

**ERASMUS+ PROGRAMME - KA2 COOPERATION
PARTNERSHIP PROJECT
n°2023-1-IT01-KA220-VET-000156675 - Learn to Learn
competence for IVET trainers/trainers**

Training module (online self study course)

Learning Analytics

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1. The importance of learners' feedback

Feedback in educational contexts is a fundamental tool for fostering effective and meaningful learning. It represents a two-way process in which teachers and students exchange information to improve and make the teaching-learning process more effective. On the teachers' side, feedback helps clarify goals, motivate and correct any errors that may occur, while students' feedback offers valuable insights to improve lesson organization and teaching strategies.

Students' feedback plays a crucial role in the **design and organization of teaching**. Through structured and informal feedback channels, educators gain valuable insights into how students are engaging with the content, whether it aligns with their learning styles, and if the materials are accessible, relevant, and sufficiently challenging. Feedback allows instructors to pinpoint areas where students may be struggling, whether due to unclear explanations, pacing issues, or the complexity of the material. Furthermore, feedback contributes to a **more student-centered learning experience**. By actively involving students in the evaluation process, teachers create an environment where learners feel heard, valued, and motivated to take an active role in their educational journey. Ultimately, when integrated effectively, student feedback ensures that teaching materials and interventions remain **responsive to the evolving needs of the classroom**, enhancing both the quality and the relevance of the educational experience.

In face-to-face teaching, feedback can take many forms, ranging from formal assessments to informal interactions that help shape and improve the learning experience. Here are some examples of feedback in a traditional, in-person teaching context:

1. **Verbal Feedback During Class:** Students may provide feedback during or after a lesson, such as asking questions for clarification or offering comments about the material. For example, a student might say, "I didn't fully understand the concept you just explained. Could you go over it again?" or "The examples you provided really helped me grasp the topic."
2. **Surveys or Questionnaires:** Students can complete informal surveys that ask about their learning experience. For example, they might rate the pacing of the class, the clarity of the material, or the effectiveness of assignments.
3. **Class Discussions:** During a class discussion, students may provide feedback on the effectiveness of teaching materials or activities.
4. **Informal Conversations:** Students often give informal feedback in conversations before or after class. For instance, a student might approach the teacher and say, "I liked the way we worked on the group project; it helped me understand the topic better" or "I felt like the material was too difficult this week."

Whereas it is relatively easy for teachers to gain insights into students' performances and opinions in a traditional classroom setting through direct interaction and observation, online teaching can present more challenges in understanding how students are doing. Without the benefit of face-to-face engagement, it can be harder to assess student comprehension, participation, and overall experience. In an online environment, educators can rely on **learning analytics** that provide valuable insights into student progress, engagement, and performance.

2. Learning Analytics

According to the [Society for Learning Analytics Research](#) (SoLAR), learning analytics is defined as the process of **measuring, collecting, analysing and reporting on data related to learning**. The goal of learning analytics is to use the power of data to make better decisions about learning programs and strategies. Some of the key objectives of learning analytics are:

- Delivering personalized, timely feedback to enhance student learning
- Measure key indicators of students performance
- Understand and improve the effectiveness of teaching practices
- Enhancing the quality of teaching and learning by providing data-driven evidence on the effectiveness of different approaches

When learners use an LMS, social media, or similar online tools, their clicks, navigation patterns, time on task, social networks, information flow, and concept development through discussions can be **tracked**.

The term “analytics” refers to the systematic computational examination of data and statistics to uncover, interpret, and communicate **meaningful patterns**. This process is closely tied to data science, as it falls within its broader scope. Additionally, analytics focuses on leveraging these identified patterns to support and drive **effective decision-making**.

The growing significance of learning analytics stems from its potential to transform and enhance learning experiences and outcomes through data. Learning analytics can be applied in various ways to meet the needs of learners and organizations. Key uses include:

- **Understanding and Predicting Learners Behavior:** By analyzing data on engagement and performance, learning analytics can uncover patterns, motivations, and habits, enabling educators to make informed adjustments.
- **Personalizing and Enhancing Courses:** Learning analytics helps tailor courses to current learners while providing insights to optimize future training programs.
- **Enabling Early Intervention:** Organizations can use learning analytics to identify learners at risk of underperforming. This allows instructors to provide timely support and interventions to help them succeed.

The process of using and implementing learning analytics can be divided into **four main phases**:

1. **Data Generation:** The process begins with students, who, during their educational activities, generate various types of data, such as demographic information, tracking of online actions, results from guidance or assessment activities.
2. **Data Processing:** The collected data is analyzed and transformed into descriptive representations or comparative measures, both intra-personal and inter-personal, using specific benchmarks.
3. **Use of Results:** The obtained information is used to define and tailor educational interventions, potentially involving teachers, instructional designers, educational system leaders, and policymakers.
4. **Impact on Students:** The interventions adopted produce effects on students, thus closing the loop and restarting the process in a continuous cycle of improvement (Gabbi, 2023).

