



Athabasca University 

SCHOOL OF COMPUTING & INFORMATION SYSTEMS

Learning Analytics: Personalizing and Adapting the Learning Process

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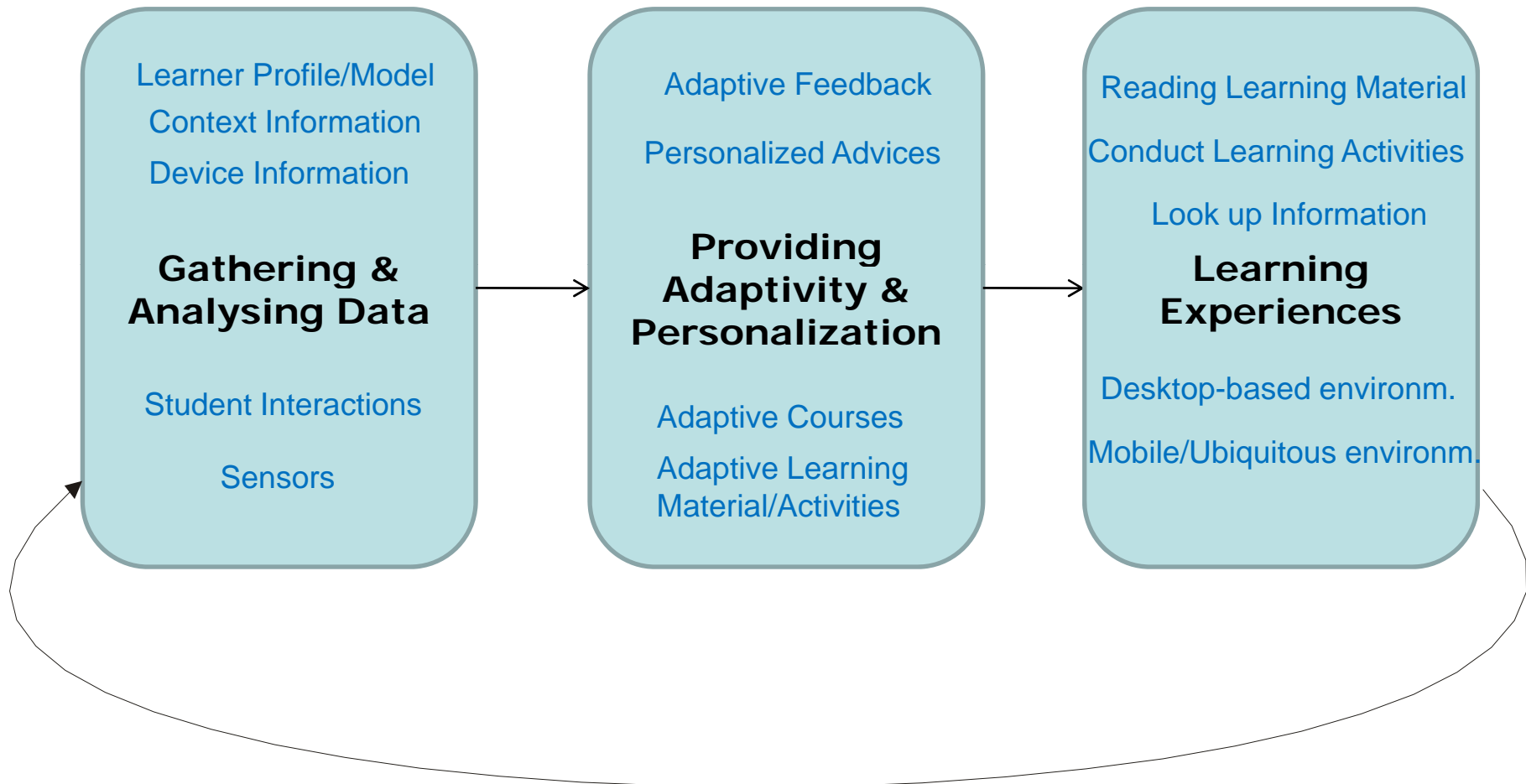
Adaptivity and Personalization in Learning Systems

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



- Based on a comprehensive student model that combines learner information and context information
- In different settings such as desktop-based, mobile and ubiquitous settings
- In different situations such as for formal, informal and non-formal learning
- Supporting learners as well as teachers
- Develop approaches, add-ons and mechanisms that extend existing learning systems

