

DATA ANALYTICS IN LMS

FOR EFFECTIVE INSTRUCTIONAL DESIGN

ABSTRACT

Learning Management Systems (LMSs) data analytics tools are critical for enhancing instructional design and supporting evidence-based decisions. This article explores how LMS analytics can significantly enhance instructional design by providing insights into learner engagement and performance. By pairing data-driven insights with rubric-based assessments, instructional designers can achieve a nuanced understanding of learner progress and outcomes. This article also discusses how different stakeholders, from students to CEOs, benefit from LMS analytics. Together, these insights aim to help instructional designers create more targeted, responsive, and impactful learning experiences.

Introduction

Data analytics within Learning Management Systems (LMSs) allows for data-driven instructional improvements by providing actionable insights. LMS platforms like **Blackboard Learn**, **D2L Brightspace**, and **Canvas** offer built-in tools that collect, visualize, and analyze data, enabling refinements in course delivery and user engagement. This article discusses three major analytics tools in LMSs, rubrics' role in evaluations, and how analytics supports educational standards.

Analytic Tools in LMS

Learning Management Systems (LMSs) provide tools for data collection, analysis, and visualization that enhance instructional quality. Here are three core tools commonly found in platforms like Blackboard Learn, D2L Brightspace, and Canvas:

Engagement Dashboards

Engagement dashboards track user interactions, including logins, page views, and assignment submissions. LMS platforms like Blackboard Learn, D2L Brightspace, and Canvas have built-in dashboards that monitor student engagement, offering real-time tracking and inactivity alerts. Blackboard Learn's Activity Stream provides users with a prioritized view of course activities, such as content uploads, assignment submissions, and grading status. This feature enables instructors to focus on urgent tasks, enhancing course management efficiency (Williams, 2024). D2L Brightspace's Class Engagement Tool consolidates data on student activity, performance, and participation, allowing instructors to filter, sort, and search data to identify students who may need additional support (D2L Knowledge, 2024). *Practical Use Example:* An instructional designer uses engagement data to send reminders, boosting student participation.

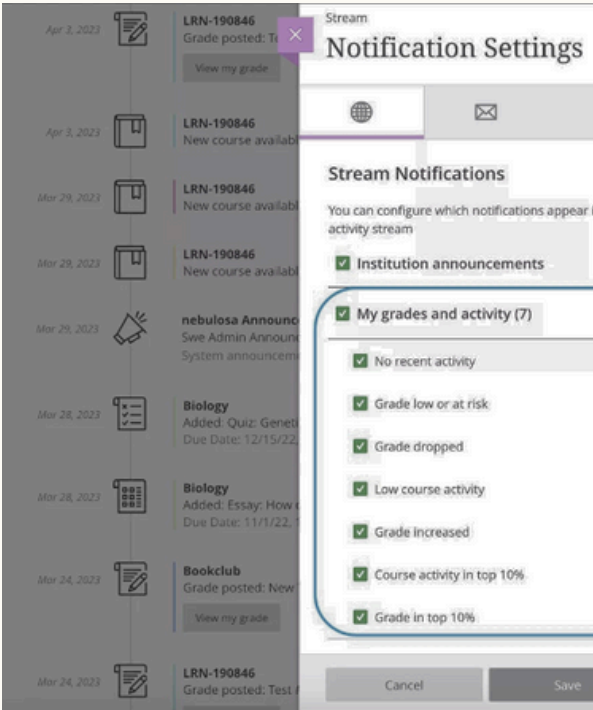


Figure 1. Blackboard Activity Stream. (How Am I Doing?, 2022)

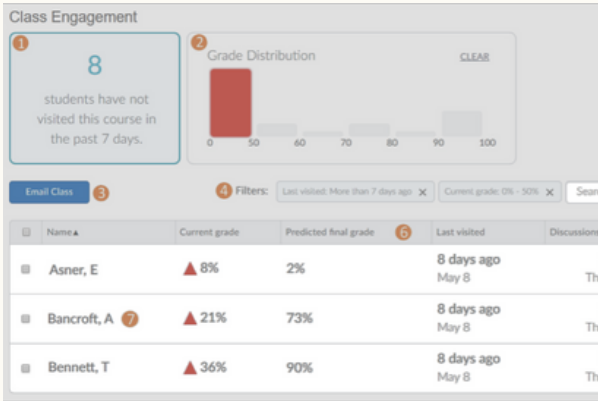


Figure 2. Visual tour of the Class Engagement tool. (D2L Knowledge, 2024)

Course Analytics Dashboards

Course analytics dashboards provide comprehensive data on grades, assignment submissions, and time spent on learning tasks. These tools help instructional designers assess student progress, detect learning gaps, and identify at-risk students. Key features include grade distribution, predictive performance analytics, and progress reports. D2L Brightspace's Class Progress Dashboard tracks completion rates and risk levels, allowing for proactive interventions (D2L Knowledge, 2024b). For example, if data shows students spending excessive time on a single assignment, designers can revise instructions or provide additional support.

