



Athabasca University 

SCHOOL OF COMPUTING & INFORMATION SYSTEMS

Supporting Learners and Teachers through Adaptive Learning Technologies

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Adaptivity and Personalization in Learning Systems

How can we make learning systems more adaptive, intelligent and personalized



- In different settings such as desktop-based, mobile and ubiquitous settings
- Based on a rich student model that combines learner information and context information
- Supporting learners as well as teachers
- Develop approaches, add-ons and mechanisms that extend existing learning systems
- Fully online or blended courses

Adaptivity and Personalization in Learning Systems

- Considering students' characteristics and context
 - Learning styles
 - Cognitive traits
 - Motivational aspects
 - Context information (environmental context & device functionalities)
 - Combining students' characteristics with context

- Providing teachers with intelligent support
 - Visualization of course quality
 - Visualization of students' progress, characteristics and needs
 - Easy access to educational log data
 - Identification of students at risk of failing a course

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Adaptivity based on learning styles

- Complex research area with several open research questions
- Learners have different ways in which they prefer to learn
- If these preferences are not supported, learners can have difficulties in learning
- Previous studies showed that providing learners with courses that fit their learning styles has potential to help learners in learning

Adaptivity based on learning styles

- Automatic identification of learning styles based on students' behaviour
- Dynamic identification and updating of learning styles
- Adaptive course provision based on learning styles [Collaboration with Leibniz University Hannover, Alberta Distance Learning Centre; Ting-Wen Chang, Jeff Kurcz]
- Adaptive recommendations for teachers to make their courses better support students with different learning styles [Moushir El-Bishouty, Kevin Saito]

→ **DEMO**

Adaptivity based on cognitive abilities

- There are several cognitive traits/abilities that are highly relevant for learning (e.g., working memory capacity, inductive reasoning ability, associate learning skills, information processing speed, etc.)
- Working memory capacity (WMC) is a very important trait for learning
- WMC enables humans to keep active a limited amount of information for a very brief period of time.
- Miller (1956) found that people can remember 7 ± 2 chunks of information.
- Learners with high WMC can remember almost double the amount of information than learners with low WMC

Adaptivity based on cognitive abilities

- Automatic identification of cognitive abilities based on students' behaviour in an online course
- Dynamic identification and updating of cognitive abilities
- Providing teachers with recommendations about how to consider students' cognitive abilities
- Adaptive course provision based on students' cognitive abilities
→ **DEMO**

Questions



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