UTS
UNIVERSITY OF TECHNOLOGY SYDNEY

# Pragmatic data interoperability

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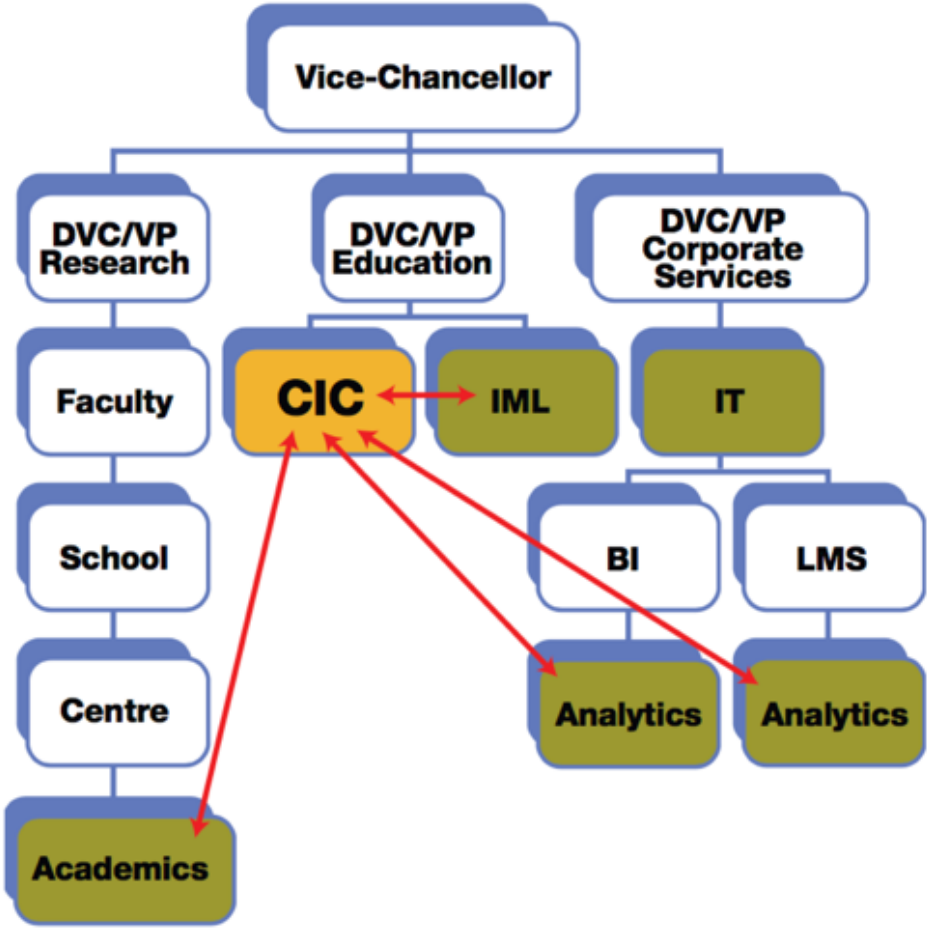
UTS:CIC
CONNECTED INTELLIGENCE CENTRE

utscic.edu.au

# what is UTS:CIC?

Connected Intelligence Centre

- UTS innovation lab specialising in Learning Analytics
- provides in house data science consultancy
- academics teach data science and perform research
- trains PhDs in Learning Analytics






Buckingham Shum, S., & Mckay, T. (2018). Architecting for Learning Analytics: Innovating for Sustainable Impact. Educause Review, 53(2), 25-37.

# some institutional context: UTS2027

## Learning for a lifetime

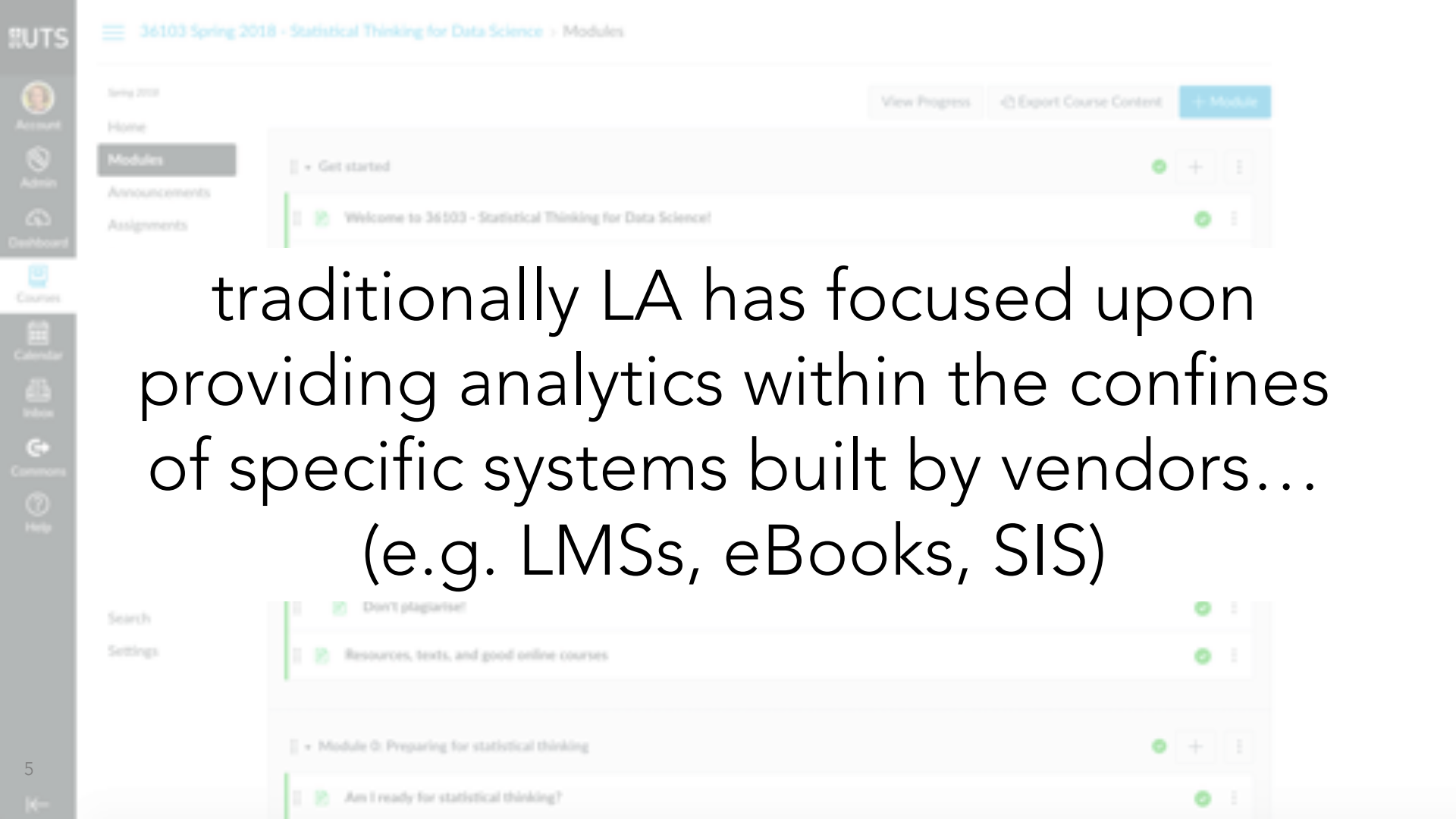
- "Our commitment to bringing about a transformation for society to a lifetime of learning means we must help curate and support learning and professional development for our students, whoever they may be, for their entire lives"

## Personal learning experience

- "Create a single, seamless experience learning platform. This will be a data-rich, single interface portal that dynamically adapts and supports a student's journey."

https://www.uts.edu.au/about/uts-2027-strategy

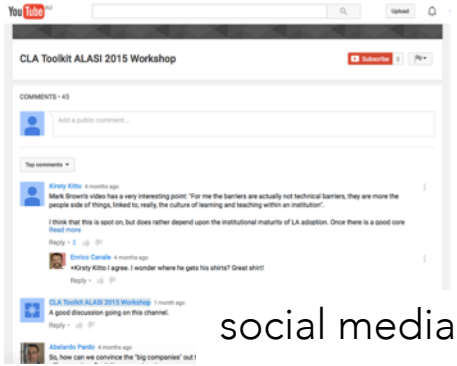
# where does learning happen?


traditionally LA has focused upon providing analytics within the confines of specific systems built by vendors…
(e.g. LMSs, eBooks, SIS)

but learning happens everywhere!

https://commons.wikimedia.org/wiki/File:Andrea_Leslie_helps_students_search_(8696541130).jpg

