



Athabasca University 

SCHOOL OF COMPUTING & INFORMATION SYSTEMS

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# **Learning Analytics: Personalizing and Adapting the Learning Process**

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# Adaptivity and Personalization in Learning Systems

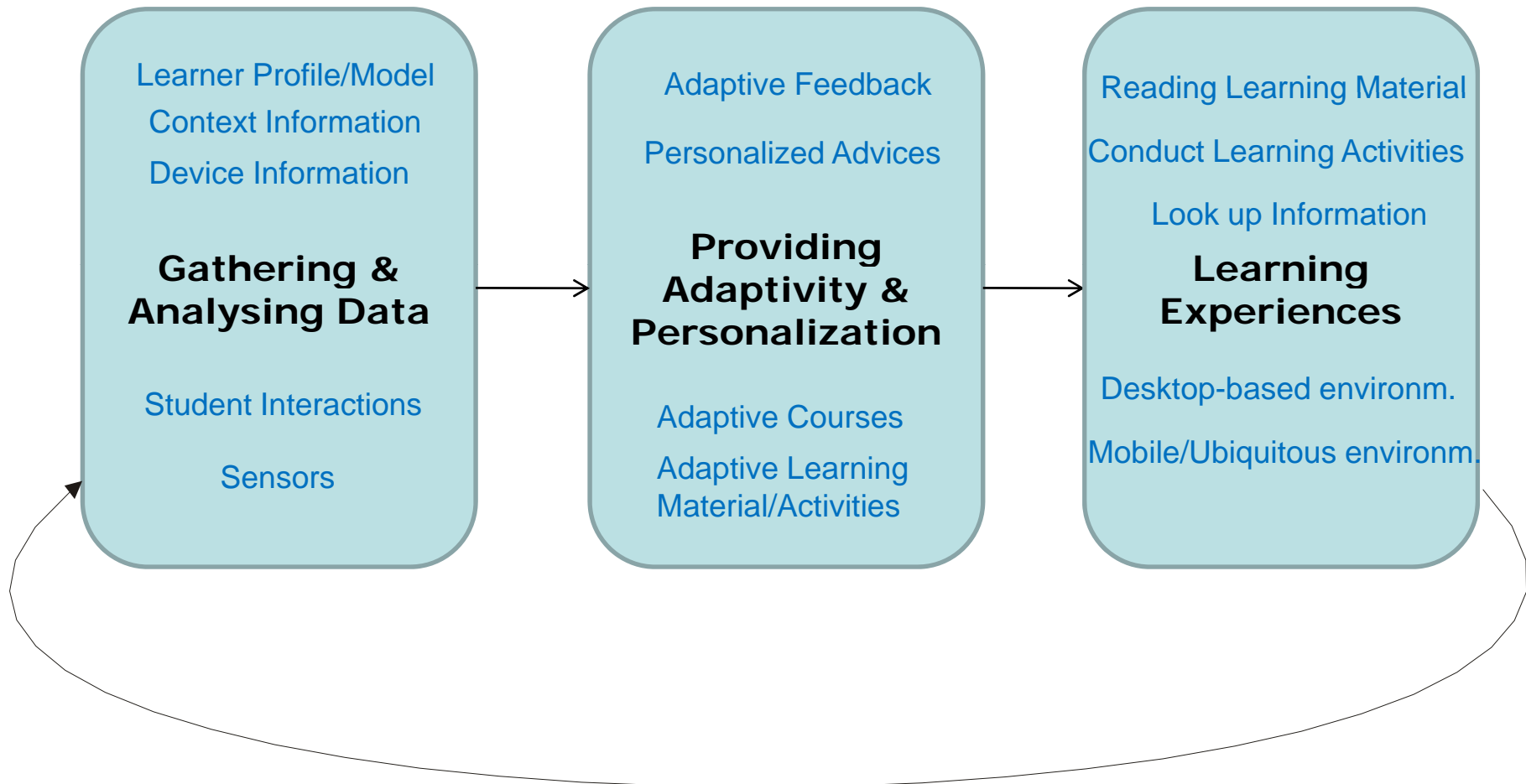
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How can we make learning systems more adaptive, intelligent and personalized



- 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

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- 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

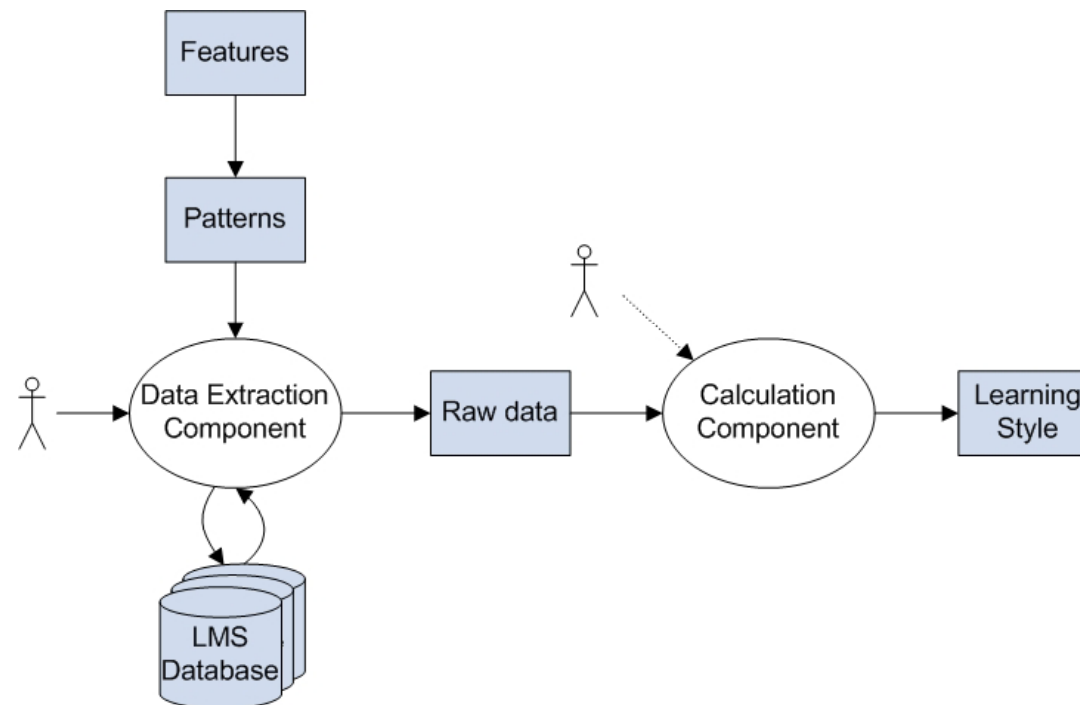
# Identifying Learning Styles

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- 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

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- 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

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- 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