

# Lessons Learned From the Creation of Assessment Dashboards for Medical Students

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## Introduction

- Learner dashboards are increasingly used in medical education to improve student performance through timely feedback through many sources. [1], [2], [3], [4]
- The Trek curriculum, launched in AY 21-22, emphasizes programmatic assessment and collects numerous different measures of student performance.
- The Trek Student Dashfolio was launched alongside the new curriculum to create a dashboard for students, faculty, and curriculum stakeholders to view all student performance data.

## Method

### Data Sources

- Course exams and item performance
- Small group professionalism ratings
- Professionalism concerns reports
- Anatomy exam grading rosters
- CAPE standardized patient encounters
- Results of NBME standardized tests
- Clinical performance assessments

### Data processing

- Data are processed and final tables are created in Microsoft SQL Server

### Dashboarding

- Tableau data extracts are created from the SQL tables using Tableau Desktop. Data updating frequency varies depending on the data source but ranges from weekly to monthly.
- Row-level security allows users to see only data they have permission to see.
- To access dashboards on Tableau Server, users must first connect to an on-campus secured network or university VPN (Global Protect), followed by verifying their identity via university single sign-on.

## Access is crucial but not intuitive for users

- In the AY 21-22 end-of-year student survey (N=179), 64% reported at least one type of Dashfolio access issue; of those, 62% (n=71) indicated VPN difficulties.
- Faculty, especially those based in non-CU sites (e.g., Denver Health), sometimes were not familiar with CU IT security requirements.

**Lesson learned:** Conduct trainings and improve messaging about troubleshooting resources.

## University IT systems are complex

- Complex IT infrastructure is why the Dashfolio can exist, but the creators/maintainers are not in IT. Delays in receiving important/timely technical information relevant to Dashfolio processes sometimes occurred as the information was distributed only within IT groups.

**Lesson learned:** Proactively make connections and build relationships with all IT groups that support process-related technologies.

## Results

### Wants are sometimes in conflict

- For example, some decision-makers wanted class comparison data visible for users and others did not. The compromise was to allow the user to “opt-in” to view comparison data by including it only in hover-overs (i.e., user had to make an active choice to view it).

**Lesson learned:** Use mockups to help decision-makers before developing data processes and create processes that are robust to changing needs.

### Interface changes cause confusion

- As more dashboards were added, the original landing page ran out of room for more content. The landing page was changed later in AY 21-22, and many users struggled with the new interface.