Clow (2013) states that this process is **cyclical and recursive**: learners generate data, which is transformed into metrics to guide interventions that, in turn, influence the learners themselves. These learners can be students in formal contexts or in less structured environments. The data may include demographic information, online activities, assessment results, and post-training data. Metrics can be represented in various ways: from simple progress indicators to comparisons with benchmarks or visualizations of activities in online forums. Interventions range from students' self-assessment, comparing their activities with those of their peers, to direct teacher interventions to support students with specific needs.

At the same time, the opportunities offered by the implementation of learning analytics bring about **new challenges**. For example, knowing in advance that a student is unlikely to successfully complete a course could negatively influence the teacher's opinion, reinforcing existing inequalities. Learning analytics can help concentrate resources where they are most needed, but focusing solely on students at risk of failure could penalize the experience of stronger students. It is therefore crucial for the teacher to **balance the use of learning analytics** without compromising growth and development opportunities for all students. Teachers have to keep in mind that the main goal is to utilize this type of data to understand how students learn and to create better learning experiences. In fact, every student learns differently, and **learning analytics can help tailor education to fit individual needs**.

2.1 Some examples of data sources used in learning analytics:

- **Login Activity:** How frequently do learners access the course?
- **Session Duration:** How much time do learners spend during each session?
- **Course Progression:** Are learners advancing smoothly or encountering difficulties?
- **Preferred Devices:** Are learners accessing the system via mobile devices or computers?

- **Assessment Performance:** Which parts of the assessment are learners finding challenging?
- **Survey Feedback:** What insights can be gathered from learner feedback and survey data?
- **Engagement:** Are learners actively participating in collaborative or social learning activities?
- **Resource Utilization:** Are learners making use of all the resources provided?
- **Completion Statistics:** What percentage of learners successfully complete the course?

2.1 Different types of analysis with Learning Analytics

1. **Descriptive Analytics:** insight into the past
It uses data aggregation and data mining to understand trends and patterns over time. This type of analysis is limited to past data and includes:
 - Student feedback collected through evaluation surveys
 - Analysis of data at all stages of the student lifecycle
2. **Diagnostic Analytics:** why did it happen?
This form of analysis is used to examine data or content and answer the question “Why did it happen?” by detecting correlations between the emerging data.
3. **Predictive Analytics:** forecasting future trends
It combines historical data, statistical models, and algorithms to capture relationships between various data sets and thus predict future trends of learning processes related to the analyzed path.
4. **Prescriptive Analytics:** advice on the next steps
This type of analysis goes beyond descriptive and predictive analytics by recommending one or more choices using a combination of machine learning, algorithms, and past data. For example, it may suggest which parts of the course to focus on in order to make changes that could have a significant impact on improving student engagement and their outcomes.

Thus, one of the key benefits of learning analytics is **the ability to make data-driven decisions**. Instead of guessing which aspects of a course are more effective, organizations and schools can rely on **concrete evidence provided by data**.

For instance, imagine an instructor introducing a short video to help learners understand a concept. By analyzing learning data, they discover that most students press pause before the video ends. This insight allows the instructor to determine that the video wasn't as effective as anticipated, prompting them to explore alternative teaching methods. Additionally, the instructor might ask himself questions like the following, that can be answered through LA:

- Which videos in my course are being viewed the most?
- Did students watch the entire video or just a portion of it?
- Are there specific sections of the video that get a lot of views? What might explain this?
- What activities did students engage in before watching the video I shared?
- After watching the video I provided, where did the student go next?

By analyzing these insights, the instructor can refine their approach to better engage students and improve learning outcomes.

At the same time, an over-reliance on quantitative data can lead to focus heavily on measurable data (e.g., quiz scores, participation rates). However, this doesn't always capture the full picture of student learning, such as creativity, critical thinking, or emotional development.

