Module 1:
Introduction to Learning Analytics

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Learning Outcomes and Outline

Learning Outcomes
At the end of this module, participants will be able to: 1. Define learning analytics 2. Explain learning analytics advantages 3. Describe features of learning analytics

Outline
This presentation contains the following outline: 1. Background 2. Types of learning analytics 3. Learning analytics approaches 4. Data sources 5. Features of learning analytics 6. Summary

Background

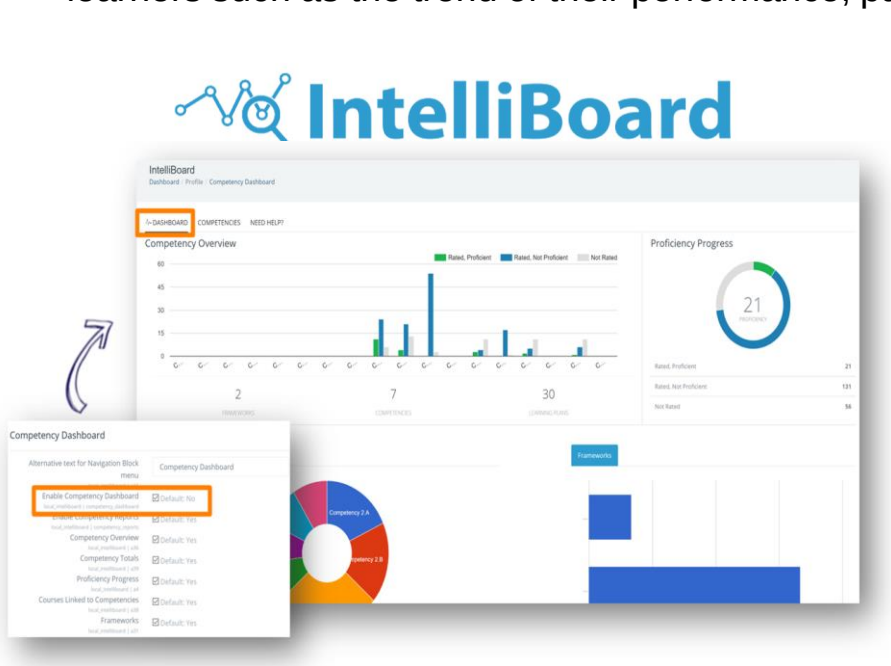
Learning analytics is the measurement, collection, analysis, and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs.

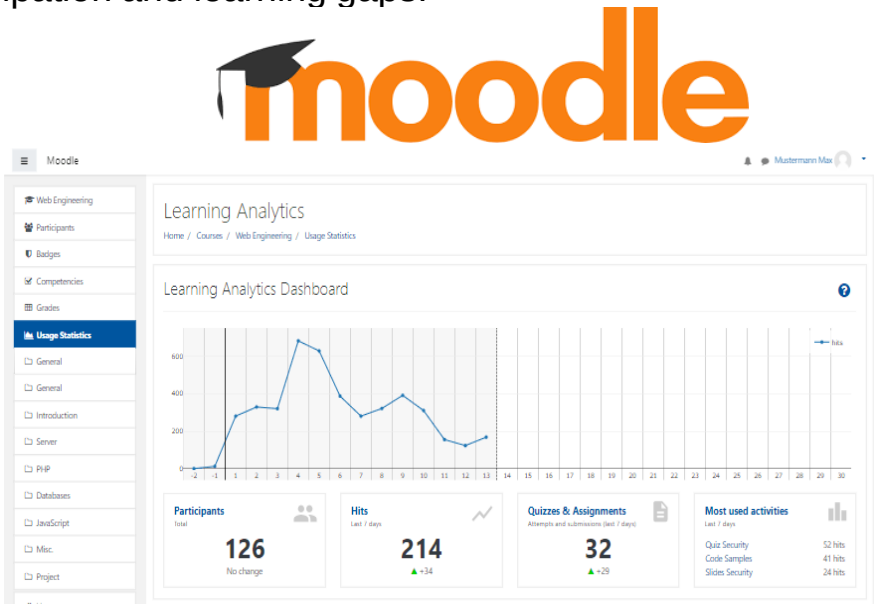
Learning Analytics have been used to mainly visualize the data about learners, in order to track the learners learning completion and educational programs achievements. Learning analytics could also predict student at risk, so instructors could perform intervention mechanisms such as facilitating extra tutorials or counselling.