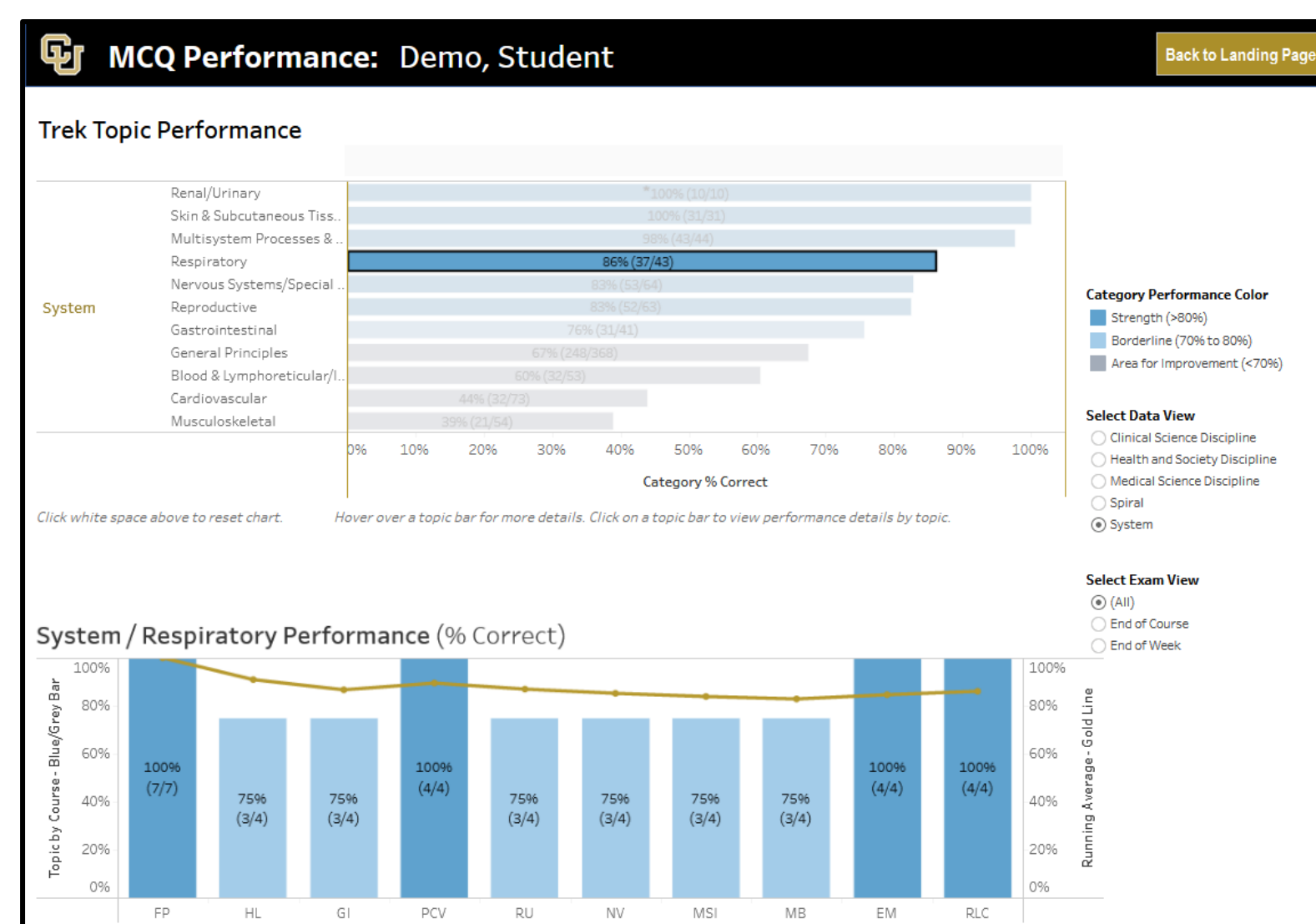
**Lesson learned:** Avoid major changes to interfaces during the academic year and increase messaging about changes if they must occur.

