

# Using Learning Analytics to Devise Interactive Personalised Nudges for Active Video Watching

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# Video Watching for Learning

MOOCs

Informal  
learning

Flipped  
classrooms



You Tube

vimeo

TED  
Talks

# CASE STUDY: ACTIVE VIDEO WATCHING

**SOFT SKILLS  
(E.G. GIVING PITCH PRESENTATIONS)**

- Videos with tutorials**
- Videos with examples**

# Active Video Watching System



[Login](#) [Home](#) [Personal Space](#) [Social Space](#) [Admin Space](#) [About](#)

[Home](#) > [Personal Space](#) > [Your Spaces](#) > Watch Video

## WATCH VIDEO

TUTORIAL 1: How to Give an Awesome (PowerPoint) Presentation

Whiteboard Animation Explainer Video. Wienot Films. 3 min.

**Pause** the video to record a comment.

The comment is saved when you click **Play** again.

No comment saved as you did not enter a comment

What is your thought?

What does it relate to?

I am rather good at this
  I did/saw this in the past
  I didn't realize I wasn't doing this
  I like this point

Previous comments by you

Elapsed Time (s)	Aspect	Comment	Comment Date
55	I did/saw this in the past	I was doing such presentations myself - focusing on the content and trying to use various types of media.	26/10/2015 21:57:37
75	I did/saw this in the past	We worked in the past with experts from advertisement, they stressed the importance of a story to get your message across. I know that it is important but am struggling to get the story plot. I think this is really very difficult.	26/10/2015 21:59:57

Personal Space for **making** comments

## ACTIVE VIDEO WATCHING SYSTEM

[Login](#) [Home](#) [Personal Space](#) [Social Space](#) [Admin Space](#) [About](#)

[Home](#) > [Social Spaces](#) > View All of a Video's Comments

There are 123 comments on this video

All Comments for Video TUTORIAL 2: How to open and close presentations?

Please rate other users' comments. However, you will not be able to save a rating for your own comments.

Comment ID	Elapsed Time (s)	Aspect	Comment	Comment Date	Commentator	Your Comment Rating
1025	<a href="#">View Video Snippet</a>	20	I like this point	Yes, first impressions determine whether the audience will be willing to listen further	11/03/2016 02:16:39	Other
1231	<a href="#">View Video Snippet</a>	23	No Aspect Selected	I need a good beginning and good ending for a presentation and put them together.	14/03/2016 22:51:03	Other
1122	<a href="#">View Video Snippet</a>	26	No Aspect Selected	This doesn't seem like a good presentation already :(	13/03/2016 22:20:53	Other
1268	<a href="#">View Video Snippet</a>	28	I like this point	Understanding that audiences remember the beginning and end is very useful.	14/03/2016 23:20:09	Other

Social Space for **reading and rating** comments

# Study Design

**Phase 1: Personal Space**  
(video watching and note taking)



**Phase 2: Social Space**  
(comment browsing and rating)



## Survey 1:

- Demographic data
- Conceptual knowledge
- MSLQ

## Survey 2:

- Conceptual knowledge
- Usability (TAM)
- Cognitive load (NASA-TLX)

## Survey 3:

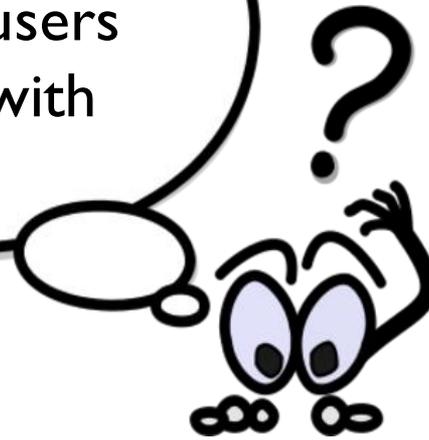
- Conceptual knowledge
- Usability (TAM)
- Cognitive load (NASA-TLX)

**38 users**  
**742 comments with ratings**

Previous Work:

**Engagement with videos (writing comments and rating comments) significantly correlated with increase in conceptual knowledge (AIED2017)**

