User Modelling: User Control

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The User’s Model versus the User Model

Now for a little Psychology...
Cognitivism and Constructivism

Cognitivism makes mental processes the primary object of study and tries to discover and model the mental processes on the part of the learner during the learning process. In cognitive theories knowledge is viewed as symbolic, mental constructions in the minds of individuals, and learning becomes the process of committing these symbolic representations to memory where they may be processed.

Constructivism subsumes the attention, encoding and retrieval of knowledge processes from cognitivism, but maintains that there is no single accurate representation of the world, only interpretations of experience. Knowledge is a collection of concepts which fit with the experience of the individual [Tuckey, 92]. Learning becomes a change in meaning constructed from experience [Atherton, 03a]. Learners actively take knowledge, connect it to previously assimilated knowledge and make it theirs by constructing their own interpretation [Cheek, 92].

Source: The Multi-Model, Metadata Driven Approach to Personalised eLearning Services, Conlan, 2005, p9 & 11
There is no spoon

• Extreme interpretations of Constructivism contend that there is no objective reality!

• There is a difference between what a user understands of the world and how a user model represents that understanding

• As the User Model is metadata, it too ...
  • ... is an abstraction
  • ... is error prone
  • ... is incomplete by nature
  • ... is susceptible to misinterpretation

• Moreover, Users are not objective with themselves
  • Consider the Confidence/Prudence measures in ELEKTRA
Implicit / Explicit | Subjective / Objective

• This causes a bit of a quandary when it comes to how we gather information about a user

• Are they a reliable source?

• Is the image we have of ourselves purely subjective?

• Can users be trusted in explicit modelling to offer an objective representation of themselves?
Now for a little Poetry!
The Love Song of J. Alfred Prufrock
by T. S. Eliot

And indeed there will be time
For the yellow smoke that slides along the street,
Rubbing its back upon the window-panes;
There will be time, there will be time
To prepare a face to meet the faces that you meet;
There will be time to murder and create,
And time for all the works and days of hands
That lift and drop a question on your plate;
Time for you and time for me,
And time yet for a hundred indecisions,
And for a hundred visions and revisions,
Before the taking of a toast and tea.

In the room the women come and go
Talking of Michelangelo.

...
Reality is subjective

User’s understanding

Programmer(‘s/s’) understanding

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We (Programmers) need to be explicit

• If our Adaptive Application is going to interact with people in a personalised manner...
  • ... we need to be explicit about its domain, boundaries, functions, expectations on the user, etc.

• These need to be explicitly captured

• Moreover, we need to decide how much User Control is supported
Sharing Understanding

• Before we can offer User Control we need to enhance the user’s understanding of the Adaptive Application
  • A truly Adaptive Application would be able to reshape its understanding of the world (i.e. that encoded by the programmers) to each user
  • We’re not quite there yet...

• The user is the most intelligent and adaptable ‘component’ of the Adaptive Application
  • Give them the ability to scrutinise elements of the application and they may understand it better
  • First step towards User Control
Scrutability

Scrutability of stereotypes should mean that a student can scrutinise the system to find answers to questions like the following.

– Am I a beginner?
– What are the implications of being a beginner?
– What would be different if I were an expert?
– How can I let the system model me as a beginner, but have it recognise some of the more advanced things I know?

There seems to be the potential for considerable benefit if learners can explore such issues. Some relate to the possibility of encouraging reflection. This has been described by Goodman, Soller and Linton [13]:

Reflective activities encourage students to analyse their performance, contrast their actions to those of others, abstract the actions they used in similar situations and compare their actions to those of novices and experts.

Reflection

• Effective scrutability should lead to enhanced user understanding of how the Adaptive Application functions and utilises the information modelled about them. It may also foster reflection.

• Scrutability → Understanding → Reflection

• What does it mean to be reflective?

• Is this a necessary part of an Adaptive Application?
So, what about User Control?

Typically needs Application to Support...

Scrutability → Understanding → Reflection → User Control?

This is optional, but will generally lead to better Application/User symbiosis.

This happens in the user’s head! Can be monitored through implicit observation.

Control may be offered without any of the previous steps, but will it be effective?
User Control

- User Control may take many forms...
  - Modification of the user model (discretely or abstractly)
  - Choosing which components of the Adaptive Application are ‘turned on’
  - Choices made through interaction with the Adaptive Application
  - Quitting the Application!
Remember, also, that the User is not static

- The Adaptive Application is not the only thing in their life
- They may ...
  - ... access external (related) material
  - ... interact with other (knowledgeable, or not!) people
  - ... take time away from the Application and forget some of what they have been exposed to!
- Appropriate User Control can cater for these
Socio-technical or HCI

- Adaptive Applications may be seen as either a socio-technical system or a form of Human Computer Interaction
  - Deep interaction between the computing technology and the user(s)

Nurturing alignment between the User Model and the User’s Model

1. Explicitly solicit model information from the user
   - Question its validity
   - Attempt to verify understanding implicitly

2. Offer scrutable (explicit) control over the user model
   - Again, attempt to verify understanding implicitly

3. Foster opportunities for reflection
What we covered today

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What we didn’t discuss today

• Dynamism and Maintenance (well, not fully)
• Completeness
• Metacognition
Reading for next the lecture


Questions?

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