Insights are derived based on the patterns identified through the analysis, which may utilize statistical, visualization and machine learning techniques. Decision making using pedagogical knowledge is needed for leveraging the advantage of learning analytics.

Learning Analytics as a Product

Learning Analytics as a product refers to applications that are made free or commercially available, such as Intelliboard and Moodle. These software are available either as a plugin into a learning management system or as a stand-alone solution. The software collects, measures and reports analyzed data about learners such as the trend of their performance, participation and learning gaps.





Learning Analytics as a Process

The previous slide explains about learning analytics products, where users benefit from the analyzed information produced by the software.

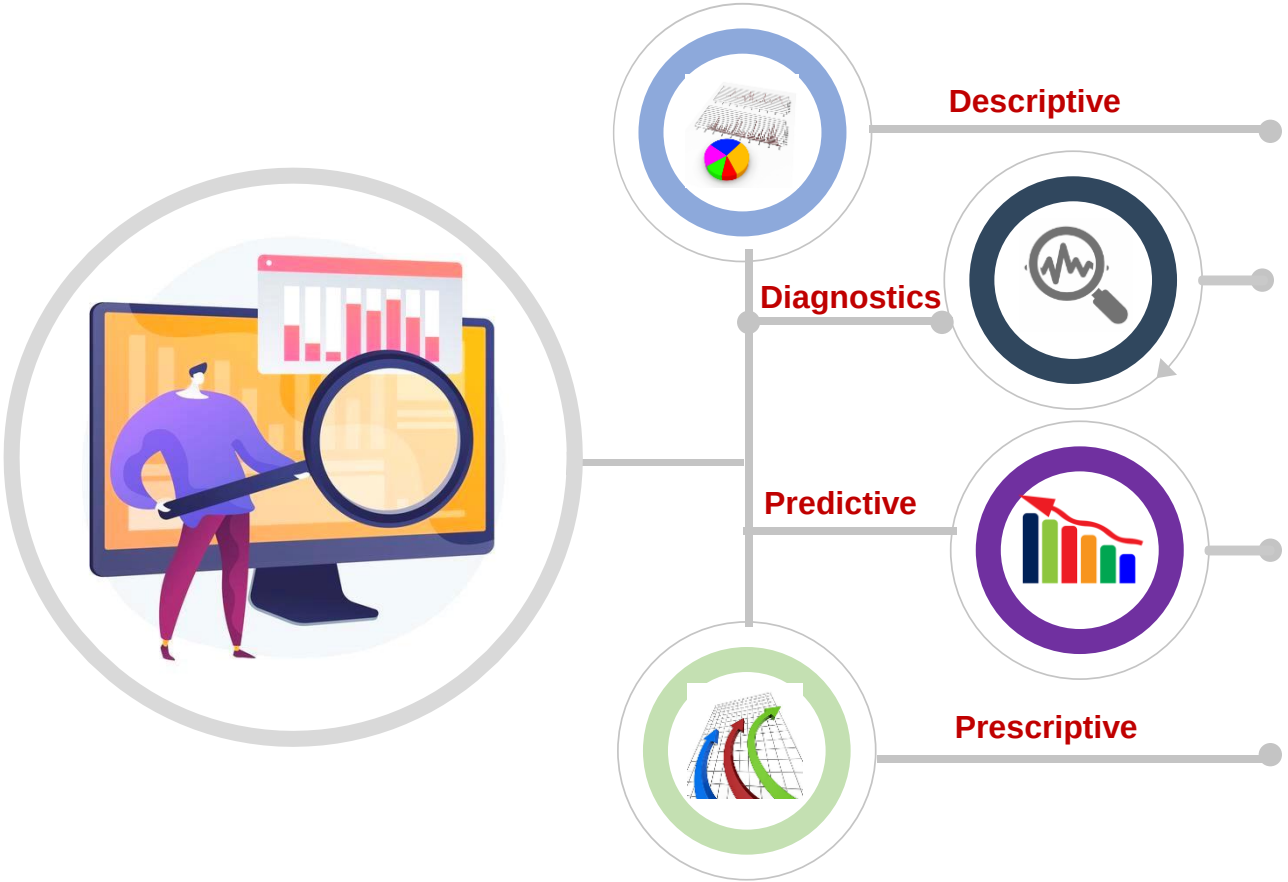
In contrast, learning Analytics as a process entails its research, development and implementation in an organisation as a continual quality improvement process in educational programs.