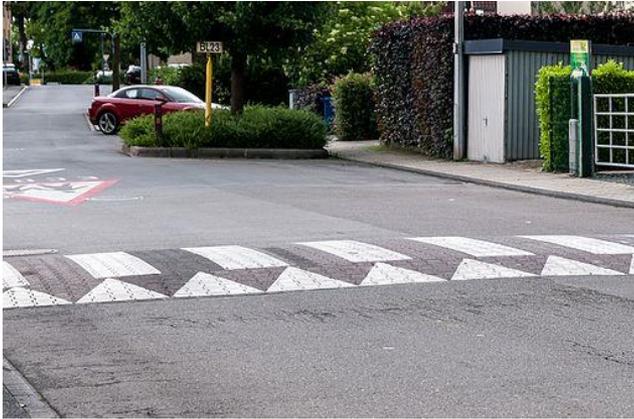
HOW to  
encourage users  
to engage with  
videos



**NUDGES**



# Nudges for Behaviour Change



## CHOICE ARCHITECTURE

What is the target behaviour?

What is the problem behaviour?

HOW to design  
a good choice  
architecture?



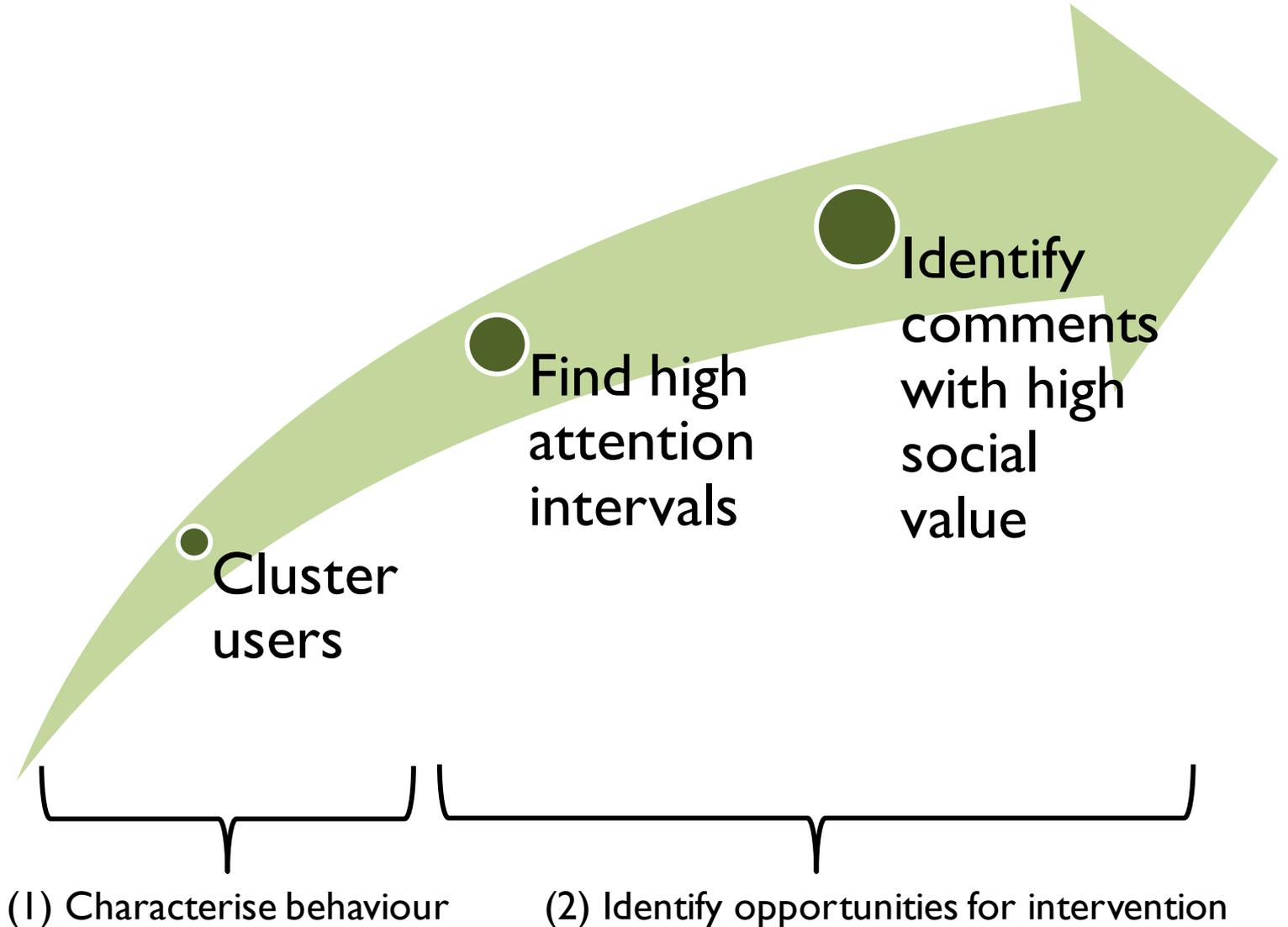
**DATA-DRIVEN APPROACH**



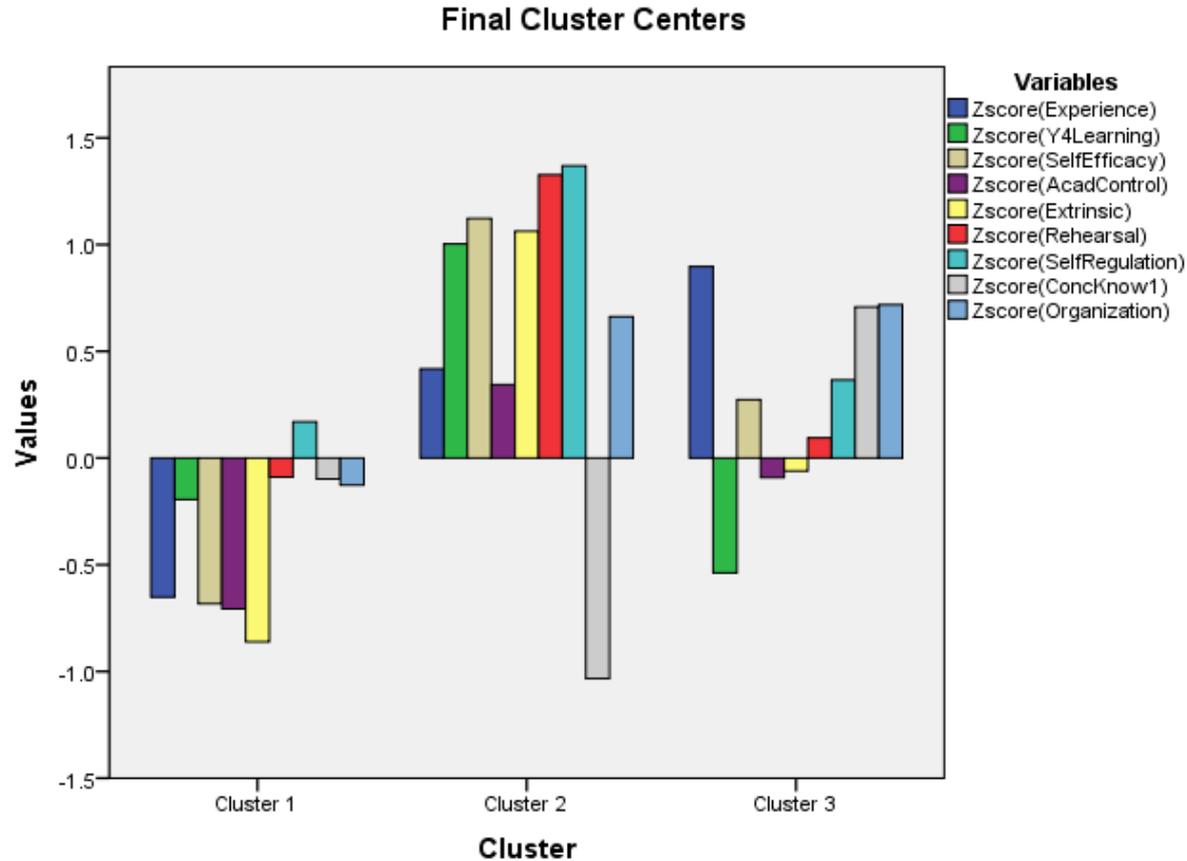
# RESEARCH GOAL

Develop a novel approach that  
utilises **data analytics**  
to derive **personalisation features**  
in a video-based learning environment