Practical Use Example: A designer notices prolonged time spent on one assignment, prompting revisions to the instructions and additional support.

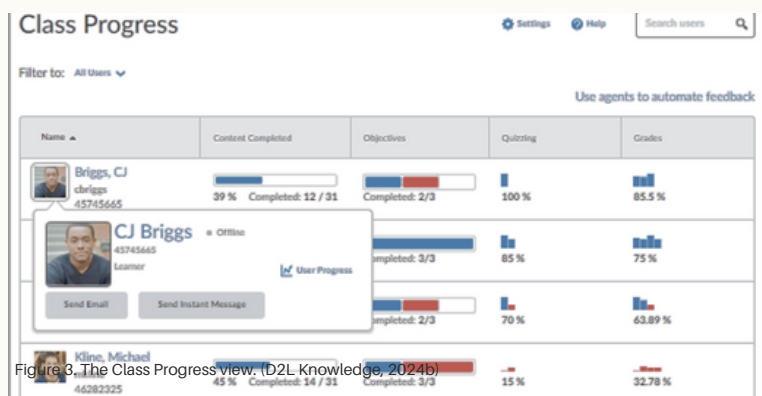


Figure 3. The Class Progress view. (D2L Knowledge, 2024b)

Learning Analytics Dashboards

Learning analytics dashboards offer a broader view of student performance across multiple courses. They facilitate trend analysis and outcome comparisons, helping instructional designers and administrators gain insights into overall learning patterns and engagement levels. Canvas's Admin Analytics provides a comprehensive overview of student engagement, success rates, and attendance (Curran, 2023). This helps instructional designers implement targeted interventions, such as personalized feedback or optional Q&A sessions, based on trend analysis. *Practical Use Example:* An instructional designer observes low attendance trends in live sessions and implements targeted reminders and incentives to boost participation.

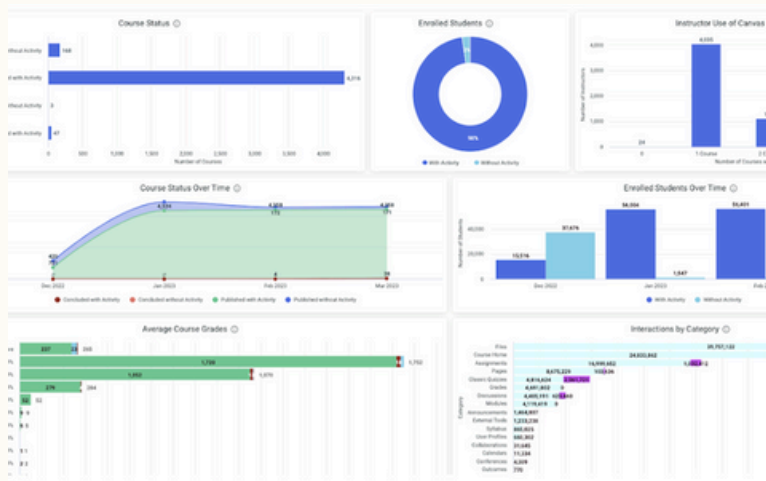


Figure 4. Canvas LMS Overview dashboard. (Curran, 2023)

Importance of Data Collection, Analytics, Visualization, and Reporting

For Instructional Designers, data collection and analytics are central to effective instructional design, offering insights into student performance and engagement. Visualization tools, such as graphs, heat maps, and progress bars, provide a quick overview of trends, supporting efficient decision-making.

- **Graphs:** Line charts illustrate trends in student performance, helping designers identify patterns like steady improvement or sudden drops in scores. For example, if a chart shows a consistent decline in quiz scores, instructional designers can adjust content or provide additional resources.

- **Heat Maps:** These help instructional designers pinpoint challenging areas by displaying frequent student clicks or pauses. For instance, a heat map indicating high interaction at a particular content section may signal confusion, prompting the designer to clarify or simplify instructions.
- **Progress Bars:** These offer real-time updates on completion rates, motivating students while also indicating where interventions may be needed.

For Other Users:

Data analytics tools offer significant benefits to various stakeholders, each with unique needs:

- **Students/Participants:** Analytics tools enable self-regulation by tracking progress and identifying areas for improvement. For example, a student who notices a low quiz score trend can allocate more study time to weak areas.
- **Instructors:** Engagement metrics help instructors tailor teaching strategies. For example, low engagement in discussion forums might prompt instructors to introduce interactive elements like videos or polls.
- **Department Heads/Administrators:** Aggregated data helps allocate resources efficiently. For example, a department head uses analytics to identify courses with low completion rates, redirecting additional tutoring or resources to those areas.
- **Grantors/Accreditation Boards:** Data analytics provide transparent, evidence-based reports that demonstrate compliance with standards and program effectiveness, which are critical for securing funding and maintaining accreditation (Team Creatrix, 2024).
- **CEOs/Supervisors:** In workplace training, analytics allow supervisors to evaluate program alignment with organizational KPIs, ensuring that skill development meets business needs.