Concept of Providing Adaptivity



Adaptivity and Personalization in Learning Systems

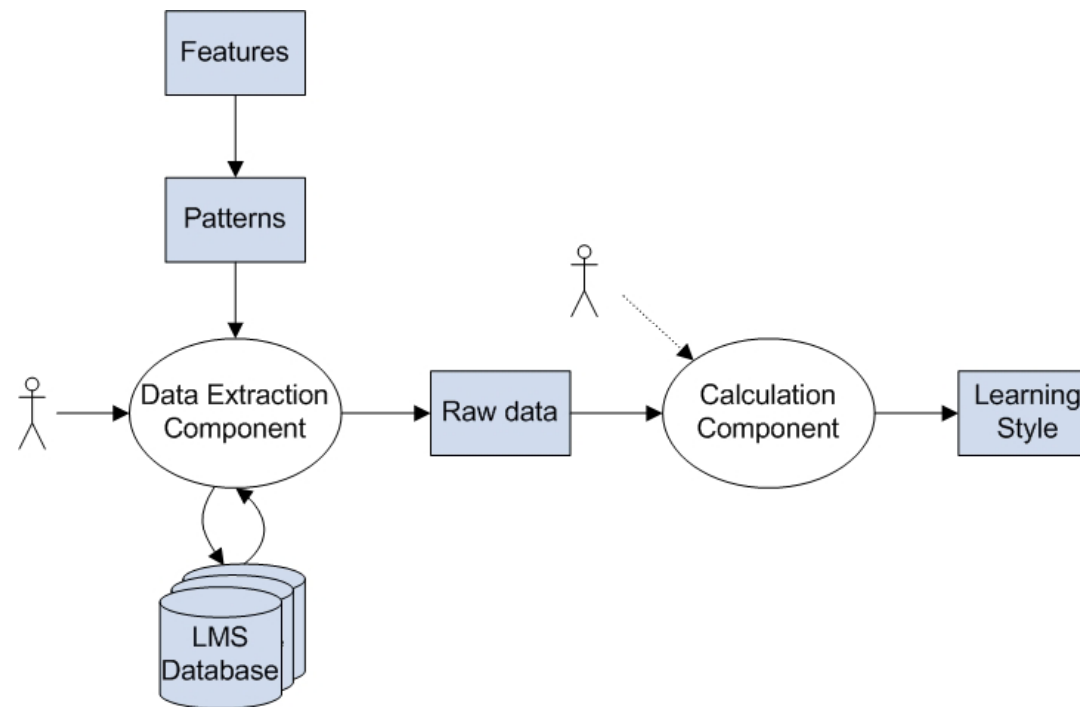
- Adaptivity based on learning styles
 - Automatic identification of learning styles based on students' behaviour
 - Dynamic identification and updating of learning styles
 - Adaptive course provision based on learning styles

Identifying Learning Styles

- Automatic Approach
- Identifying learning styles is based on patterns of behaviour
- Commonly used types of learning objects were used (Content objects, Outlines, Examples, Self-assessment tests, Exercises, Discussion forum) and relevant patterns were derived from these types of learning objects
- Calculation of learning styles is based on hints from patterns
- A rule-based mechanism is used for this calculation (similar to the approach used in the questionnaire)
- Evaluation with 75 students showed that the instrument is suitable for identifying learning styles (results: accuracy of 73% – 79%)

Tool for Identifying Learning Styles

- Developed a stand-alone tool for identifying learning styles in learning systems



Adaptive Course Provision

- Developed an adaptive mechanism
 - Incorporates only common types of learning objects
 - Content
 - Outlines
 - Conclusions
 - Examples
 - Self-assessment tests
 - Exercises
 - Adaptation Features
 - Adaptive sequencing of examples, exercises, self-assessment tests, outlines and conclusions
 - Adapting the number of examples and exercises
 - Teachers have to:
 - Provide learning objects
 - Annotate learning objects (distinguish between the objects)
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Adaptive Course Provision

- Evaluation with 437 students showed that:
 - Matched Group: **less time and equal grades**
 - Mismatched Group: **ask more often for additional learning objects**
 - Demonstrates positive effect of adaptivity
- Extension with respect to
 - Include more types of learning objects
 - Make adaptive mechanism adaptable for teachers