Various initiatives have been conducted in learning analytics research, such as:

a) dashboard and apps design,
b) development of prediction models using machine learning, and
c) policy for academic advisory governance

Tools that can be used analyzing data about learning are Microsoft Excel, SPSS, NVIVO, Python, and Power BI; depending on the analysis needs.

Learning Analytics Approaches



“What has already happened?”
Visualization of learning patterns

“Why something happen?”
Hypothesizing factors of performance and satisfaction

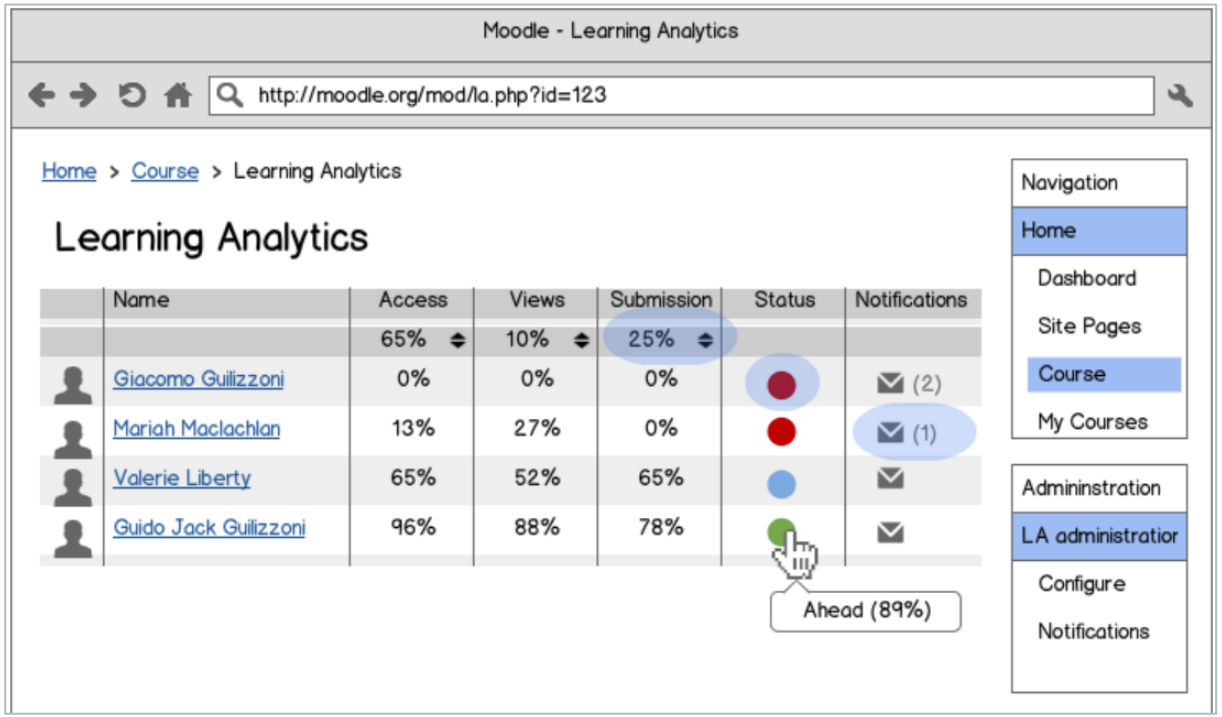
“Who could be at risk?”
Prediction of low achievement or engagement

