

A Taxonomy for Data Capture in VR and AR

Mrs. Dottie Lindsey
JCA Solutions

A Taxonomy for Data Capture in VR and AR

By Dottie Lindsey

“Td rather talk about dogs than about me.”

–Donald McCaig

All the shorthand

- VR - Virtual Reality
- AR - Augmented Reality
- xAPI - Experience Application Programming Interface

Overview

- Why does any of this matter?
- What is xAPI?
- Why does xAPI matter for Virtual and Augmented Reality?
- What does a taxonomy for xAPI look like?
- How is an xAPI taxonomy utilized?
- What comes next?

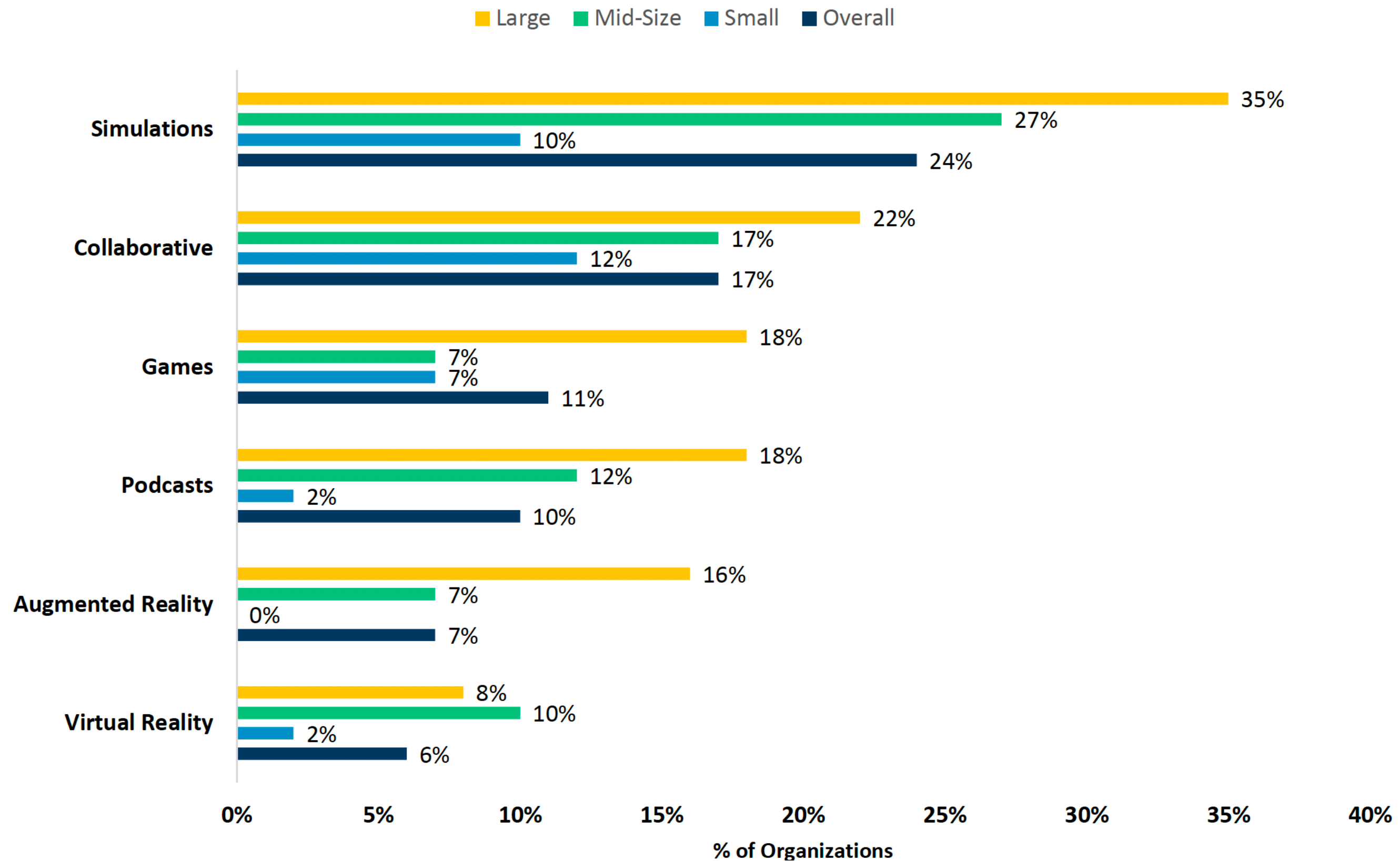


According to Brandon Hall Group’s research:

Developing an eLearning course	takes an average of 106 hours	Developing training programs	takes an average cost of \$184/hour
Produce a simulation	takes an average of 96 hours	Simulations	represent a savings of more than \$2,000/program

Comparing Costs

Image courtesy of Training Magazine



Compliance training methods used by organizations

Image courtesy of Brandon Hall Group's 2017 Compliance Training Survey

What is xAPI?

