NJIT

New Jersey Institute of Technology

An Interactive Visualization Dashboard for Dynamic Data- Driven Calibration of Instructional Effectiveness

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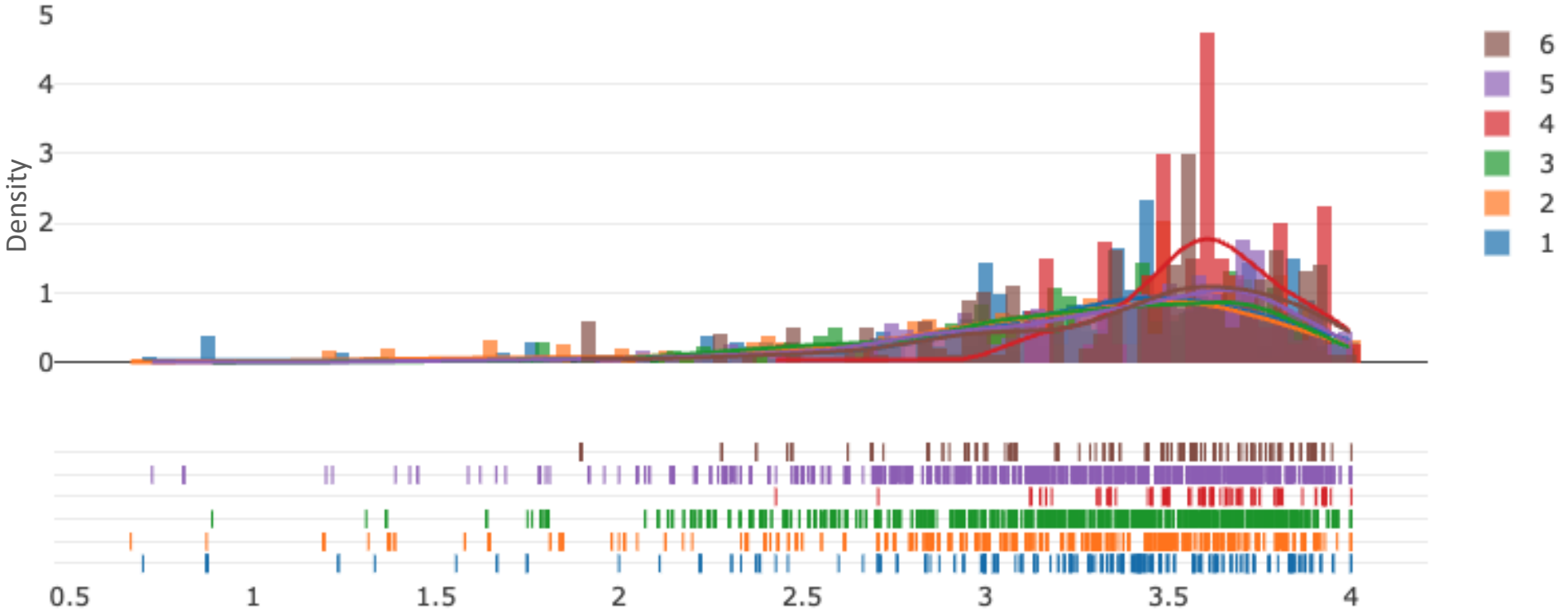
Content

- Course Evaluations at NJIT
- Preliminary Findings Based on Overall Effectiveness Question
  - The overall effectiveness of instructors can vary across demographic groups, departments, colleges and even different performance levels
- Introducing Weights and Multiple Factors
  - Visualization Tool Demonstration
- Conclusions

Course Evaluations at NJIT

- Administration:
  - Administer at the end of every spring and fall Semester
  - One set of questions; Responses are confidential but not anonymous
- Instrument (face to face)
  - Three course related questions (i.e., quality of course materials, educational values, difficulty of the courses compare to other courses)
  - Eight instructor related questions (i.e., communication, use of class time, instructors' availability, promptness in returning work, consistency in grading, knowledge of course material, and **overall teaching effectiveness**)
  - Five-point Likert scale
    - 0=poor 1=fair 2=satisfactory 3=good 4=excellent
- Database
  - Longitudinal data available from 2015 to 2023
  - This presentation includes 2019 and 2022 fall and spring data