# the connected learning analytics toolkit




social media

Learning
Record Store

scraping

xAPI

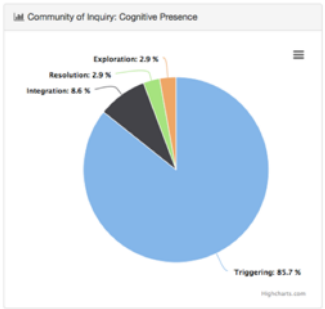
analysis

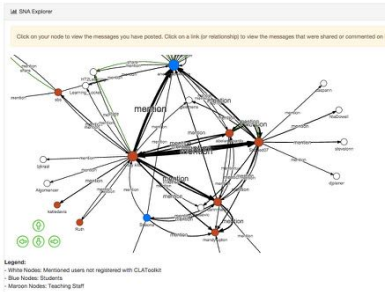
learning analytics

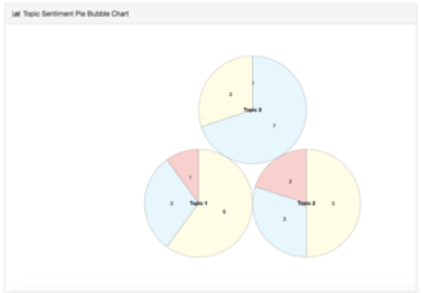
students

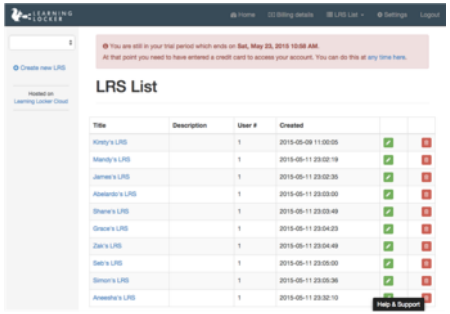
academics

admin & developers



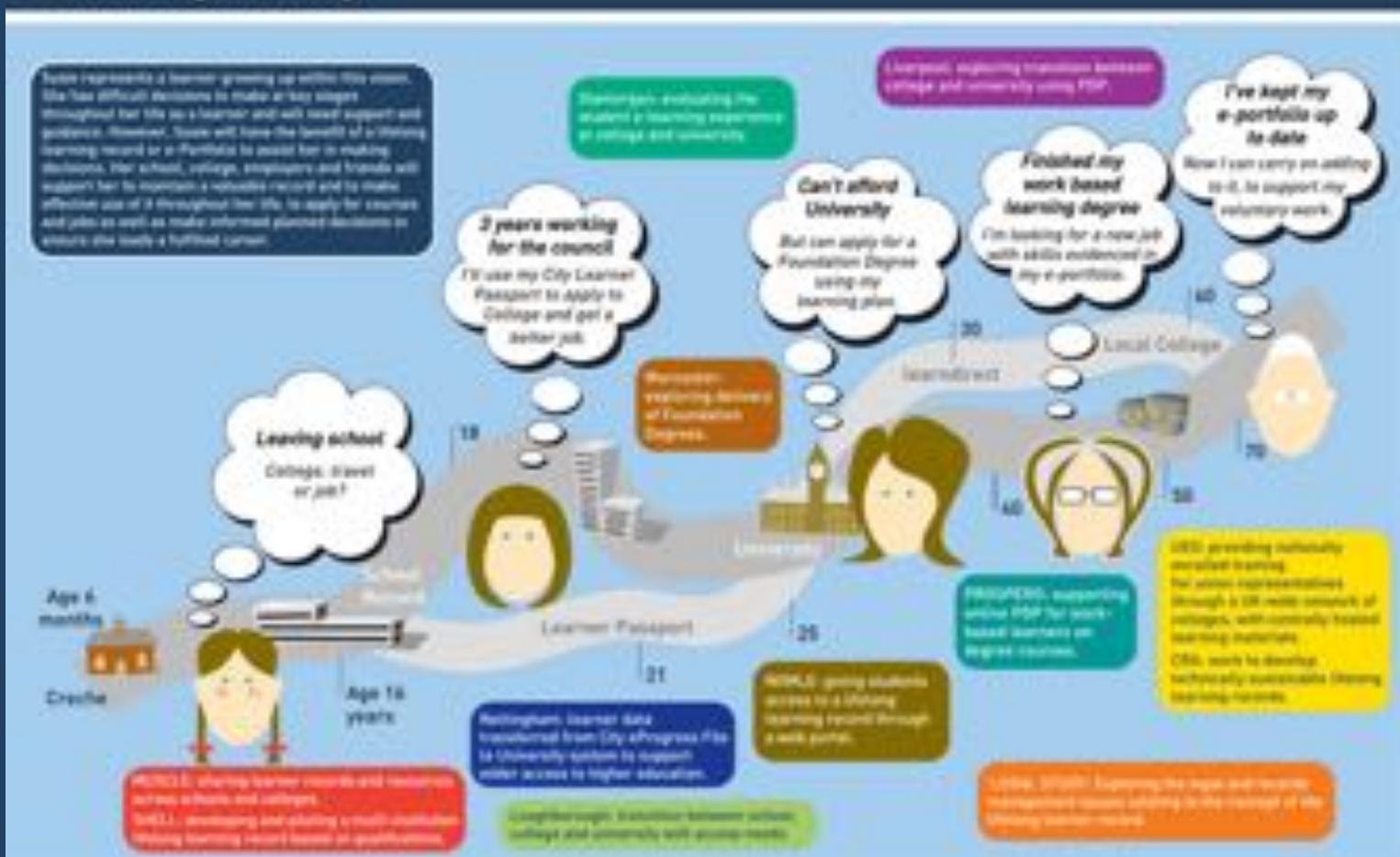



# I am not talking about that though!

You can read the papers if you like…

- Kitto, K., Cross, S., Waters, Z., Lupton, M. (2015). Learning Analytics beyond the LMS: the Connected Learning Analytics Toolkit. In Proceedings of the Fifth International Conference on Learning Analytics and Knowledge (LAK15). ACM, New York, NY, USA, 11-15.
- Bakharia, A., Kitto, K., Pardo, A., Gašević, D., Dawson, S. (2016), Recipe for success: lessons learnt from using xAPI within the connected learning analytics toolkit. In Proceedings of the Sixth International Conference on Learning Analytics & Knowledge (LAK16). ACM, New York, NY, USA, 378-382.
- Kitto, K., Lupton, M., Davis, K., Waters, Z. (2017). Designing for Student Facing Learning Analytics, Australasian Journal of Educational Technology, 33(5), 152-168.

# Susie's journey

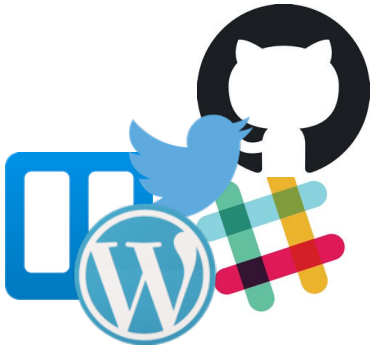


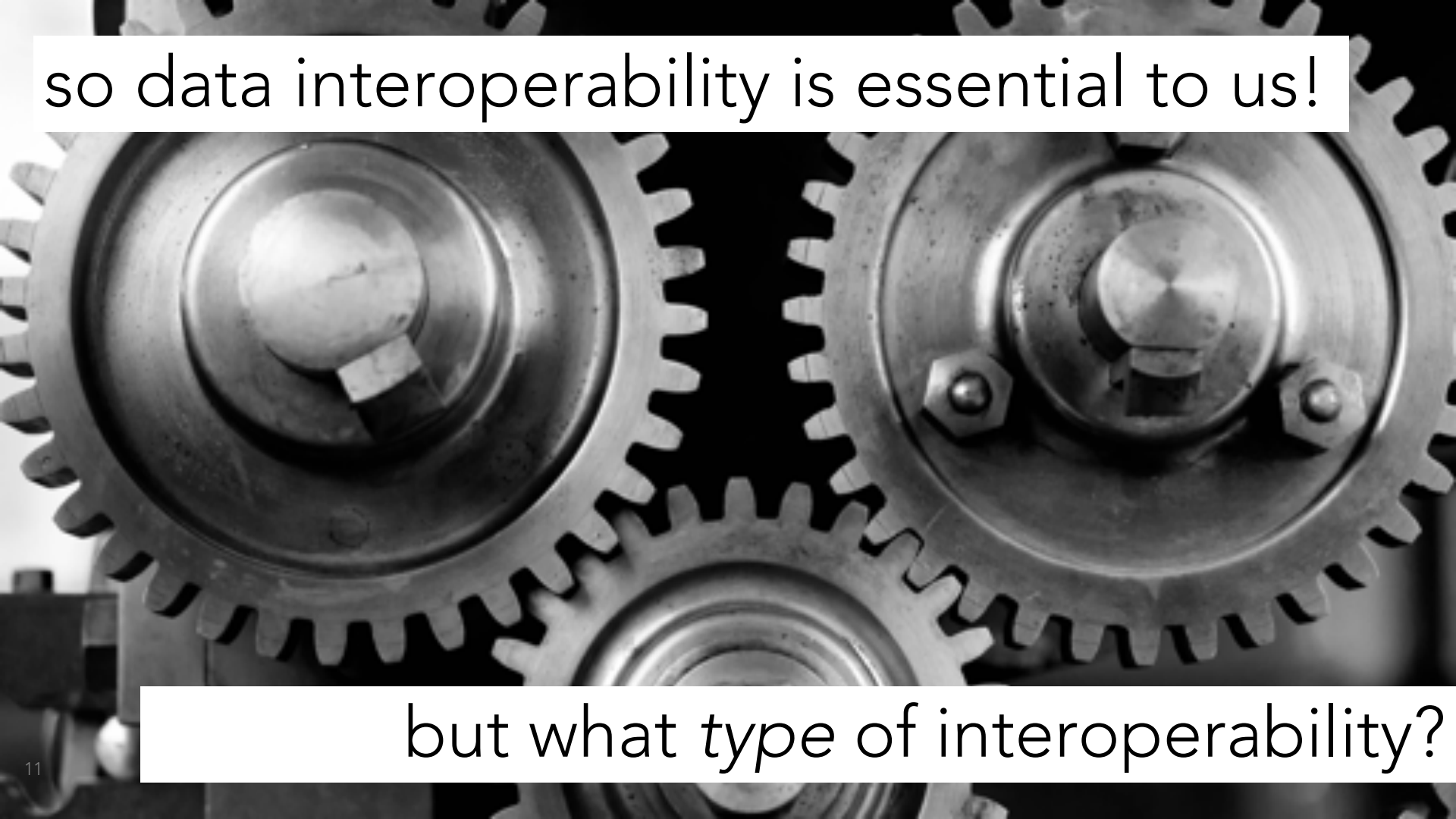

learning occurs over a lifetime!