- A standard designed to be simple and flexible
- Consists of statements
- Statements are required to have an actor, verb, and object
- Utilizes profiles for definitions

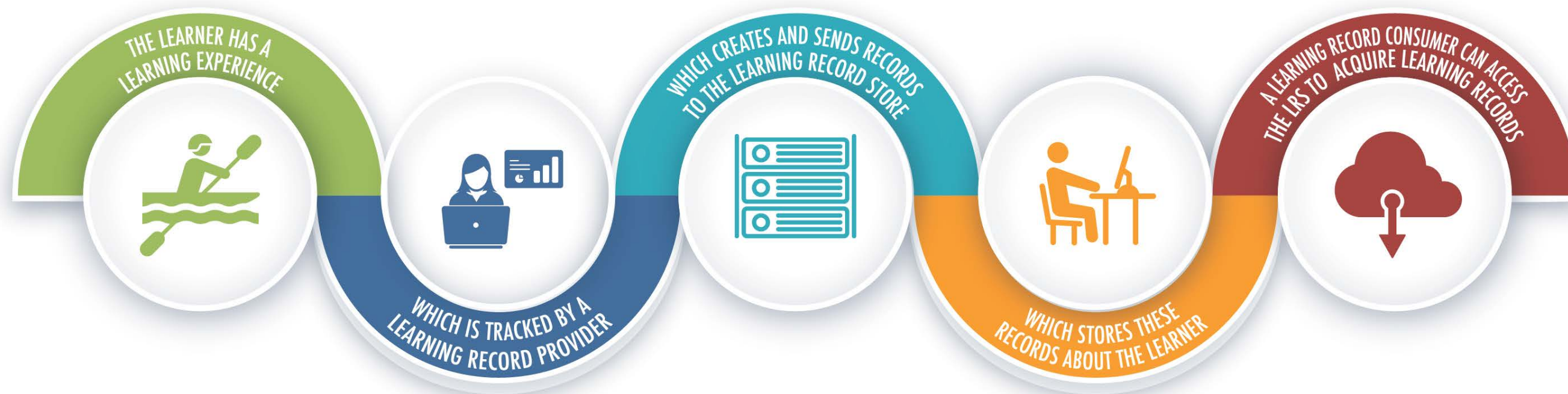

```

{
  "actor": {
    "objectType": "Agent",
    "name": "Student",
    "mbox": "mailto:student@jcasolutions.com"
  },
  "verb": {
    "id": "http://adlnet.gov/expapi/verbs/passed",
    "display": {
      "en-US": "passed"
    }
  },
  "object": {
    "id": "http://myexample.com/training/HowToPetADog",
    "definition": {
      "name": {
        "en-US": "How to pet a dog"
      },
      "description": {
        "en-US": "A basic lesson in greeting dogs safely"
      },
      "type": "http://adlnet.gov/expapi/activities/lesson"
    }
  }
}