Score Distribution Across Colleges

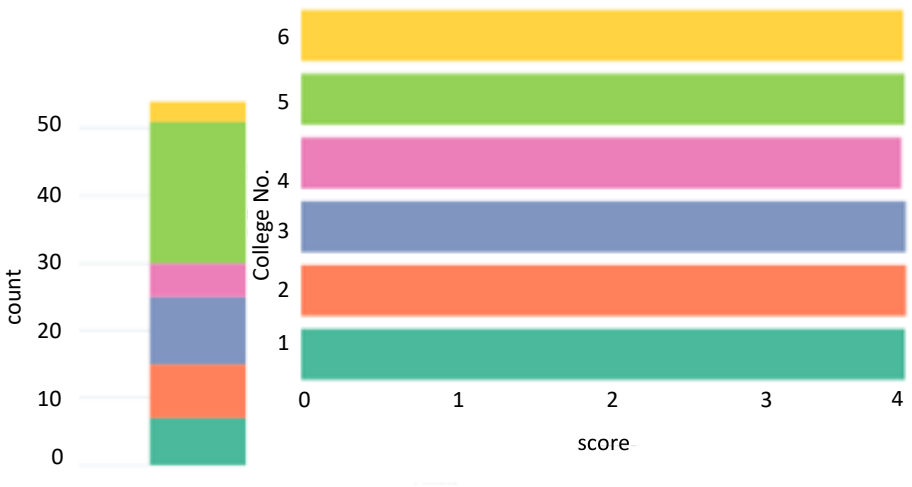


Comparing Performance Across Colleges

Top 50 Instructors

Instructor distribution

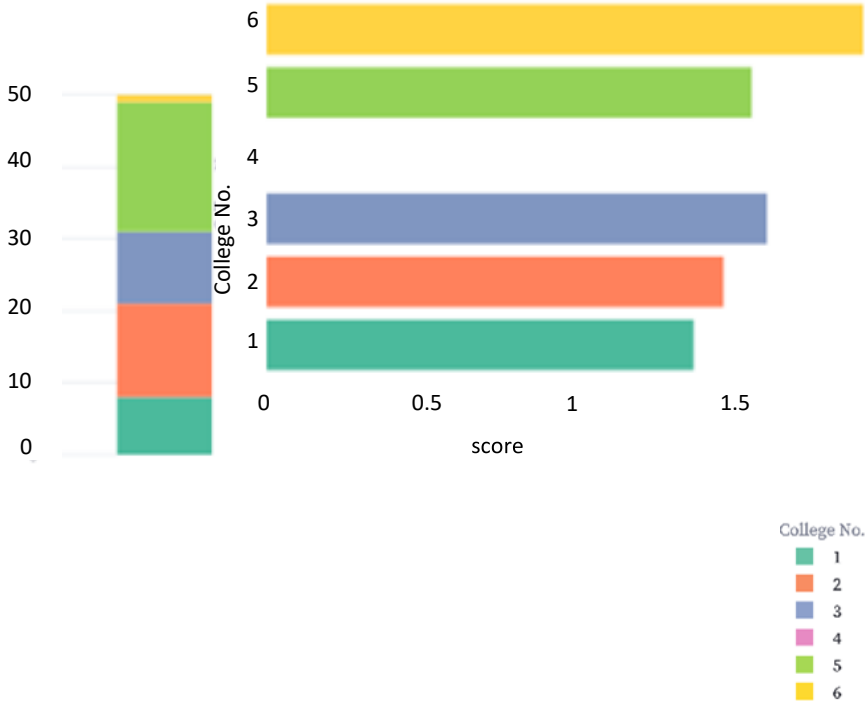
Average instructional effectiveness score



Bottom 50 Instructors

Instructor distribution

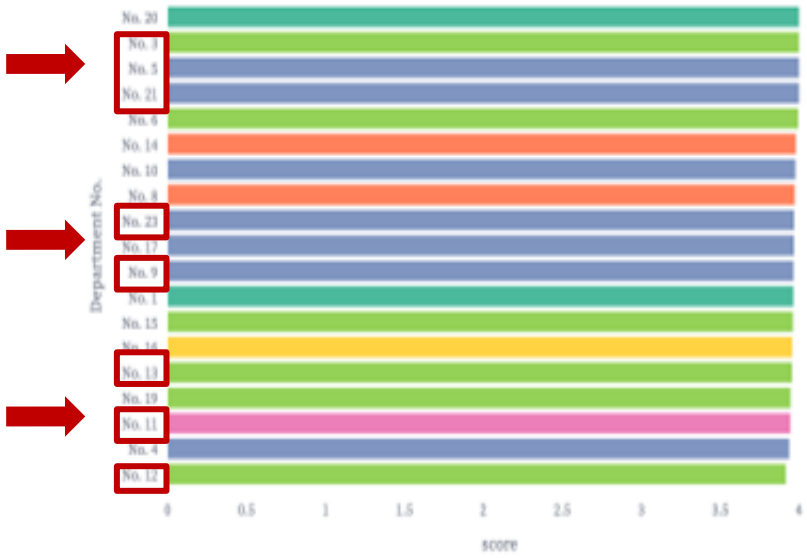
Average instructional effectiveness score