# the emerging UTS digital learning ecosystem

- LMS works as core to a decentralized system
- The core is heavily supported by other elements in the ecosystem
- Several core external tools are utilized to enrich student experience
- But many other tools are used by our academics!  (how to support?)
- LA is a focus for for enabling personalization  (and CIC *builds* tools!)
- But student data can be generated in a wide range of tools…




so data interoperability is essential to us!
but what *type* of interoperability?

# big and comprehensive?
# or loose and modular?

you could ensure that *all* educational technology uses one data stack…

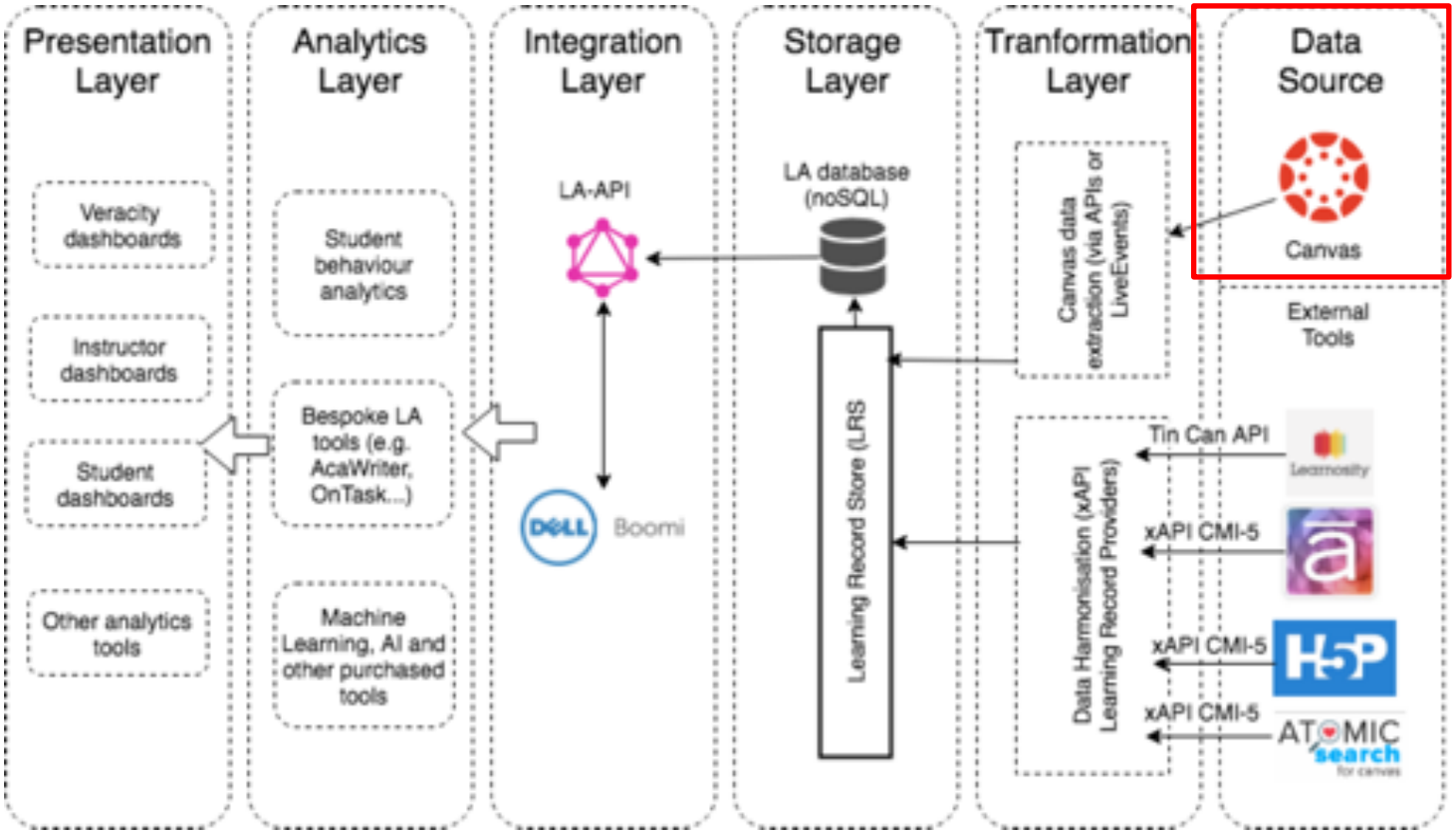
- but how long would this remain current?
- and how quickly will it evolve as new use cases arise?
- and who is control of it anyway?
- and how comprehensive can this approach actually be?

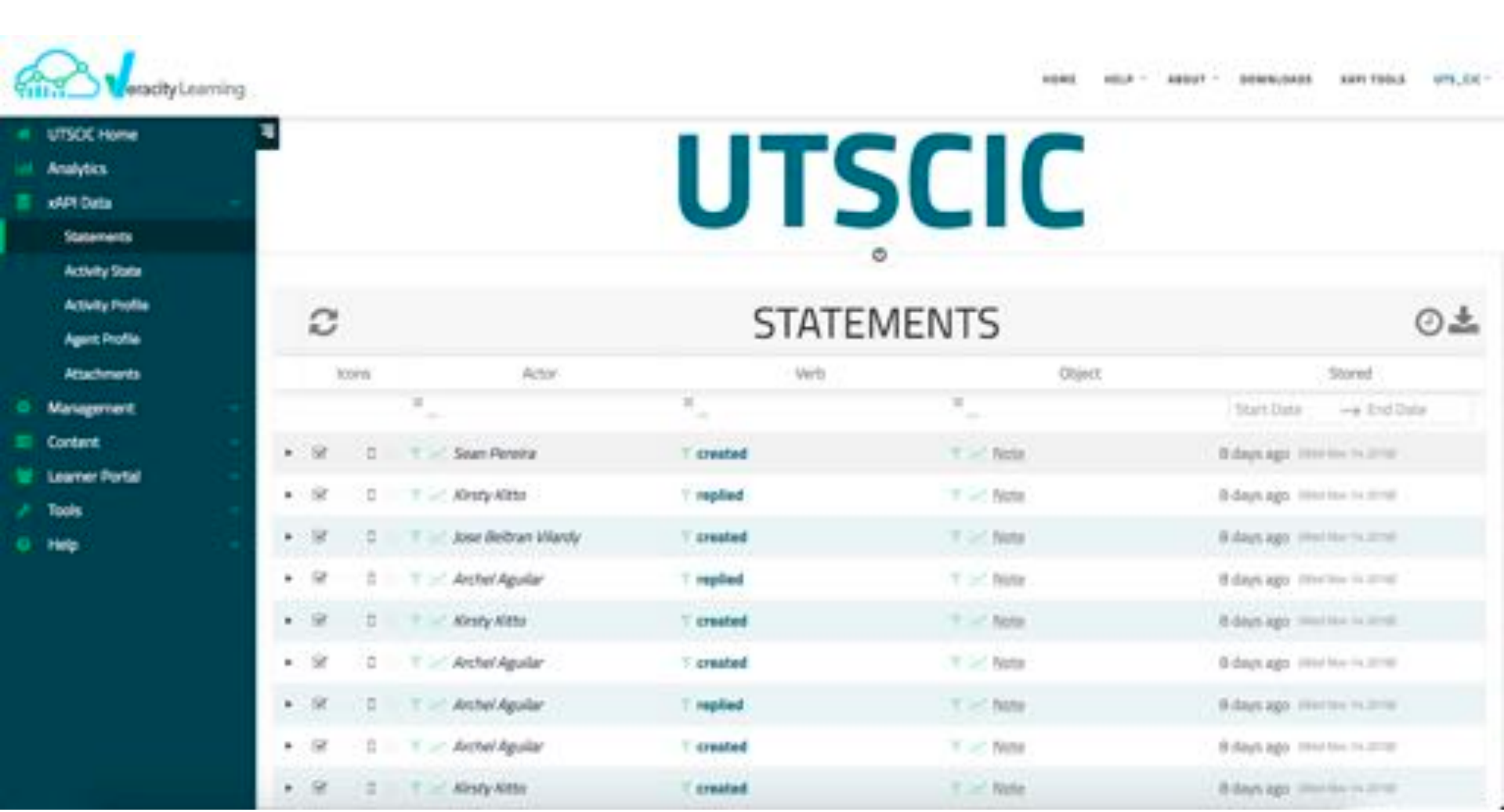
or you could try and do something that is more modular…

EXPERIENCE API™

- where any LRP can get up and running quickly to provide data
- but then you need to ensure that there is a way to map data between different providers