```

Example xAPI Statement

A student actor passed the
“How to pet a dog” training

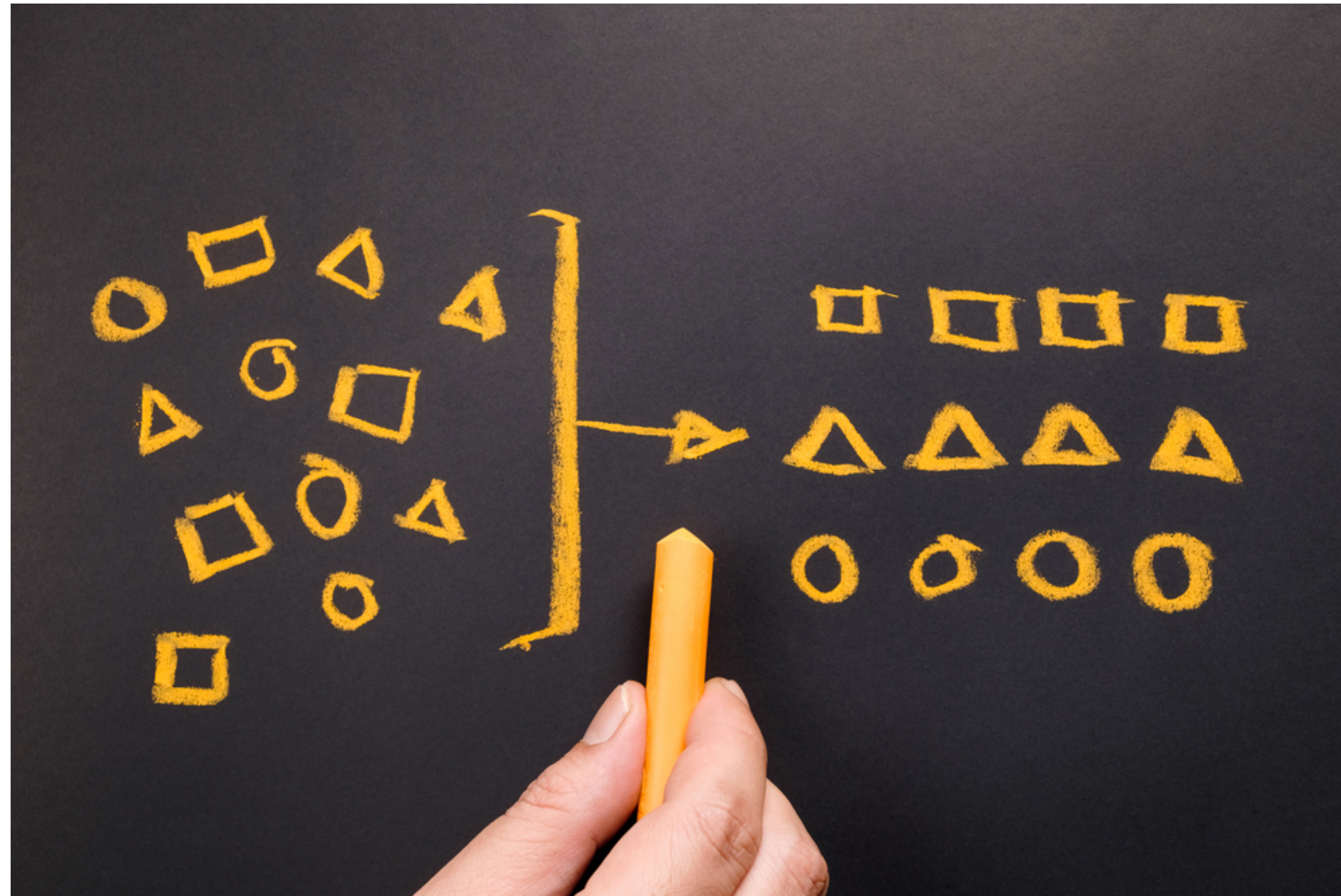


Data Flow in xAPI

Image courtesy of the xAPI Specification

What Is A Taxonomy?