Table 1: Pros and cons of using LA

Pros of using Learning Analytics	Cons of using Learning Analytics

<i>Informed Intervention:</i> You can intervene earlier when students are falling behind or not engaging, offering additional support before it's too late.	<i>Data Overload:</i> The more data you collect, the harder it can be to sift through and interpret. You might end up feeling overwhelmed by the sheer volume of information and unsure how to use it effectively.
<i>Better Course Design:</i> The data allows you to adjust your teaching methods and course design based on what's working and what isn't, leading to continuous improvement.	<i>Privacy Concerns:</i> With data collection comes the risk of violating students' privacy. It's crucial to ensure that you're collecting only the data that's necessary, protecting it properly, and complying with regulations like GDPR (if applicable).
<i>Time-saving:</i> You can automate some aspects of tracking student progress, which reduces manual work and allows you to focus more on teaching rather than administrative tasks.	<i>Dependence on Technology:</i> If your school or institution doesn't have the right technological infrastructure or tools, using LA might be difficult or unreliable. This could lead to inaccurate or incomplete data analysis.
<i>Supports Retention:</i> With early insights, you can help prevent students from dropping out or failing, especially by identifying students who may need extra help or motivation.	<i>Risk of Bias:</i> Data can sometimes reflect systemic biases, like how students from different backgrounds or with different learning styles are assessed. If not carefully managed, these biases can skew the insights and lead to unfair conclusions.

3. How do Learning Analytics work in the most common LMS platforms?

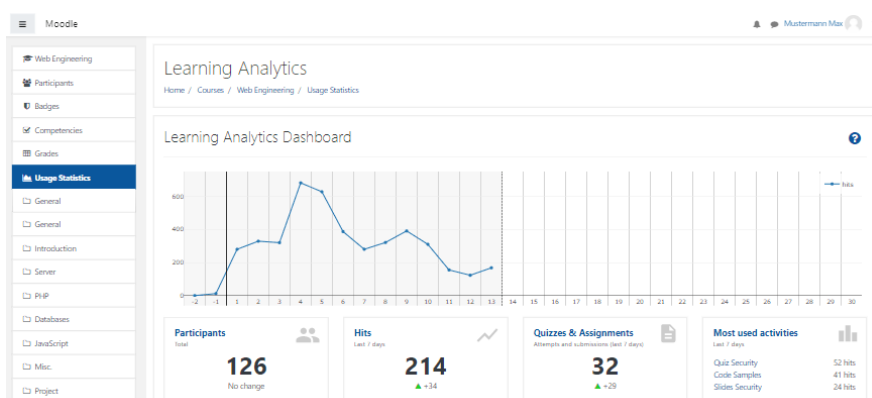
Every online learning platform has a management console usually accessible to the technical figure in charge of managing it (this is usually the same person who creates the accounts and whom you contact to solve technical problems). It is advisable to deal with this figure if you do not have direct access to the platform management console or have little experience with it and want to start using Learning Analytics to support your instructional design work. In some cases LA data are available directly in the console in graphical form (as in the case of Google Workspace), for other platforms there are plugins available (as in the case of Moodle).

Below is some information related to the possibilities of using this data on the most popular online content management platforms for teaching.

3.1 How Learning Analytics Work in Moodle

Moodle is one of the most widely used learning management systems, known for its versatility and adaptability. It offers a wide range of [Moodle plugins](#) specifically designed for learning analytics, enabling educators to track, analyze, and enhance the learning experience effectively. Some examples are:

1. **Tracking Student Engagement**
 - Moodle tracks metrics like login frequency, time spent on courses, and participation in discussions or forums.
 - Teachers can monitor whether students are accessing resources regularly or lagging behind.
2. **Course Completion Progress**
 - Moodle displays students' progress through activities and modules.
 - Teachers can identify students who are at risk of falling behind and provide support before it's too late.
3. **Assessment Analytics**
 - Moodle tracks quiz scores, assignment submissions, and other assessment results.
 - Insights can show which questions or topics students struggle with the most, guiding future instruction.
4. **Heatmap**
 - Colour-coded indication of activity views on course page
5. **Personalized Learning Paths**
 - With Moodle, learning analytics can help create personalized learning paths. For example, students who excel in a topic might be directed to advanced materials, while those struggling might be guided to remedial resources.

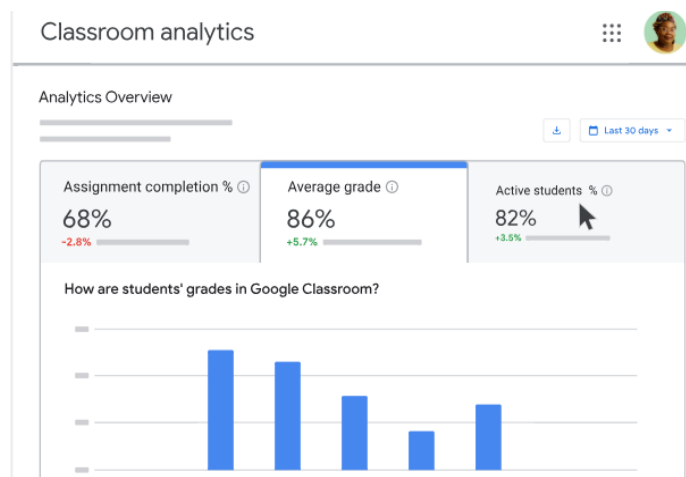


Source: Moodle "[Learning Analytics - Moodle Plugins directory](#)"