# we have already broken the “comprehensive” model…

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UTSCIC Home
Analytics
xAPI Data
Statements
Activity State
Activity Profile
Agent Profile
Attachments
Management
Content
Learner Portal
Tools
Help
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STATEMENTS
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Actor
Verb
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Soan Pereira
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Jose Beltran Vilardy
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Archel Aguilar
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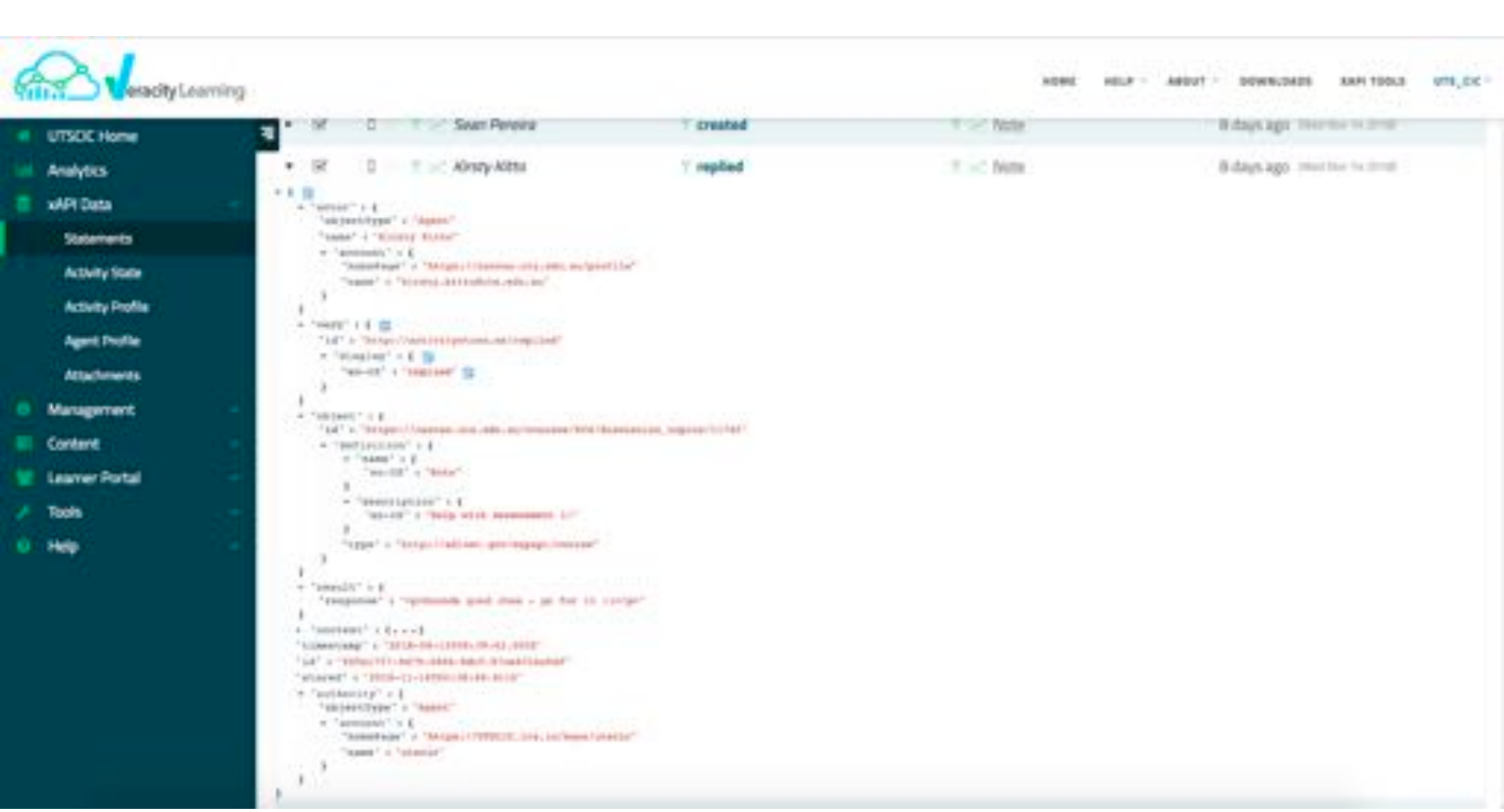
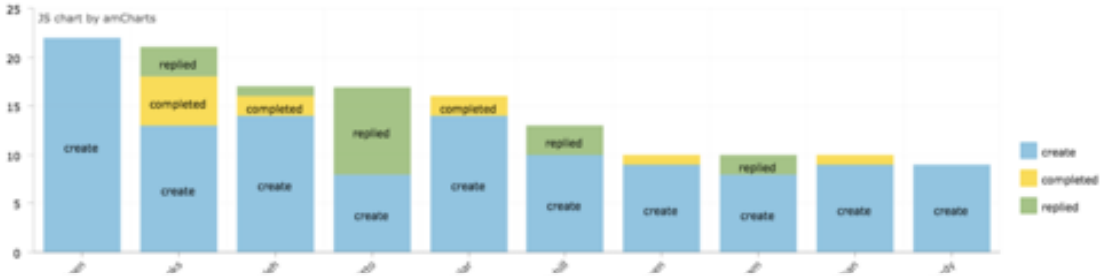
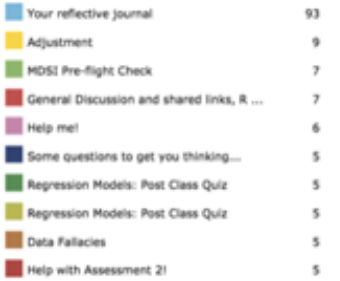

Veracity Learning
HOME
HELP
ABOUT
DOWNLOADS
XAPI TOOLS
UTS_CIC
UTSCIC Home
Analytics
xAPI Data
Statements
Activity State
Activity Profile
Agent Profile
Attachments
Management
Content
Learner Portal
Tools
Help
Sean Pereira
created
Note
8 days ago
Alinzy Alitta
replied
Note
8 days ago