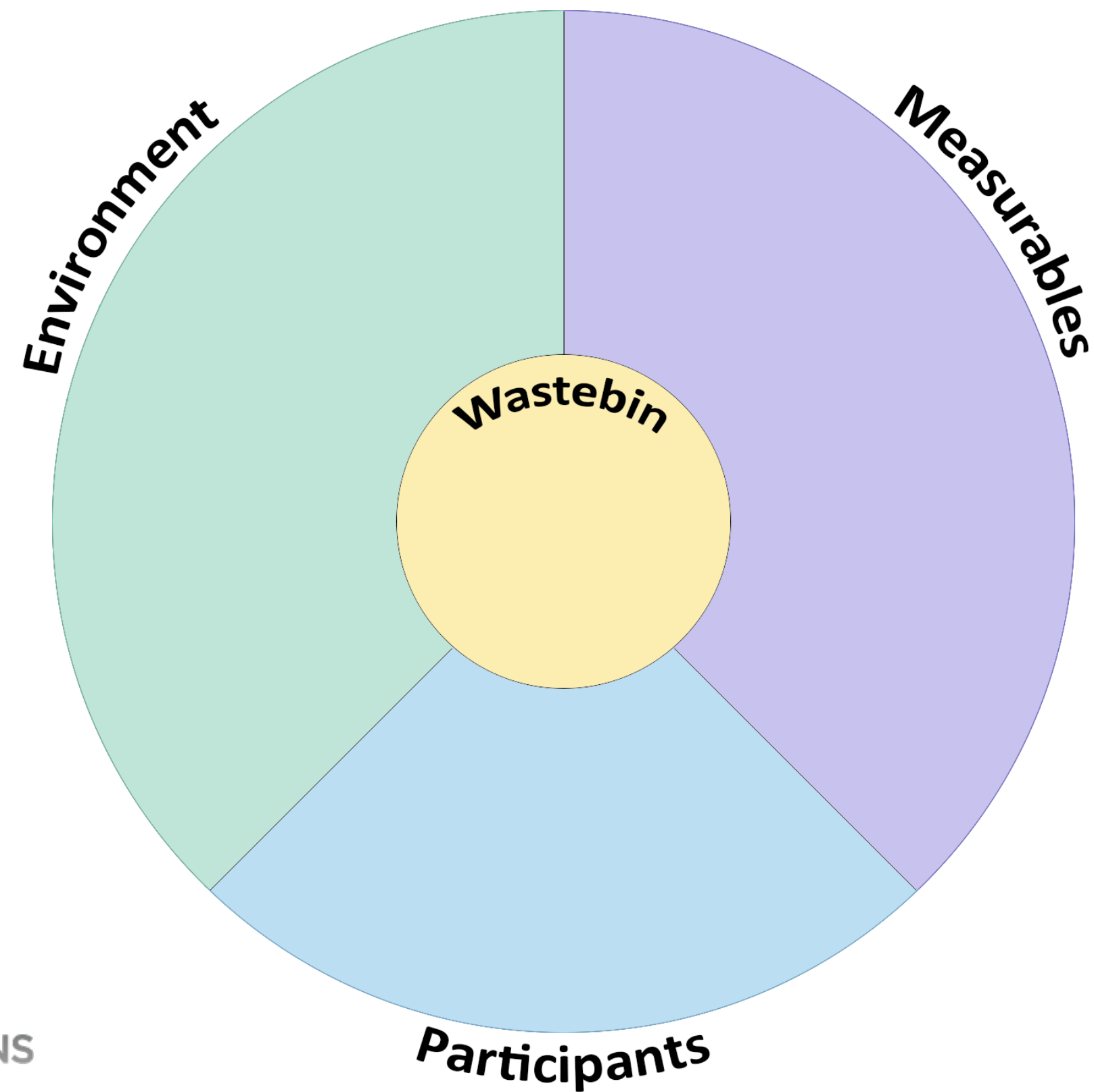
The outline before the blueprint



Why do we need one?

- Clarifies a project specification
- Instructs the design of a project
- Helps identify existing xAPI profiles that may be of use
- Ensures that the need for a new profile has been vetted
- Enables a the creation of a new profile where appropriate
- Gives an overview of what reporting can be done

The Beginning of Our Taxonomy



What are some questions you should be asking?

- What are the specific goals of your training?
- Is the training new or is it a conversion?
- What data do you need to pull now versus in the future?
- What are your edge cases?
- Why are you using AR/VR?
- What equipment do you need?
- What does your taxonomy look like?
- How much of this data can be captured by xAPI statements?
- Can we use existing xAPI profiles?

Dog Interaction Training Example

Ask, Greet, Pet



What data do we need?

- Whether or not the student has successfully completed tasks in the correct order
- How nervous the student was
- Which dogs the student asks to pet
- Which dogs the student pets
- Which steps are missed most often
- Where the student is looking

What data might we need in the future?

- How long the student spends petting a dog
- What types of dogs the student chooses not to greet
- Whether or not the student recognizes aggressive behavior
- Whether or not the student recognizes nervous behavior

What are some edge cases?