3.2 How Learning Analytics Work in Google Classroom

Teachers can use Google Classroom analytics to "get a centralized view on Classroom activity data for each class they teach and easily identify which students might need extra support" (Google, [Learn about Classroom analytics as a teacher](#)). By accessing the analytics page of their classes, teachers can get insights on:

1. **Assignment completion:** the percentage of all assignments due during this time period that were turned in by students.
2. **Average grade:** an average of all graded Classroom assignments due in the time period that you select
3. **Active students:** the percentage of all students in the class who interacted with this class during the selected time period.

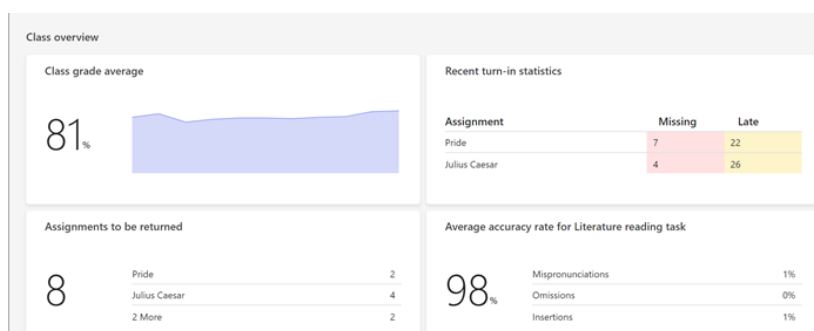


Source: Google “[Classroom Management Tools & Resources - Google for Education](#)”

3.3 How Learning Analytics Work in Microsoft Teams

Microsoft Teams **Insights dashboard** provides valuable data on student activity, ranging from assignment submissions to participation in class discussions. The dashboard provides insights into:

1. **Digital activity data:** it shows how active students are within a given time frame, for example if they opened a file, visited a channel, attended a meeting (and for how long).
2. **Assignments and grades report:** it monitors student learning with views of grade average and distribution, assignment progress status and turn-in statistics.
3. **Reflect data:** it provides insights into the class's emotional state, it gives students an opportunity to name and share their emotions by using **emojis or words** (e.g., proud, confident, unsure, etc.).



Source: Microsoft Teams “[Assignments and grades in Insights](#)”

3.4 A step-by-step example of LA in Microsoft Teams: accessing the digital activity report

1. **Access Insights:** On teams, Insights is automatically available by selecting the Insights tab. Educators can also add the Insights app through the app bar (select *More added apps* > Search for *Insights* in the search bar > Select *Save* > Pin Insights to your app bar).
2. **Get to the overview page:** When you click on the Insights tab in your class team channel, you'll land on the class overview page, which gives you an initial view of student activity. From there, you can explore

further to access detailed insights about students' engagement with Teams activities. Drill down and select "Digital activity report".

3. Filter the results: By default, your report reflects all students, all activities, this week. You can use the filters to customize your report depending on what you want to see:
 - a) **Student filter:** Enter a student's name in the search box to view data for that specific individual.
 - b) **Activity filter:** Access data related to assignments, communication, file usage, and more.
 - c) **Time filter:** Choose "This week" to reveal a dropdown menu with additional time options for viewing data.
5. Read the data: The size of the bar in each student's row indicates their activity level, reflecting the estimated time spent (e.g., a dot next to a student's name means no activity). You can hover over a bar in a student's row for specifics on their activity and see in detail:
 - a) Which online meetings they attended, and for how long.
 - b) Tabs viewed
 - c) If they viewed or turned in an assignment
 - d) If they opened or edited a file
 - e) If they posted a message, replied to one, or reacted.

Bibliography and further resources:

Clow, Doug (2013). [*An overview of learning analytics. Teaching in Higher Education*](#), 18(6)
pp. 683–695.

Gabbi, Elena (2023). [*Learning analytics per lo sviluppo professionale: un approccio metodologico allo studio delle comunità di pratica.*](#)

[Learning analytics in a nutshell](#)

[Learning Analytics 101 - Learning Analytics Research Network \(LEARN\) | NYU Steinhardt](#)

[Moodle and Learning Analytics: Unlocking the power of eLearning data](#)

[What is Learning Analytics - Society for Learning Analytics Research \(SoLAR\)](#)

[Learn about Classroom analytics as a teacher](#)

[Educator's guide to Insights in Microsoft Teams](#)