cultural codes as well as rule-based semantics. And then moving into pragmatic language – words in the context of discourse.

**Design best design practices** for use in human performance descriptions which could be used to model AI agents – and test in a variety of synthetic training scenarios.