By providing tailored insights for each user group, LMS analytics support a data-driven culture that enhances instructional quality, learner engagement, and program outcomes.

Integration of Rubrics and Checklists in Data Analytics

Rubrics and checklists are crucial components in Learning Management Systems (LMSs),

providing structured criteria for evaluating instructional quality and learner performance. They support both quantitative and qualitative data analysis, facilitating data-driven decisions (Reddy & Andrade, 2010).

Self-Built vs. Standardized Rubrics

Self-built rubrics allow instructional designers to tailor assessments to specific course goals, making them ideal for pilot programs or innovative courses that require unique evaluation criteria. For example, an eLearning course on design thinking might use a custom rubric to measure creativity, aligning assessments with course objectives.

Standardized rubrics, like those from Quality Matters or the Online Learning Consortium, offer consistent evaluation across programs, supporting compliance, accreditation, and uniformity. These rubrics are effective for ensuring consistent standards but may lack the flexibility needed for complex assessments (Reddy & Andrade, 2010).

Both types of rubrics contribute to LMS analytics, visualized through graphs and charts. This integration enhances instructional quality by providing clear, structured data that informs decisions (Reddy & Andrade, 2010).

Criteria	Level 4 17 points	Level 3 14 points	Level 2 12 points	Level 1 1 point
Content: Policy Topic	The topic chosen in a policy problem at the federal level. You demonstrate the problem affects citizens and is solvable by the federal government.	You discuss a policy problem that could be solved by federal policy. You demonstrate that it affects citizens to a degree and suggest that this may be solvable by federal policy, but it may be possible to solve this better in a different way. ✓	You may not have clearly identified the policy problem. You may be really talking about a policy solution already or you have not clearly made the case this deserves a federal solution.	It is not policy a federal necessity
Surces and annotation	You have chosen reputable sources that provide policy research on your topic. The annotation for each is clear and you have identified how they may be useful.	The sources may generally be reputable, but you may rely too much on general or popular sources, which may not contain enough policy research (more opinion). Your summaries are ok, but it may not be clear how these will help your project.	The sources are too general to be of much use. They may contain too many political opinions, as opposed to policy research studies. The summaries may not clearly demonstrate how you will use this in your project. ✓	You do enough sources any ann source's be com help yo
Writing	Your writing style is appropriate--both in terms of writing mechanics and in terms of tone (not partisan, except where allowed)	You may have some minor writing style issues or your tone may be more political than analytical. ✓	You have major writing style problems or your tone is entirely too partisan.	Your wr inappro level co

Figure 5. Brightspace Rubric (Muse, 2021)

Discussion

Integrating data analytics and structured assessments like rubrics within Learning Management Systems (LMSs) supports data-driven decision-making by providing both quantitative and qualitative insights. Engagement dashboards highlight low participation, prompting course adjustments, while rubrics ensure consistent assessment and align with models like ADDIE for iterative course improvements.

Analytics help instructional designers refine content, increase engagement, and identify learning gaps. As noted by Hernández-García et al. (2023), the effectiveness of predictive models depends on accurately categorizing interactions based on course delivery modes, emphasizing the need for context-aware analysis to improve instructional outcomes.

Rubrics complement analytics by providing consistent evaluation criteria, supporting compliance, and enhancing accuracy in assessments (Hernández-García et al., 2023). Self-built rubrics allow for tailored assessments, while standardized rubrics ensure consistency across programs.

Implications for Different Stakeholders

Integrating analytics with rubrics impacts various stakeholders:

- **Students:** Use rubric-based feedback for self-regulation and motivation.
- **Instructors:** Adjust teaching strategies based on performance data.
- **Administrators:** Evaluate programs, allocate resources, and ensure compliance.
- **Grantors/Accreditation Boards:** Use analytics to demonstrate standards compliance.
- **Corporate Supervisors:** Align training content with organizational goals through analytics and rubric-based assessments (Hernández-García et al., 2023).

Conclusion

Learning Management Systems analytics are crucial for enhancing instructional design, improving engagement, and ensuring program quality. Paired with rubrics and checklists, these tools provide structured criteria for assessment, allowing instructional designers to make informed, data-driven decisions. As LMS technology evolves, designers must continuously refine their skills to interpret analytics effectively and apply insights to elevate course quality and ensure compliance with educational standards. The integration of analytic tools and structured assessments fosters adaptive learning experiences and supports the continuous improvement of educational programs.

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