- A student never approaches a single dog
- A student spends way too long petting a dog
- A student never gets to the step that marks the training as complete
- A student does not figure out the correct hand gesture

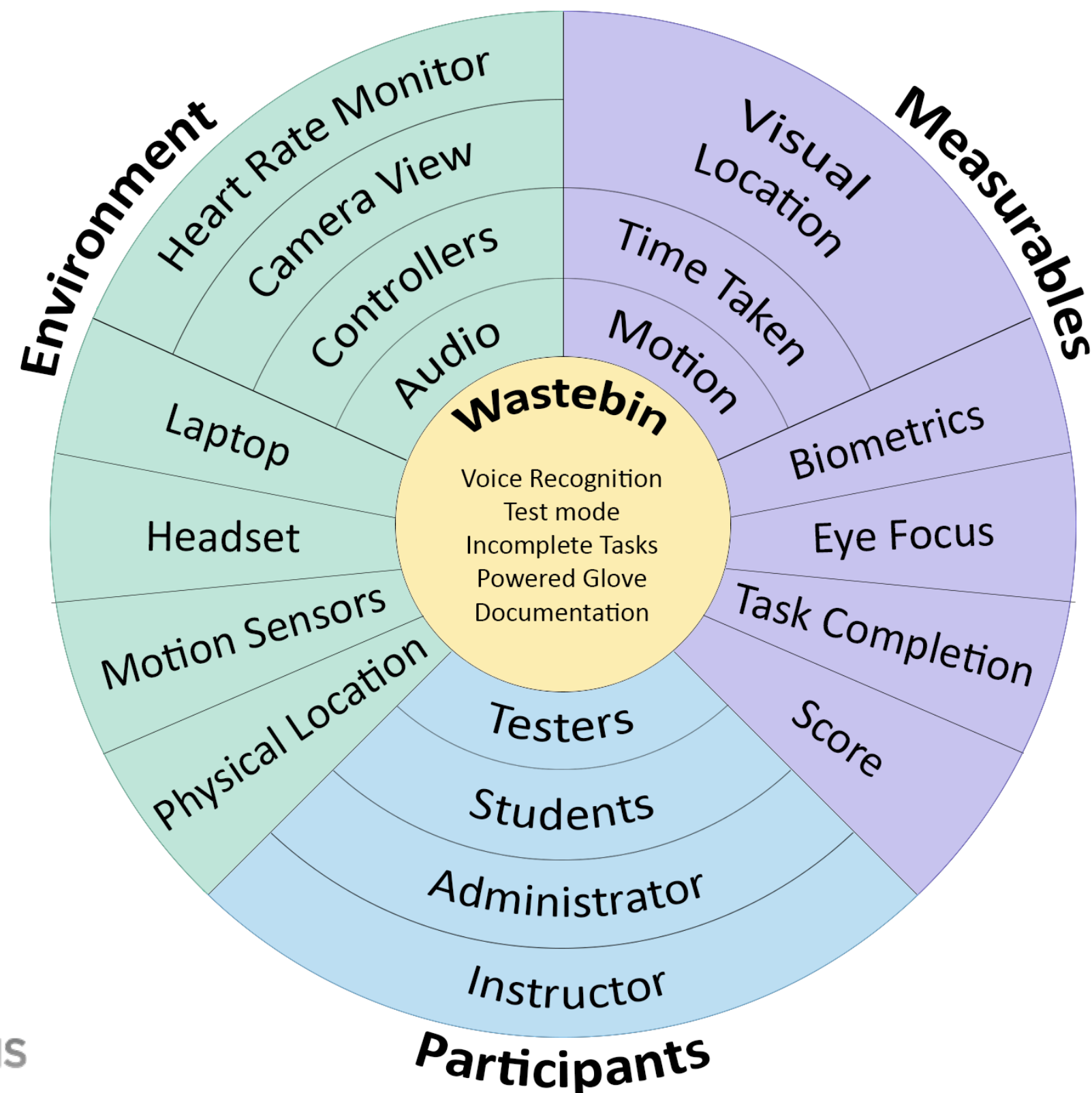
Why use AR or VR?