# Our Approach



# Whom to Nudge: Problem and Target Behaviour (Clusters)



**PROBLEM  
BEHAVIOUR**

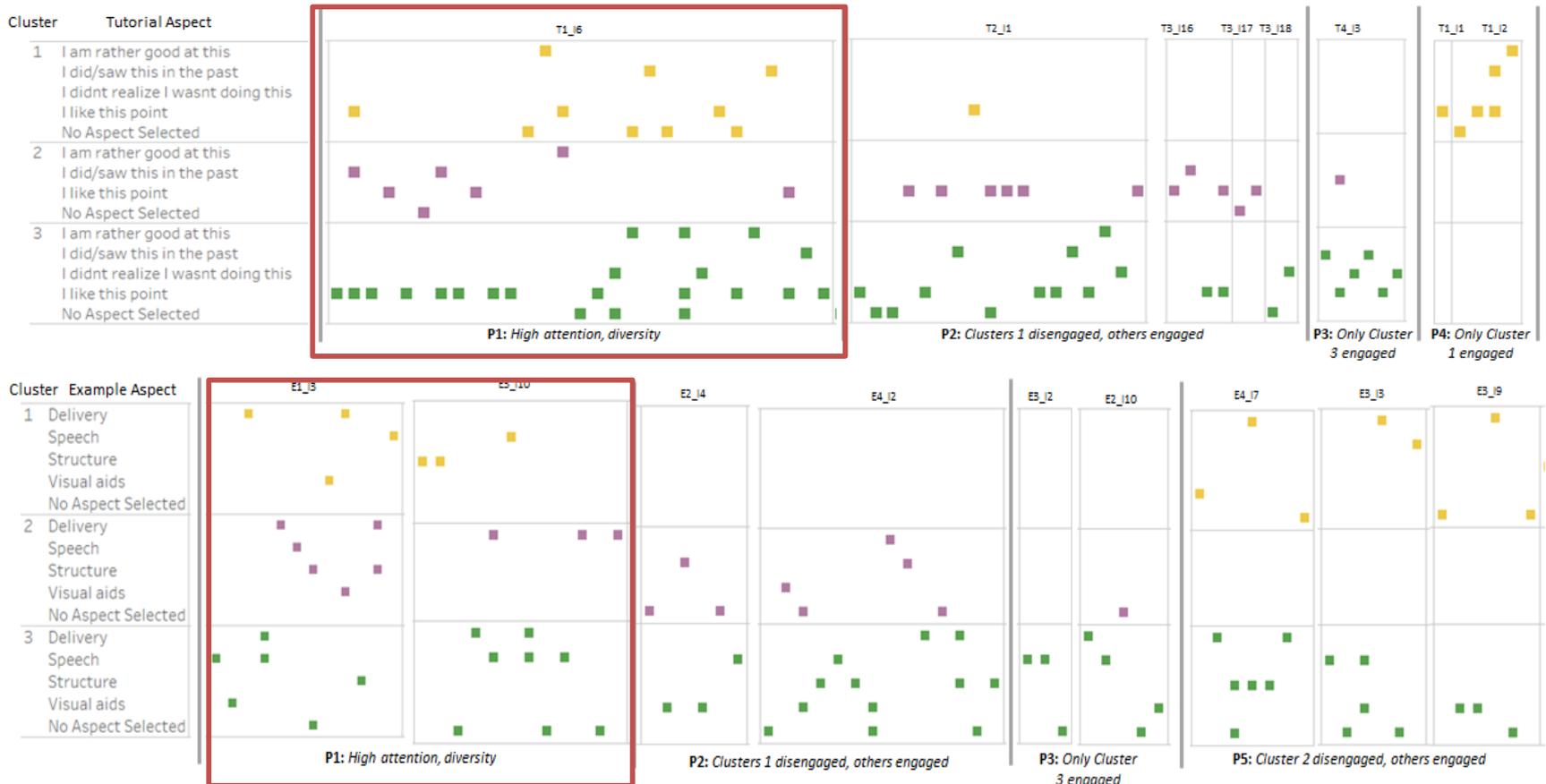
Parochial  
Learners  
(14)

Habitual Video  
Watchers  
(7)

Engaged Self-regulated  
Learners  
(17)