class activity

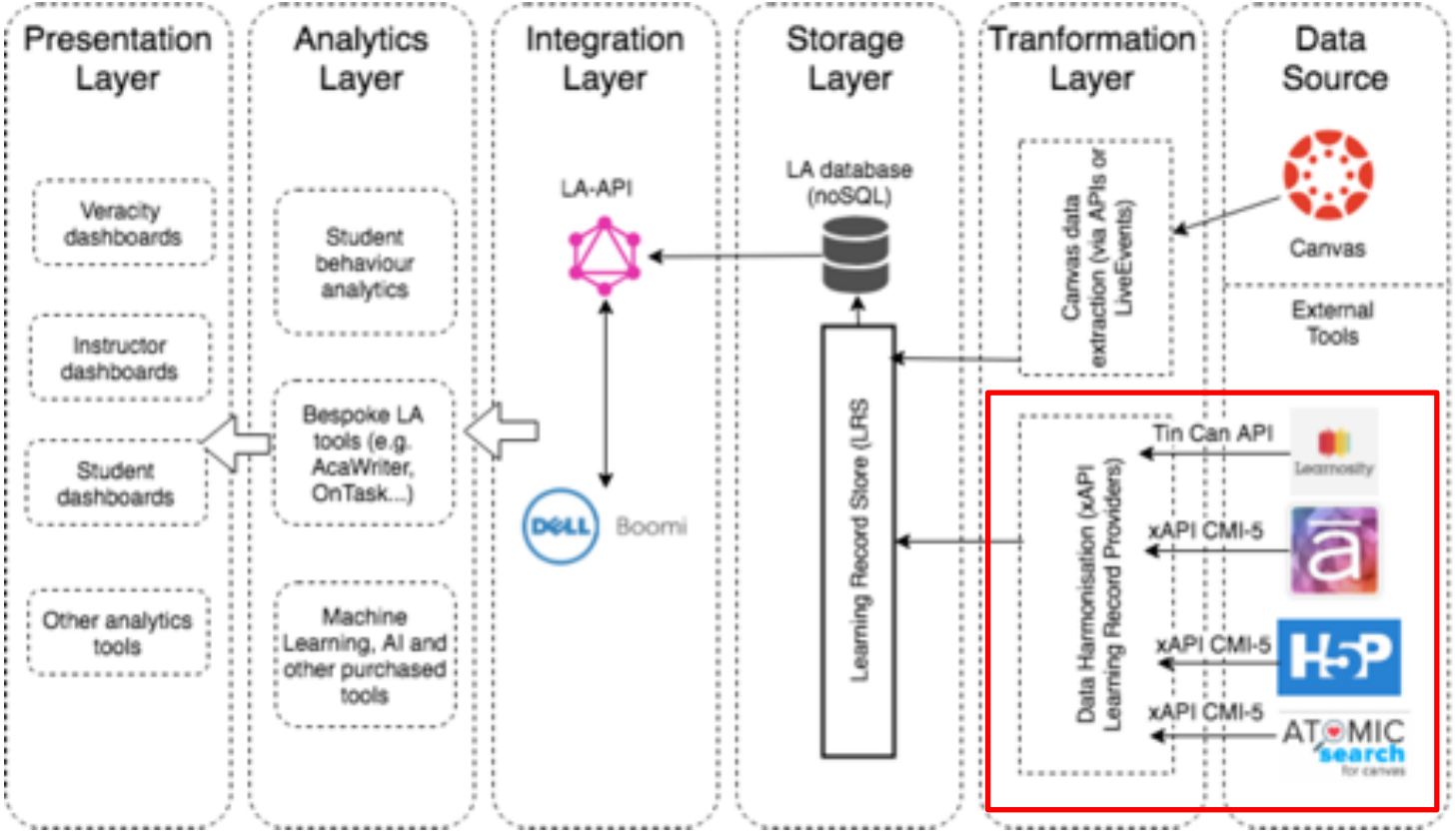

actor activity




resource use

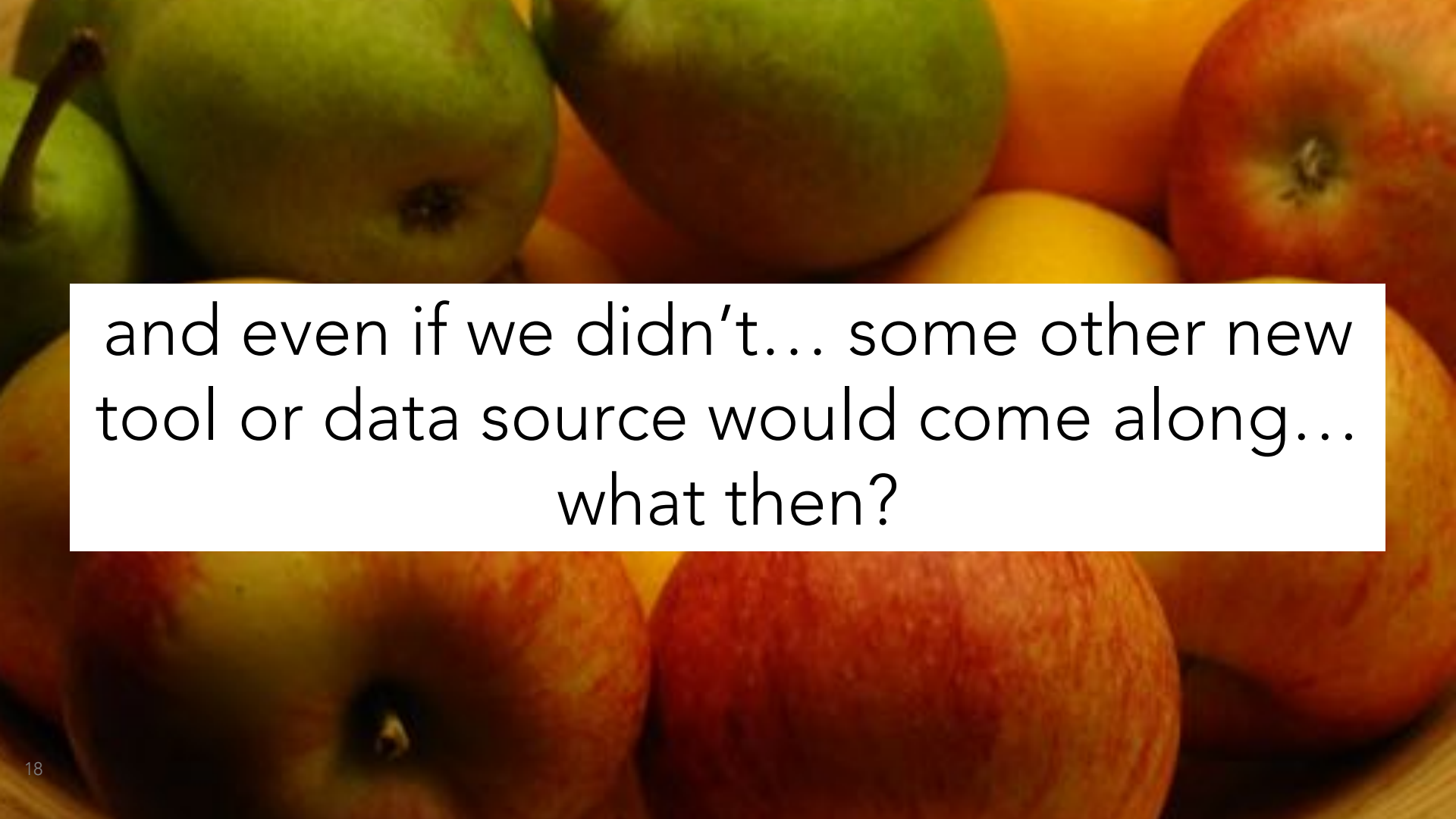


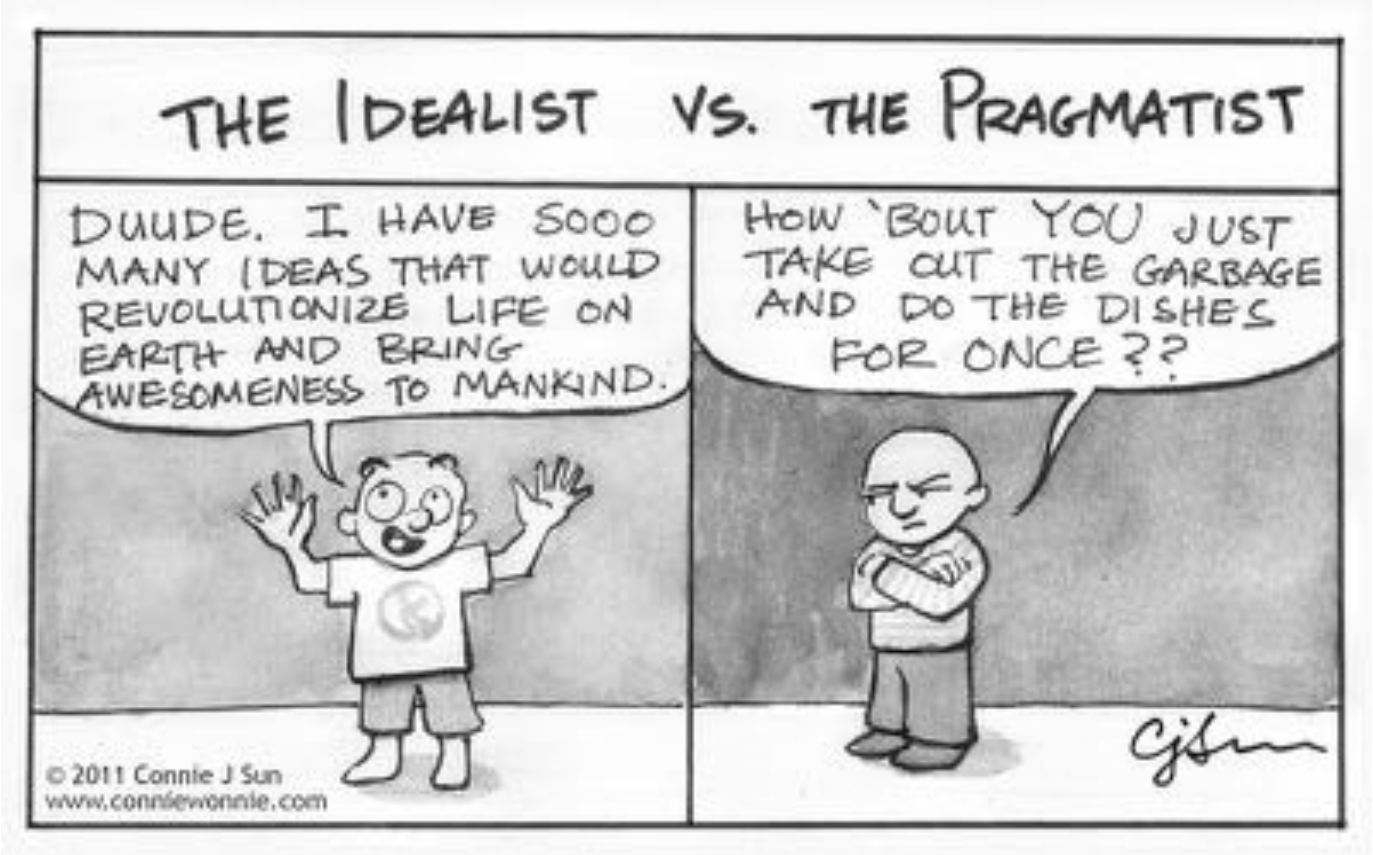
# Note: we have already broken the "big and comprehensive" model…




an ecosystem of data providers!

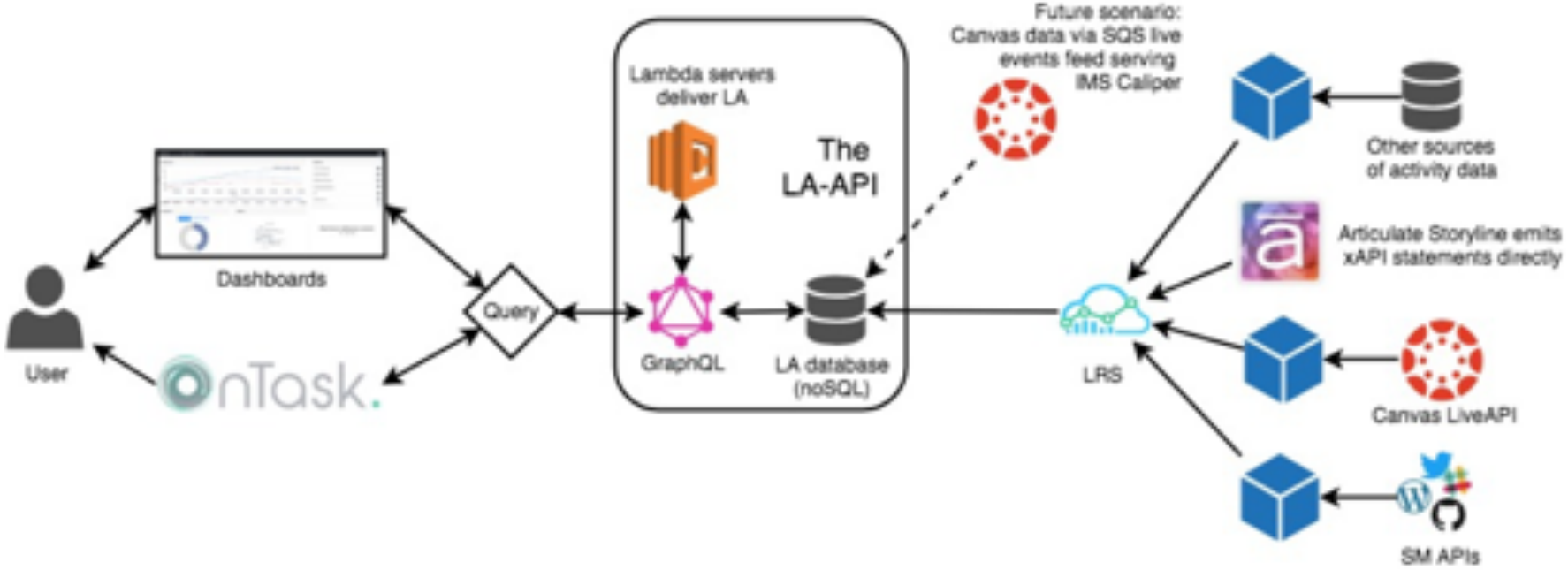
are the statements the same?


and even if we didn’t… some other new tool or data source would come along… what then?