“What should we do?”
Recommended action for further teaching and learning

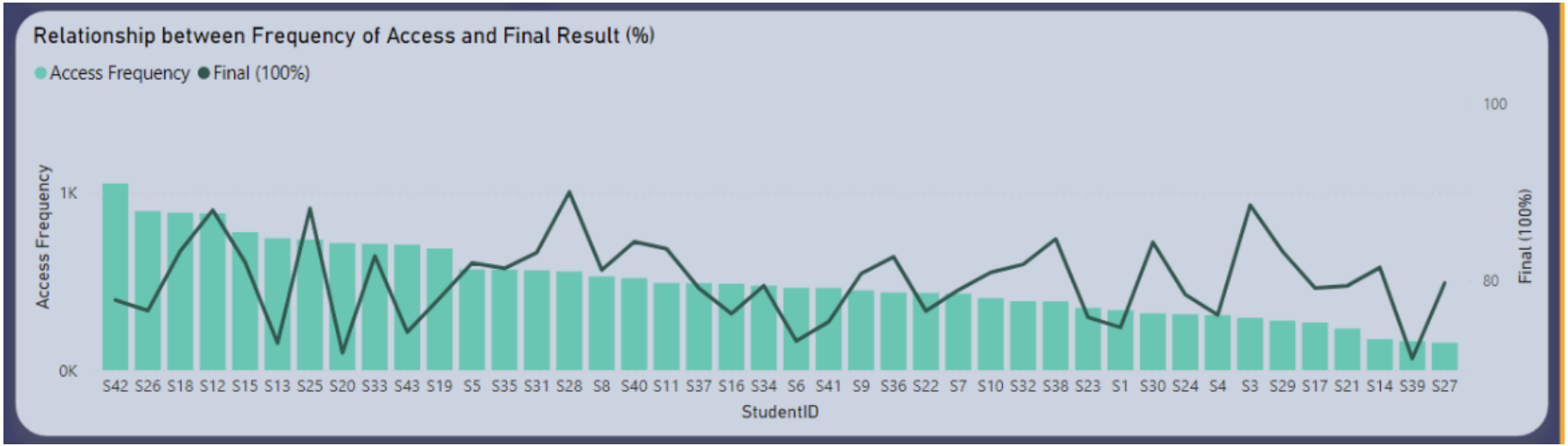
Data sources

Various data can be used for learning analytics:

1. Marks and grades from assessments such as quiz and assignment
2. Time spent for learning activities
3. Choice of materials for learning
4. Frequency of access to digital educational resources and tools
5. Participation in learning activities such as posts in forum
6. Teaching assessment and learning satisfaction survey
7. Student reflection



Example analysis



- Data for learning analytics can be obtained from the learning management system, records by the instructors, student information system, sensors and student reflection.
- Data analysis techniques include visualizing graphs, finding correlation, calculating scores and metrics, and deducing patterns.
- For example, from the graph we can deduce that there is no correlation between the frequency of access and final results. This process can be repeated and more information can be digged to further understand about the student's learning behavior and good recipe of learning styles.

Learning Analytics Features for Students

- time spent online
- collaborative learning with friends and colleagues
- learning recommendation for successful course completion
- prefer self/independent learning rather than conventional classroom setting
- timeline showing current status and goal
- time needed to complete a task or read a text
- prompts for self-assessments
- further learning recommendations
- comparison with fellow students
- considering the students personal calendar for appropriate learning recommendations
- newsfeed with relevant news matching the learning content
- revision of former learning content
- feedback for assignments
- reminder for deadlines
- term scheduler, recommending relevant courses

Reference: Schumacher, C., Ifenthaler, D., (2018), "Features students really expect from learning analytics", Computers in Human Behavior, 78, 397-407

Learning Analytics Features for Instructors

Instructors can apply pedagogical action based on the insights from the analytics

- Monitors learners progress
- Maneuver teaching strategies or improvise instructional design
- Personalize student learning path
- Identify individual student performance against class's average
- Identify students with similar performance or learning preferences
- Mitigate students at risk

Learning Analytics Features for Institutions

Administrators can perform data-driven decision making based on the gain insights:

- Monitor program and student completion
- Communicate with learner
- Improvise curriculum, promotion and student affairs strategy
- Improvise program learning path and system policy

Summary

Learning analytics is a hybrid of pedagogical process and technological application which entails the understanding of learners and their context, by collecting, measuring, reporting and taking action to improve learners experience.

Learning analytics can be performed using descriptive, diagnostics, predictive and prescriptive analytics techniques.

Instructors can trace and improve the teaching approach towards better educational program quality.

Students can get a guide of how to improve their learning strategies.

Institutions can get insight to improve their curriculum.

Thank you

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