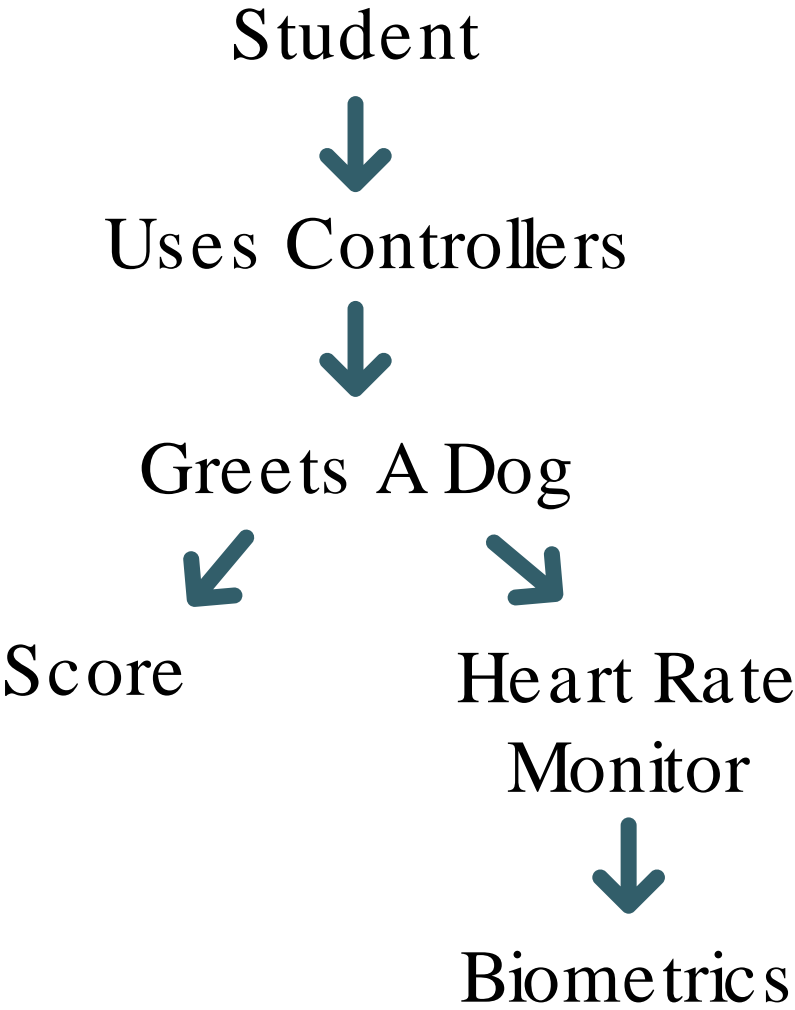
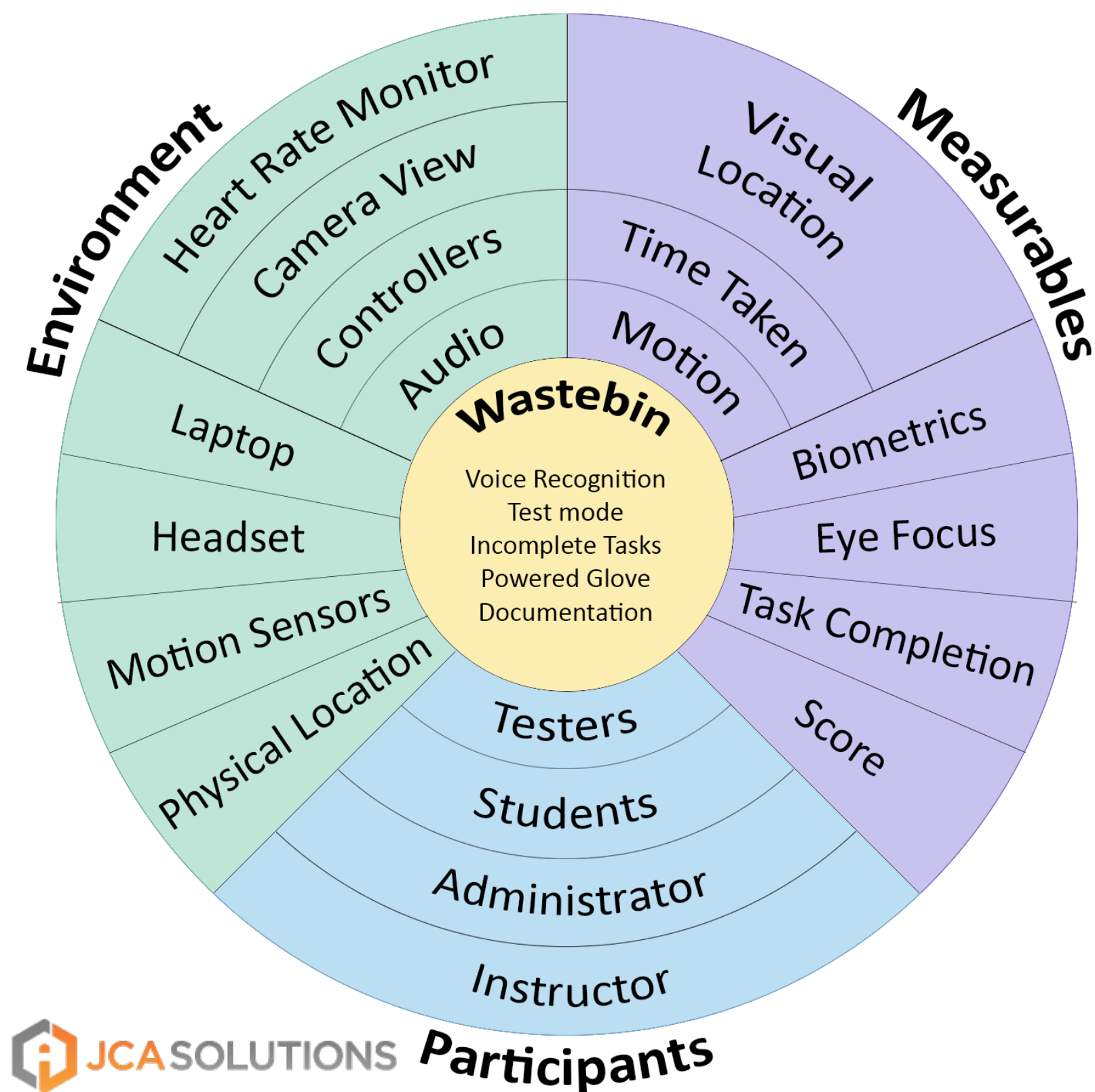
What equipment do we need?