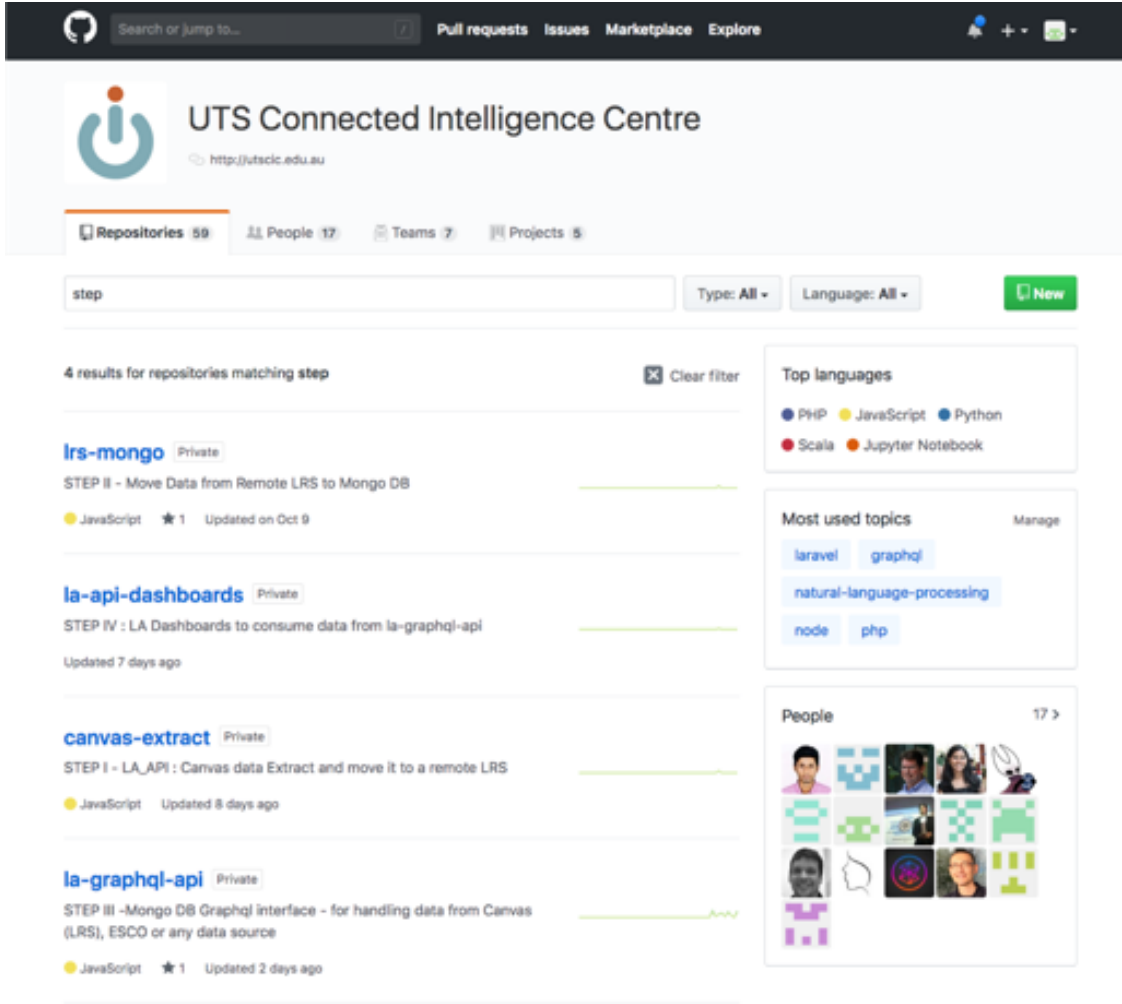

# pragmatic data interoperability

# a pilot ETL pipeline – the LA-API



# 4 related code repositories for ETL pipeline

just got permission to open source the whole data pipeline… anyone want to link up their tools or data sources?



# the GraphQL schema provides flexible data access…

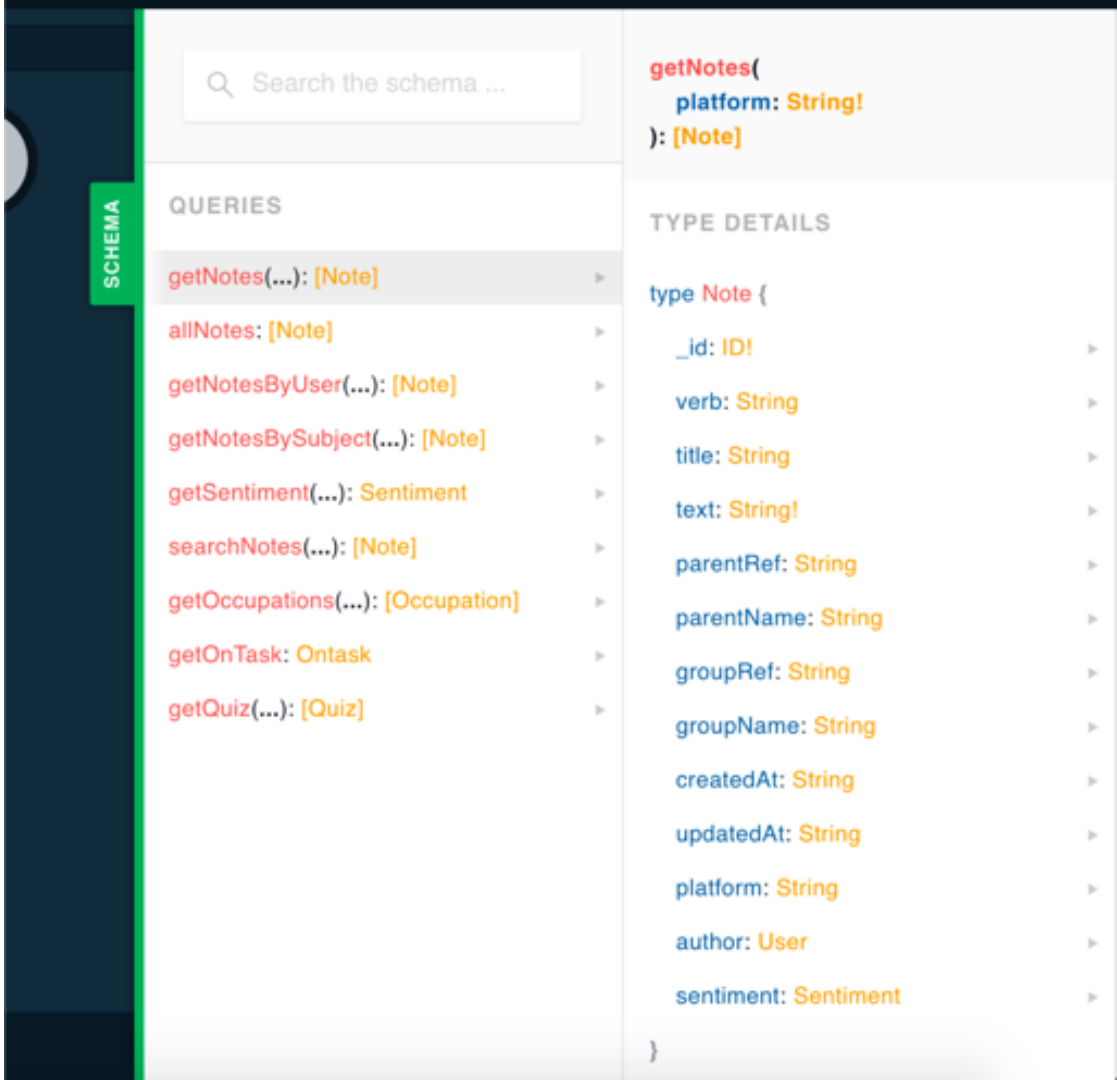
What if I want counts of activity?

```
{
  searchNotes(search: email,
value:
"kirsty.kitto@uts.edu.au"){
    parentName
    createdAt
  }
}
```

What if I want to do text analysis?

```
{
  searchNotes(search: email,
value:
"kirsty.kitto@uts.edu.au"){
    verb
    parentName
    createdAt
    author{
      name
    }
    text
  }
}
```