**TARGET  
BEHAVIOUR**

# When to Nudge: Attention Intervals (Region Aggregation)

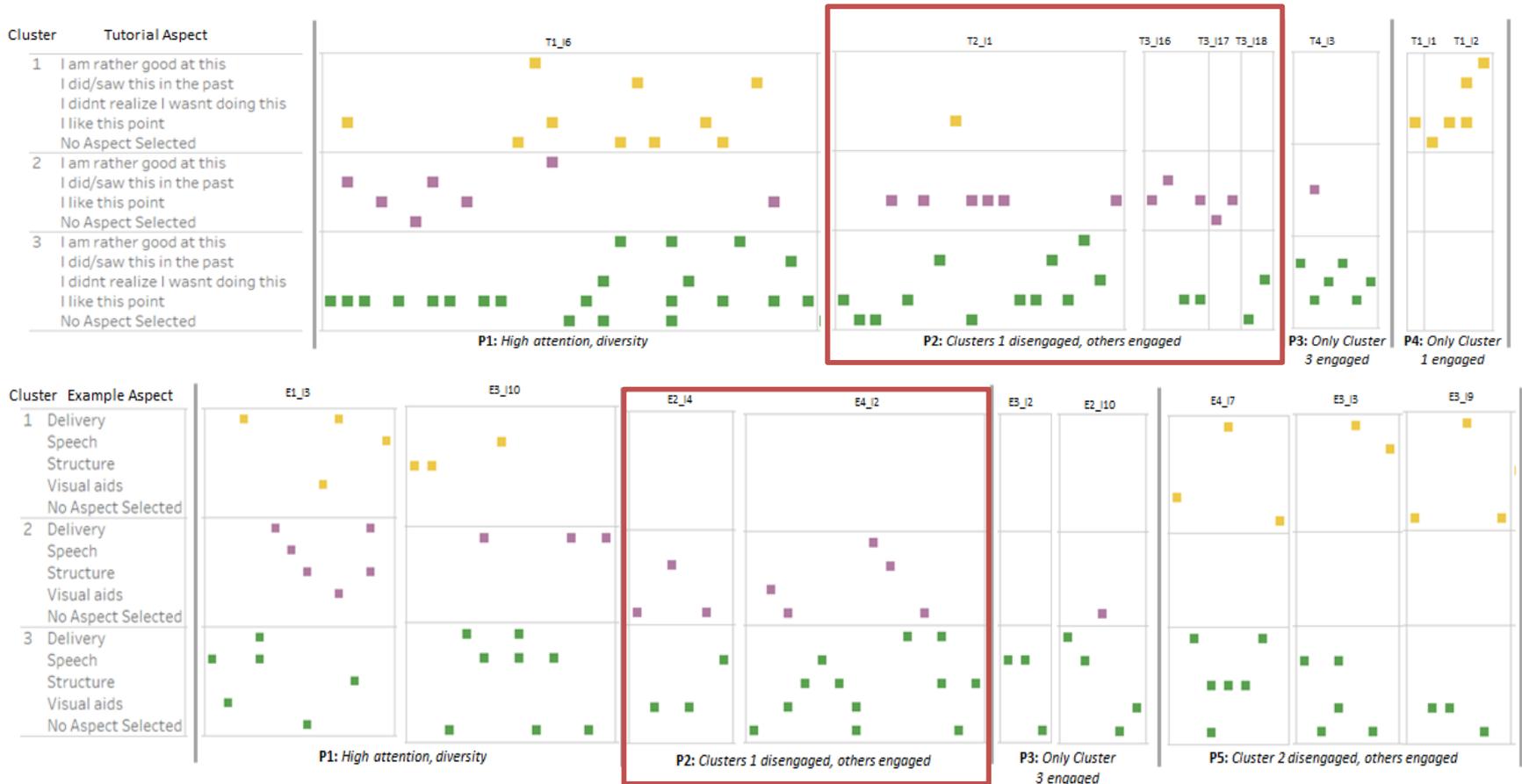


Example of identified pattern (P1)

**Behaviour:** all clusters engaged – high attention

**Intervention:** indicate that some interesting is ahead

# When to Nudge: Attention Intervals (Region Aggregation)



Example of identified pattern (P2)

**Behaviour:** parochial cluster disengaged, other engaged

**Intervention:** show existing comments to users approaching interval

# What Comments to Include in a Nudge: Those with High Social Value

## Feature engineering:

Linguistic features  
Domain-specific  
keywords  
Metadata

Linguistic Inquiry Word  
Count (LIWC)

## Feature correlations:

correlate feature values  
with the number of  
ratings

Keyword matching

## Prediction model:

Binary classification  
(predict 'Good' or 'Not  
Good' comment)