- Laptop
- Headset
- Motion Sensors
- Controllers
- Heart rate monitor

Our new taxonomy



Filter student data through the taxonomy



How much of this data can be captured by xAPI?

The flexibility of xAPI allows almost all data to be captured. Restrictions come from data points that are hard to measure and funding.

Can we use existing xAPI profiles?

Yes!

	SCORM	ADL Vocabulary	Serious Games
Verb	Passed	Interacted	Accessed
Activity	Lesson	Simulation	Non-Player- Character


```
{
  "actor" : {
    "objectType": "Agent",
    "name" : "Student",
    "mbox" : "mailto:student@jcasolutions.com"
  },
  "verb" : {
    "id": "http://adlnet.gov/expapi/verbs/passed",
    "display": {
      "en-US": "passed"
    }
  },
  "object": {
    "id": "http://myexample.com/training/HowToPetADog",
    "definition": {
      "name": {
        "en-US": "How to pet a dog"
      },
      "description" : {
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    "name" : "Student",
    "mbox" : "mailto:student@jcasolutions.com"
  },
  "verb" : {
    "id": "https://w3id.org/xapi/seriousgames/verbs/accessed",
    "display": {
      "en-US": "accessed"
    }
  },
  "object": {
    "id": "http://myexample.com/training/HowToPetADog/NPC/Dog1",
    "definition": {
      "type": "https://w3id.org/xapi/seriousgames/activity-types/non-player-character"
    }
  },
  "result": {
    "extensions": {
      "http://myexample.com/training/HowToPetADog/ext/heart-rate/value": 110
    }
  }
}

```

Example xAPI Statement

A student gained access to a dog (NPC) and the student's resulting heart rate was measured

Summary

Virtual and augmented reality are growing fields in training. As a standard, xAPI helps capture data without restrictions while avoiding miscommunication. Creating a taxonomy allows us to identify which data points are important, design effective reporting, and decide which, if any, xAPI profiles can be implemented.



Resources

- xAPI Vocabulary & Profile Publishing Server
<http://xapi.vocab.pub/>
- Brandon Hall Group <http://www.brandonhall.com/>
- xAPI-Spec <https://github.com/adlnet/xAPI-Spec>
- The Impact and Potential of Virtual Reality Training in High-Consequence Industries
<https://trainingmag.com/impact-and-potential-virtual-reality-training-high-consequence-industries/>
- Contact Info: dlindsey@jcasolutions.com