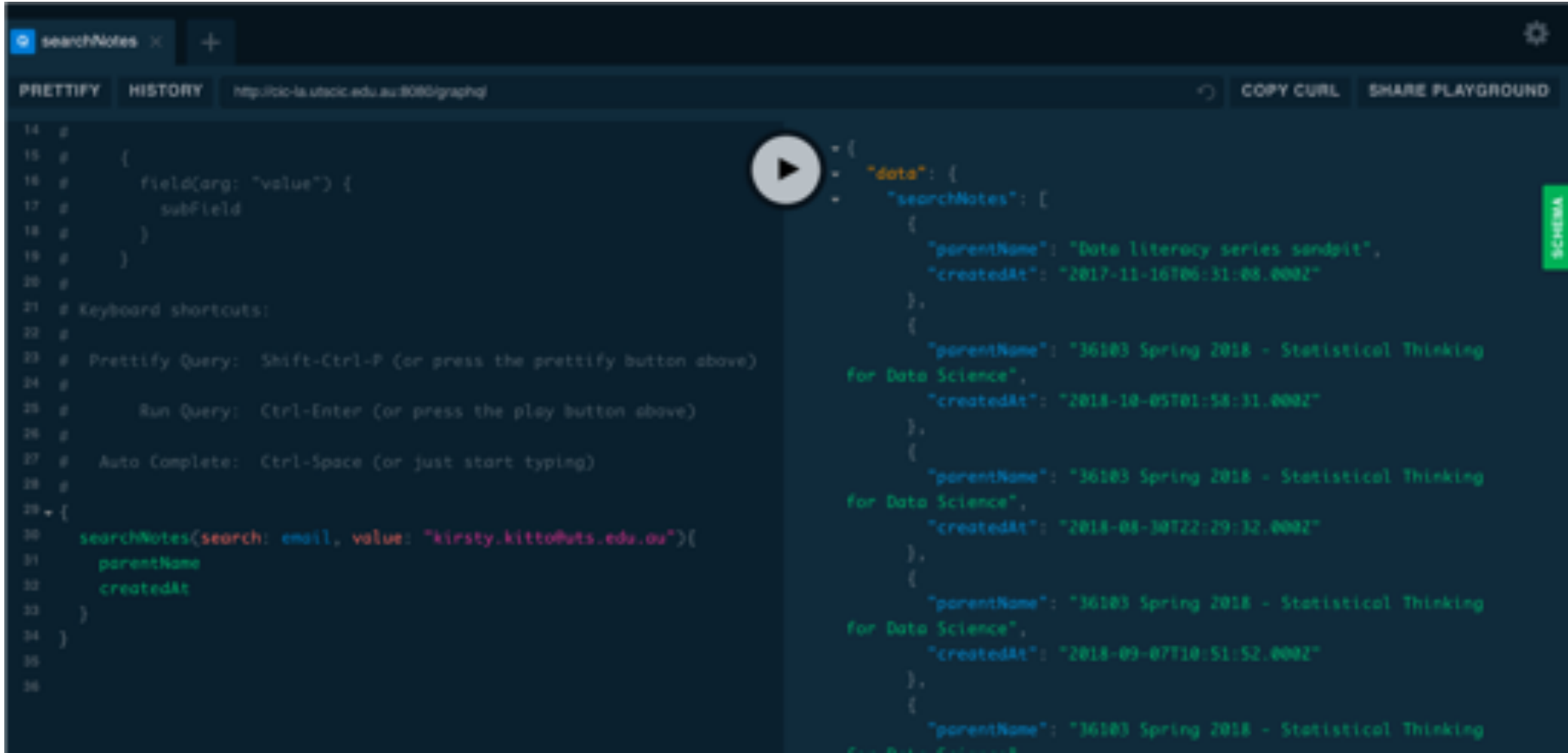
that is… the GraphQL schema delivers the pragmatic data interoperability



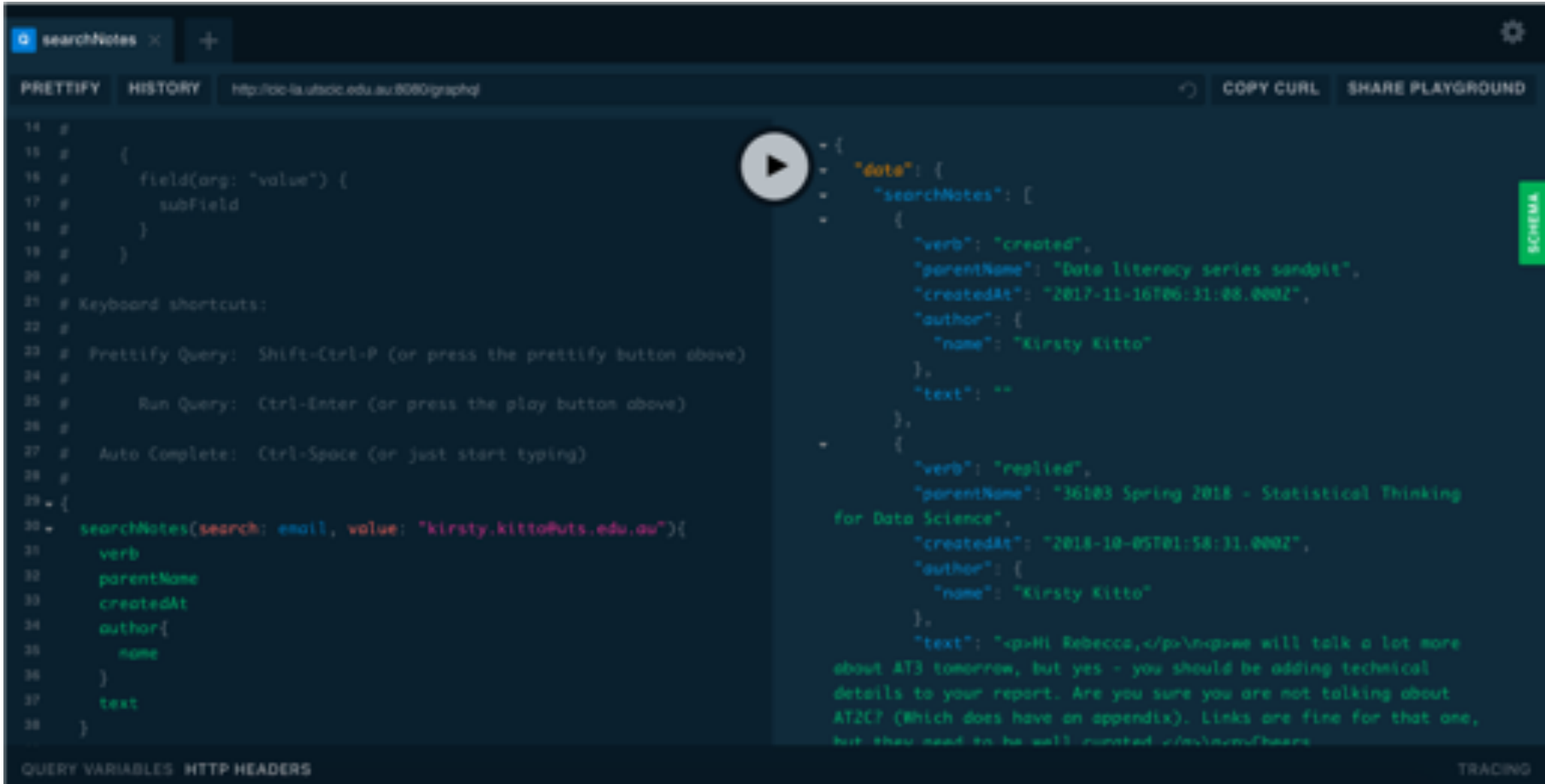
resolvers fetch the data from anywhere hooked up to the LA-API

```
async searchNotes(parent, args) {
    let notes = [];
    if(args.search === 'subject') {
        let value = new RegExp(args.value, 'i');
        notes = await Note.find({parentName : {$regex: value}});
    }
    if(args.search === 'email') {
        let user = await User.find({email : args.value.toLowerCase()})
        if(user.length === 0) return [];
        notes = await Note.find({user: new ObjectId(user[0]._id)});
    }
    if(args.search === 'platform') {
        notes = await Note.find({platform: args.value});
    }
    if(args.search === 'verb') {
        notes = await Note.find({verb: args.value});
    }
    if(args.search === 'title') {
        let value = new RegExp(args.value, 'i');
        notes = await Note.find({title : {$regex: value}});
    }
    return notes;
},
```

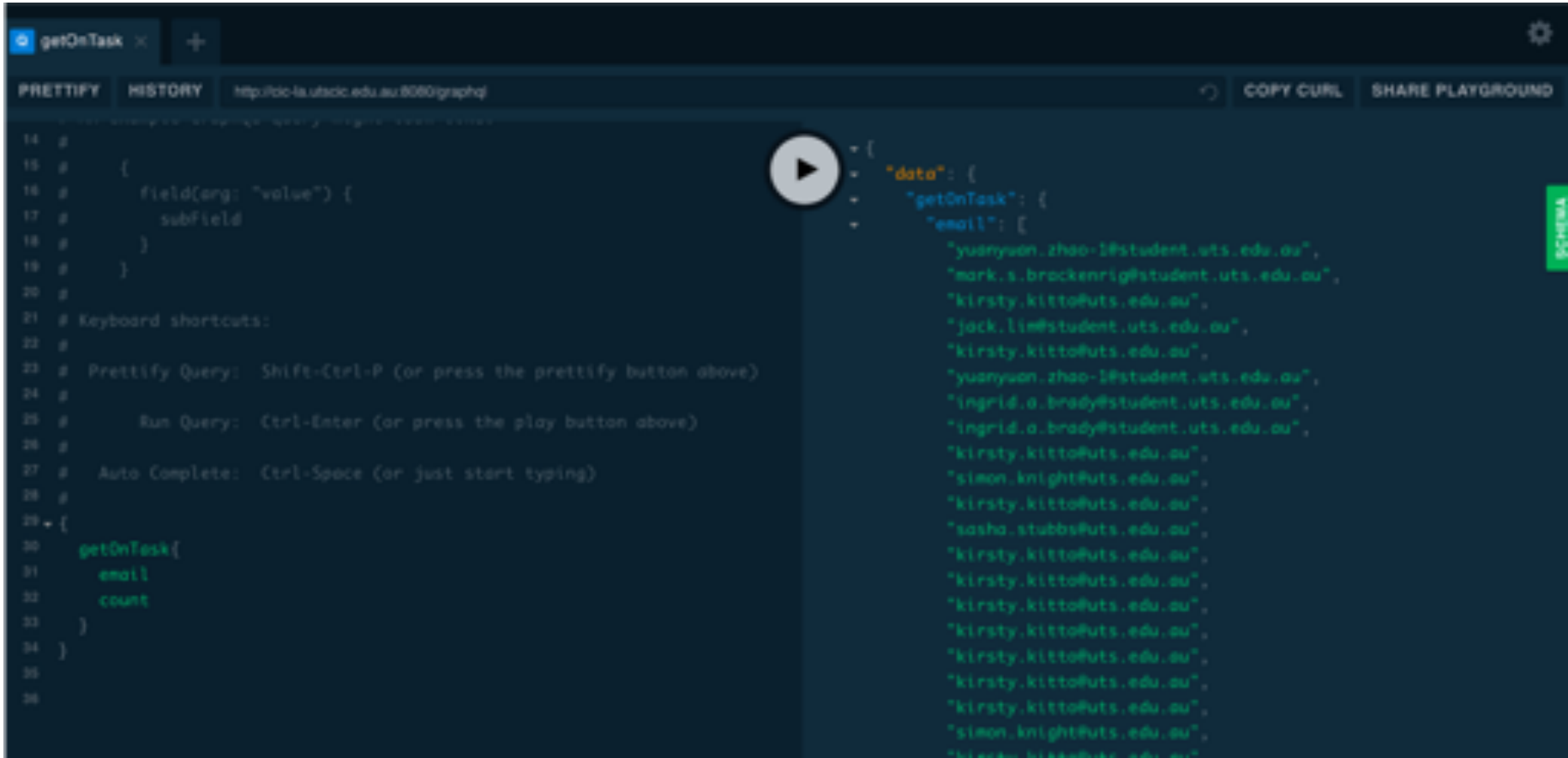
# what is the activity of a user?



