Developing a Learning Analytics Dashboard for Students

Krishnavamsi Gujju
Marcia Moraes, Sudipto Ghosh, James Folkestad
Computer Science Department
Colorado State University

Step1: Literature Review

- **Definition and Purpose:** Learning Analytics Dashboards (LADs) are interactive tools designed to visualize and analyze educational data. They aim to support educators and learners by providing insights into learning processes.
- **Technological Advancements and Challenges:** Leveraging data analytics advancements, LADs face challenges such as ensuring data privacy and creating user-friendly designs.

Objective and Scope of LR

- **Purpose**: To establish a comprehensive understanding of the current state of Learning Analytics Dashboards (LADs) in educational settings, identifying gaps and opportunities for further research and development.
- **Aim and Scope:** The review aims to critically understand LAD's impact and design across various educational levels, analyzing 21 papers to identify gaps and opportunities for research and development.
- **Selection and Analysis:** Articles were chosen based on relevance to LADs, contribution to educational technology, and insights into user engagement, employing a structured approach for analysis.
- **Outcomes:** Identified key trends, challenges, and potential areas for innovation in LAD design and application, laying the groundwork for the subsequent phases of the project.

Methodology

Search and Analysis: Adopted systematic search strategies and thematic analysis to focus on the design, implementation, and educational impact of LADs, ensuring findings were aligned with existing research.

Key Findings from Literature

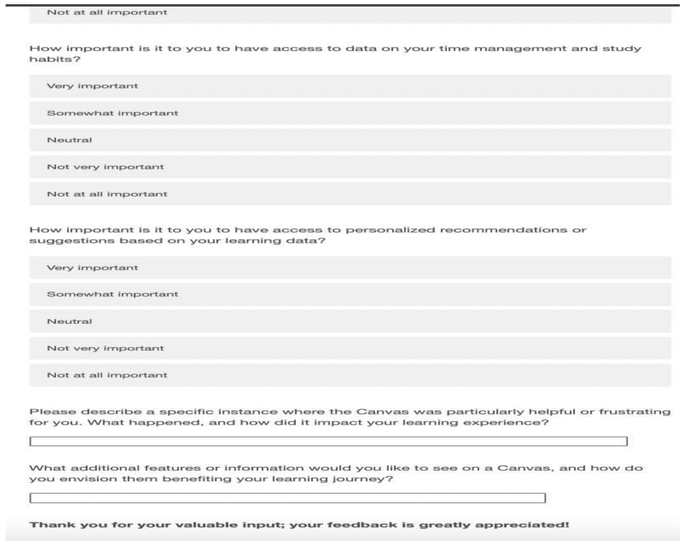
- **Trends and Challenges:** Identified a shift towards more user-centric and adaptive designs, addressing significant barriers such as data privacy and the technical complexity of LAD implementation.
- **Recommendations:** Suggested enhancements in LAD functionality and accessibility, aiming to improve user engagement and educational outcomes.

Implications for Future LAD

- **User Experience Improvement:** Stresses the importance of intuitive design and personalized feedback mechanisms to boost engagement and learning outcomes.
- **Bridging Theory and Practice:** Advocates for closer collaboration among developers, educators, and learners to ensure practical, real-world applicability of LADs.

Step 2: Survey

- **Survey Overview:** This survey, aimed at computer science undergraduates and graduates at CSU, sought to uncover preferences and desired features for LAD's. It encompassed a variety of questions, including functionality desires, user experience improvements, and specific features students and faculty felt were missing or could be enhanced in existing systems. The goal was to collect detailed feedback that could directly inform the development to meet the needs of the academic community.
- **Key Question Highlight:** Focused on identifying additional features or information students and instructors desire in a LAD.



Categorization of Responses:

- **Functional Implementations Needed:** Survey responses called for upcoming assignment reminders and customizable notification options for better academic management. A unified page displaying all course grades and a GPA estimation tool was also highlighted, aiming to streamline students' academic tracking.
- **Awareness of Existing Features:** Some responses highlighted a lack of awareness about current functionalities, suggesting the need for better user education on using the dashboard effectively.
- **Instructor-Led Improvements:** Feedback included requests for more consistent use of Canvas by instructors, clearer notifications, and enhanced module organization to facilitate learning.