# Putting it all Together:

## Framework for interactive personalised nudges

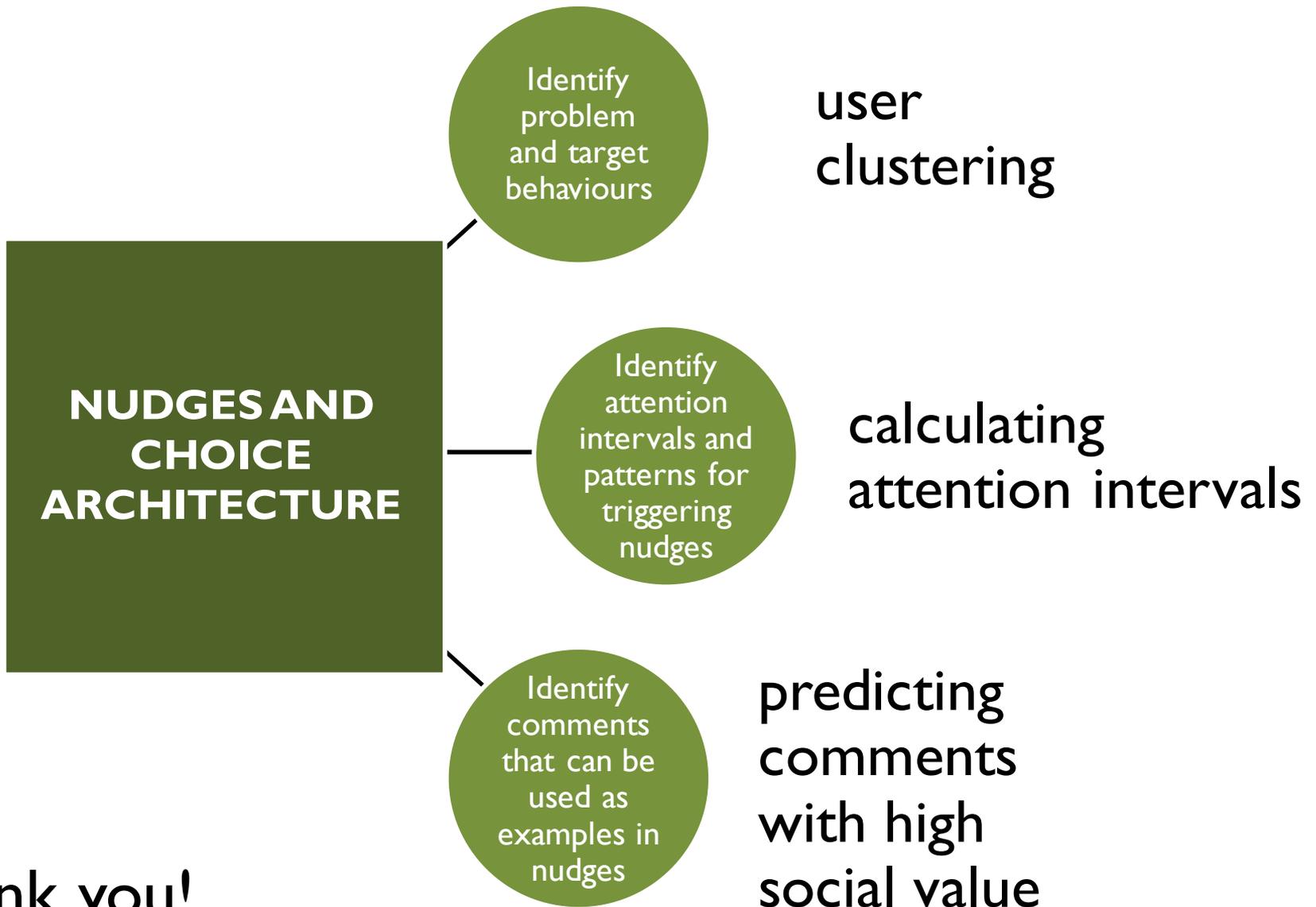
<p>Nudge 1: Direct the attention of a <b>Parochial Learner</b> when they are approaching an <b>interval P3</b> with a <b>'Good' social value comment</b></p>	<p>Nudge 2: Promote engagement of a <b>Habitual Video Watcher</b> when they are in <b>interval P1</b> with a <b>'Good' social value comment</b></p>	<p>Nudge 3: Reward positive behaviour when a learner has made a comment that is likely to be of <b>'Good' social value</b>.</p>
<p><i>"You are about to watch a part where other students made comments, for example ['Good' comment]"</i></p>	<p><i>"Have you thought about [unused aspect]. For example, somebody else has said ['Good comment]"</i></p>	<p><i>"You made a very good comment that can be useful to others [user comment]."</i></p>
<p>The learner makes a relevant comment.</p>	<p>The learner start to relate comments to more video aspects.</p>	<p>The learner's motivation and knowledge increase.</p>

**USER CLUSTERS**

**ATTENTION  
INTERVALS**

**COMMENTS WITH  
SOCIAL VALUE**

# From Analytics to Contextualised Nudges



Thank you!