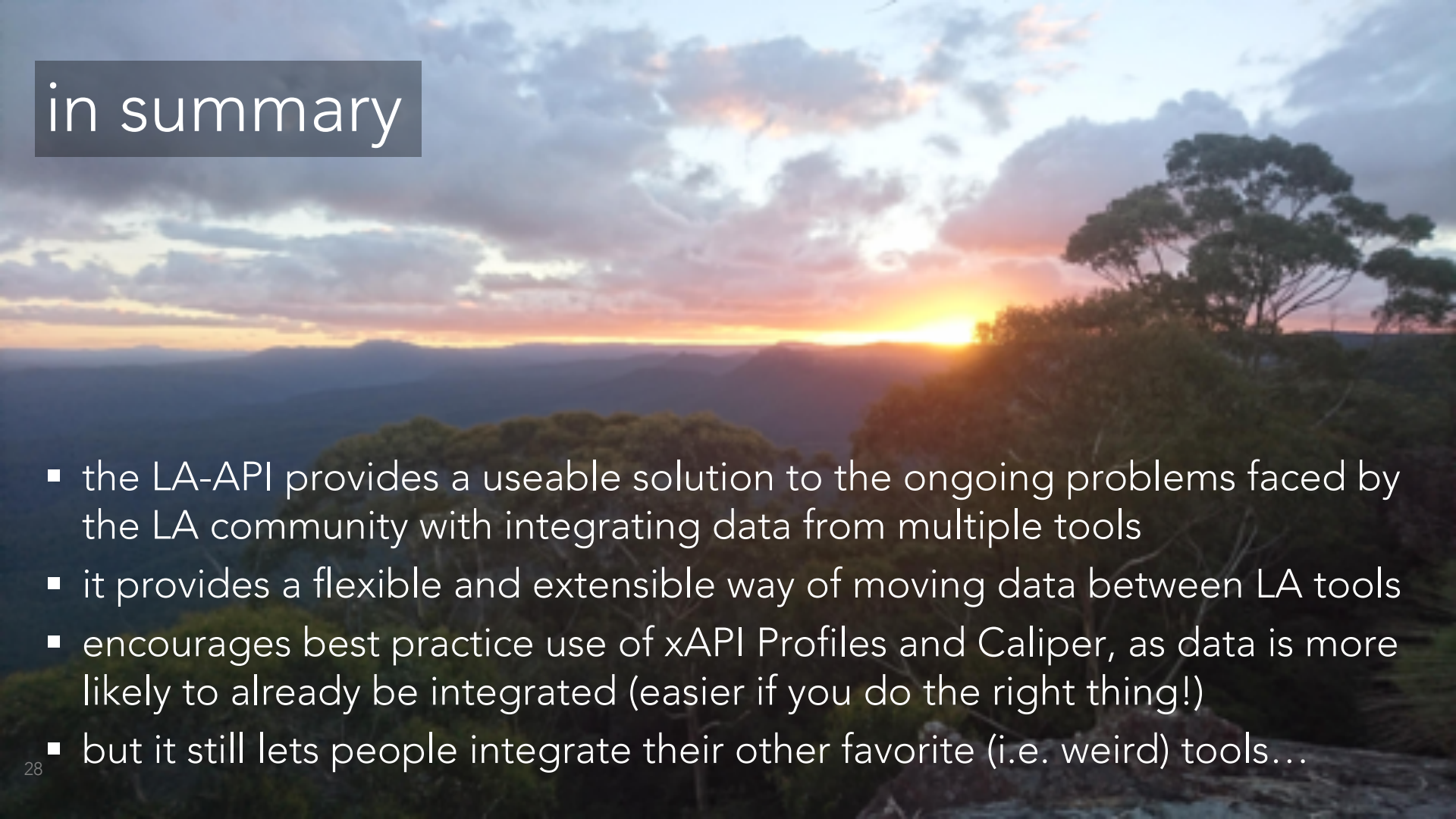
# what text did they write?



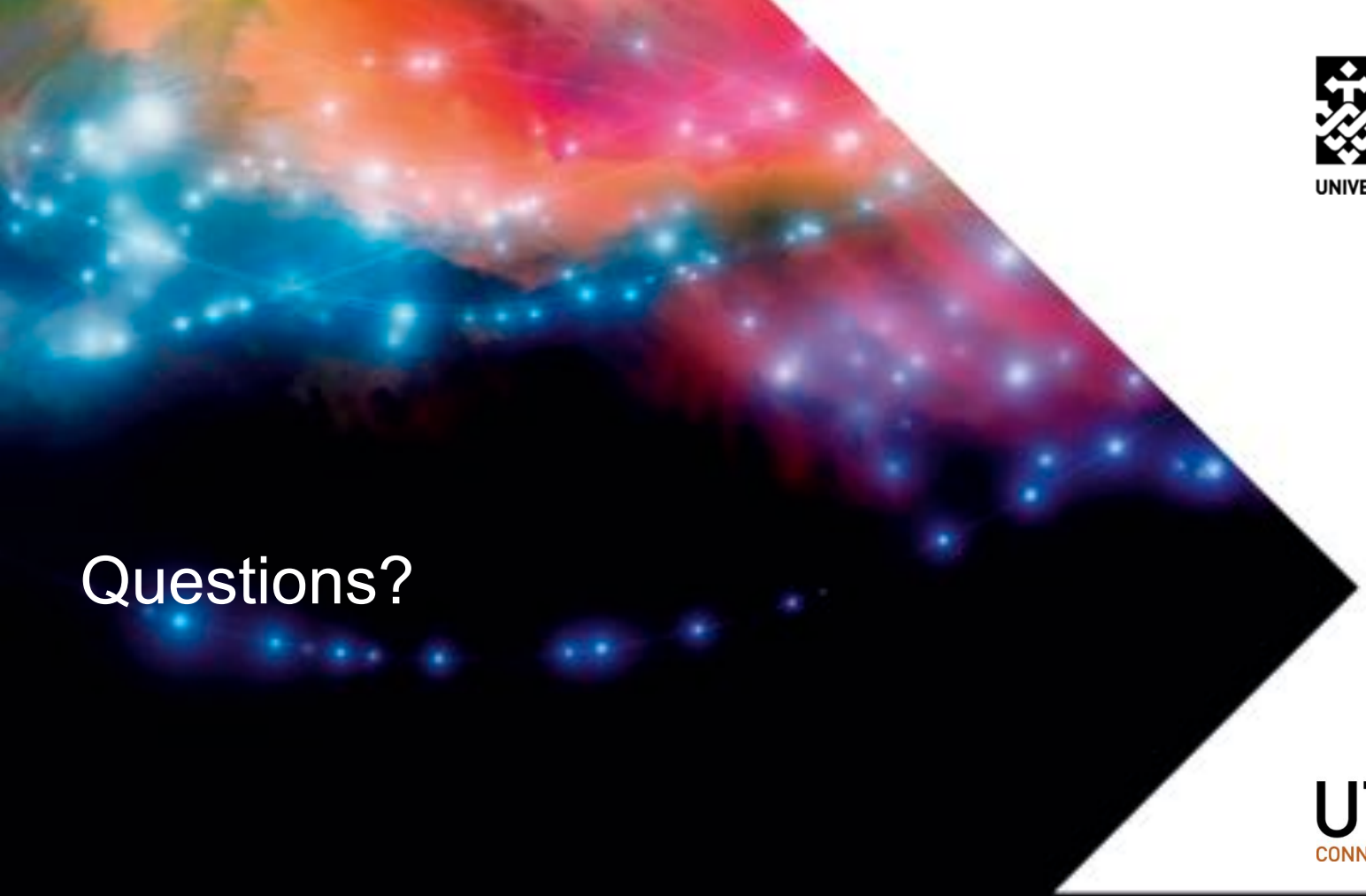
# no… actually  I want to send data to OnTask…



# in summary



- the LA-API provides a useable solution to the ongoing problems faced by the LA community with integrating data from multiple tools
- it provides a flexible and extensible way of moving data between LA tools
- encourages best practice use of xAPI Profiles and Caliper, as data is more likely to already be integrated (easier if you do the right thing!)
- but it still lets people integrate their other favorite (i.e. weird) tools…



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# Questions?

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