## Database/dashboarding skills are a must

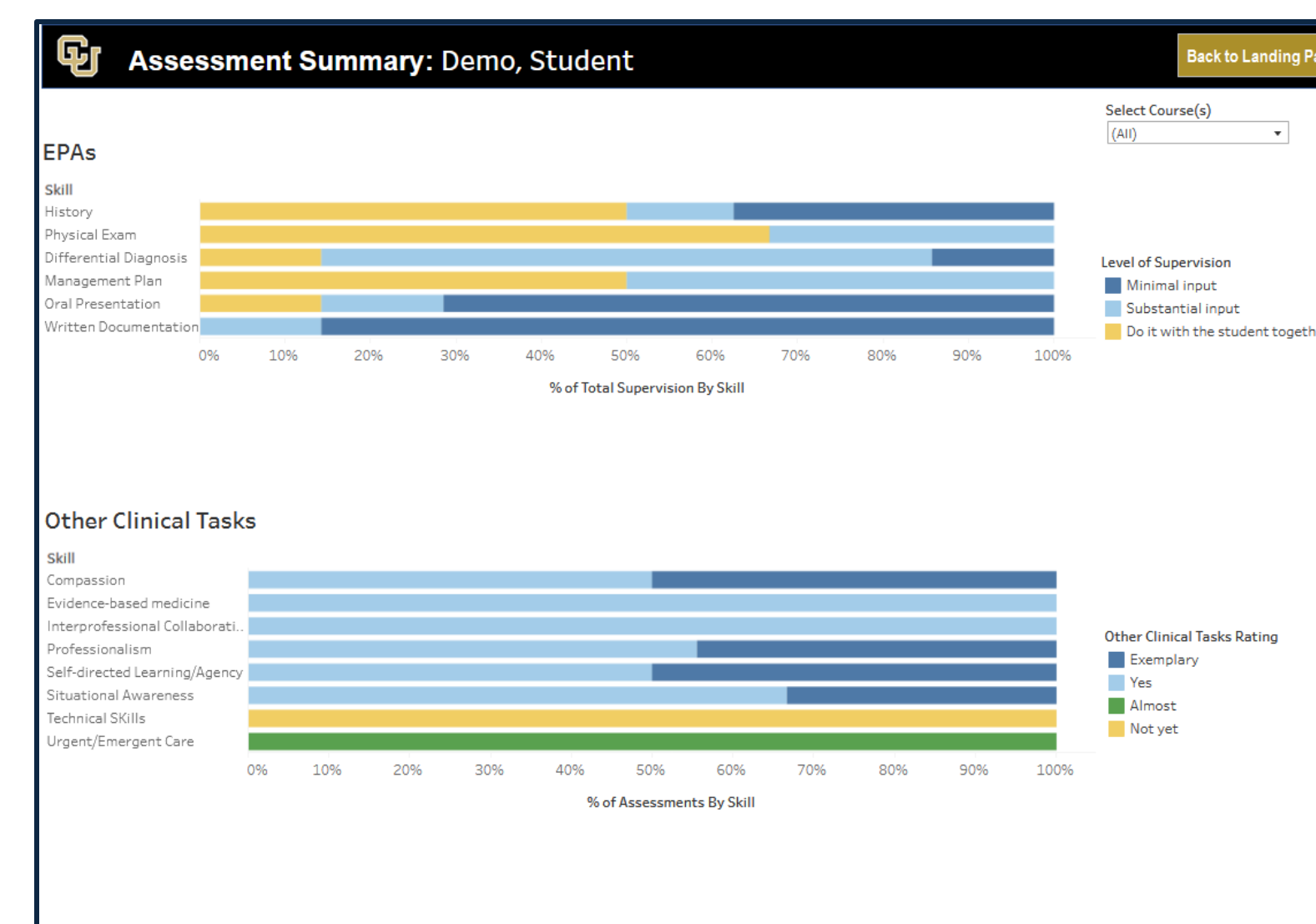
- Creating and maintaining the Dashfolio requires both breadth and depth of knowledge in data structures, data processing, database management, descriptive statistics, and data visualization. We have succeeded in learning the necessary skills as we go along by supporting each other’s learning.

**Lesson learned:** Expect steep learning curves if learning “on the job” and encourage knowledge and documentation sharing among creators/maintainers.

Currently we have Dashfolios for three different classes of students. The Class of 2025 Dashfolio contains 15 different views/dashboards and over 800,000 rows of data!



Example Dashfolio pages showing student performance on exam questions (left) and clinical skills (right)



## Discussion

- Learning dashboards are a powerful educational tool, and they can be challenging to create and maintain.
- As CO 2025 moves through the Trek curriculum, we will continue to develop new processes and new visualizations from new data sources as curriculum needs change over the course of medical school.
- Future directions: Survey faculty users to learn more about faculty use of the Dashfolio and monitor how CO 2025 usage of the Dashfolio changes over time.

## References

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- [4] Hauer KE, Iverson N, Quach A, Yuan P, Kaner S, Boscardin C. Fostering medical students’ lifelong learning skills with a dashboard, coaching and learning planning. *Perspectives on Medical Education*, 2018; 7(5): 311-317.