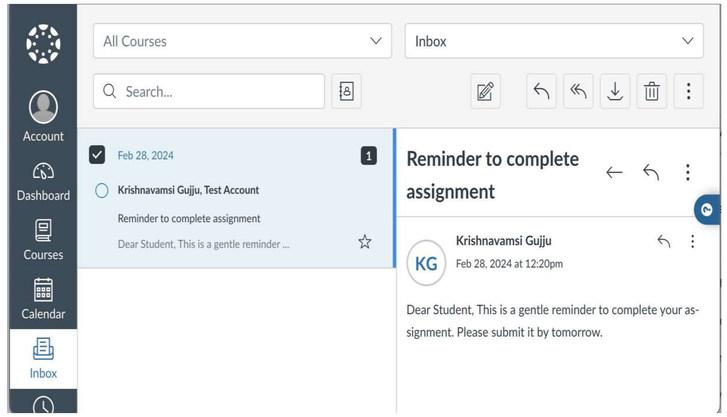
Survey Analysis and Findings with Implications: Survey findings emphasize the need for LAD enhancements focusing on personalization, streamlined information access, and time management, driving future feature development.

Step3: Development and Future Work

Development and Implementation

Completed Feature: Upcoming Assignment Reminders

Developed a feature that automatically sends reminder messages automatically to students one day before an assignment's due date, ensuring timely submissions and aiding in task management. This functionality addresses the need for better time management and helps prevent late submissions.



Future Developments:

Additional Notification Options: Plans to implement customizable notification settings, giving students greater control over the alerts they receive, enhancing the user experience.

Consolidated Grades Page: Aiming to create a page that displays all course grades in one place, with the potential addition of a GPA estimator, simplifying academic tracking and planning for students.

References

- W. Matcha, N. A. Uzir, D. Gašević and A. Pardo, "A Systematic Review of Empirical Studies on Learning Analytics Dashboards: A Self-Regulated Learning Perspective," in IEEE Transactions on Learning Technologies, vol. 13, no. 2, pp. 226-245, 1 April-June 2020, doi: 10.1109/TLT.2019.2916802.
- B. A. Schwendimann et al., "Perceiving Learning at a Glance: A Systematic Literature Review of Learning Dashboard Research," in IEEE Transactions on Learning Technologies, vol. 10, no. 1, pp. 30-41, 1 Jan.- March 2017, doi: 10.1109/TLT.2016.2599522.
- Fatemeh Salehian Kia, Stephanie D. Teasley, Marek Hatala, Stuart A. Karabenick, and Matthew Kay. 2020.How patterns of students' dashboard use are related to their achievement and self-regulatory engagement. In Proceedings of the Tenth International Conference on Learning Analytics & Knowledge (LAK '20). Association for Computing Machinery, New York, NY, USA, 340–349. https://doi.org/10.1145/3375462.3375472
- [10] Show students their data: Using dashboards to support self-regulated learning. EDUCAUSE Review. (n.d.). https://er.educause.edu/articles/2021/7/show-students-their-data-using-dashboards-to-support-self-regulated-learning
- Carl C. Haynes. 2020. The Role of Self-Regulated Learning in the Design, Implementation, and Evaluation of Learning Analytics Dashboards. In Proceedings of the Seventh ACM Conference on Learning @ Scale (L@S '20). Association for Computing Machinery, New York, NY, USA, 297–300. https://doi.org/10.1145/3386527.3406732
- Blazenka Divjak, Barbi Svetec, and Damir Horvat. 2023. Learning analytics dashboards: What do students actually ask for? In LAK23: 13th International Learning Analytics and Knowledge Conference (LAK2023). Association for Computing Machinery, New York, NY, USA, 44–56. https://doi.org/10.1145/3576050.3576141 (14)