Comparing Performance Across Departments

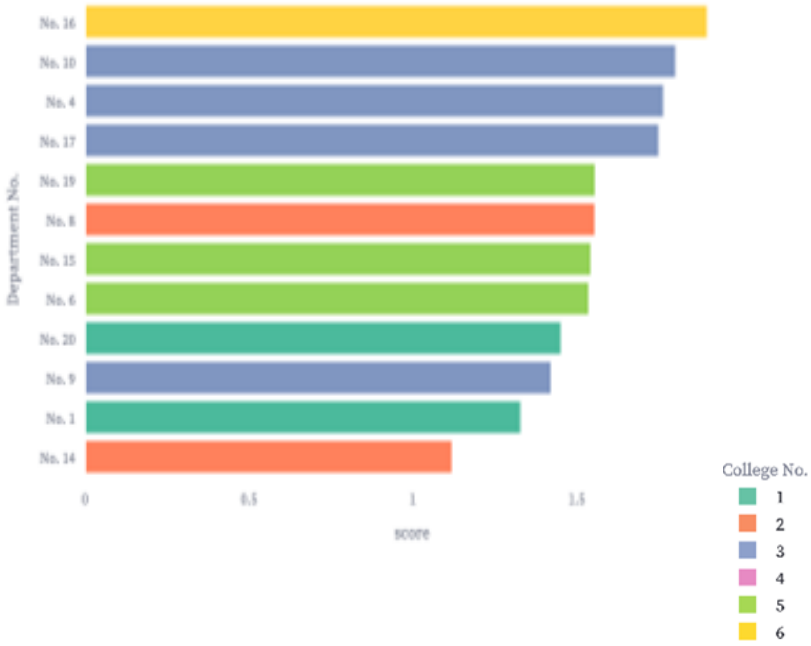
Top 50 Instructors

Departmental average instructional effectiveness score



Bottom 50 Instructors

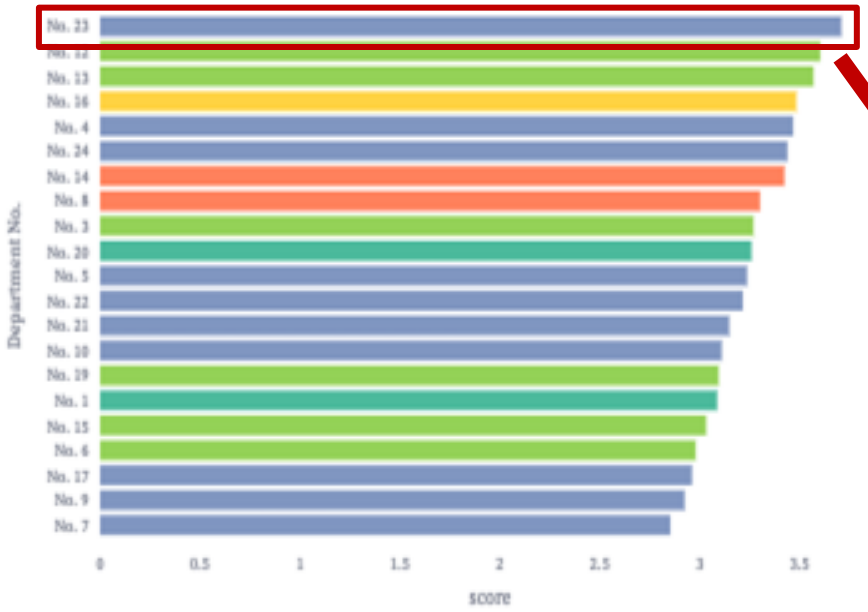
Departmental average instructional effectiveness score



Comparing Performance Across Genders

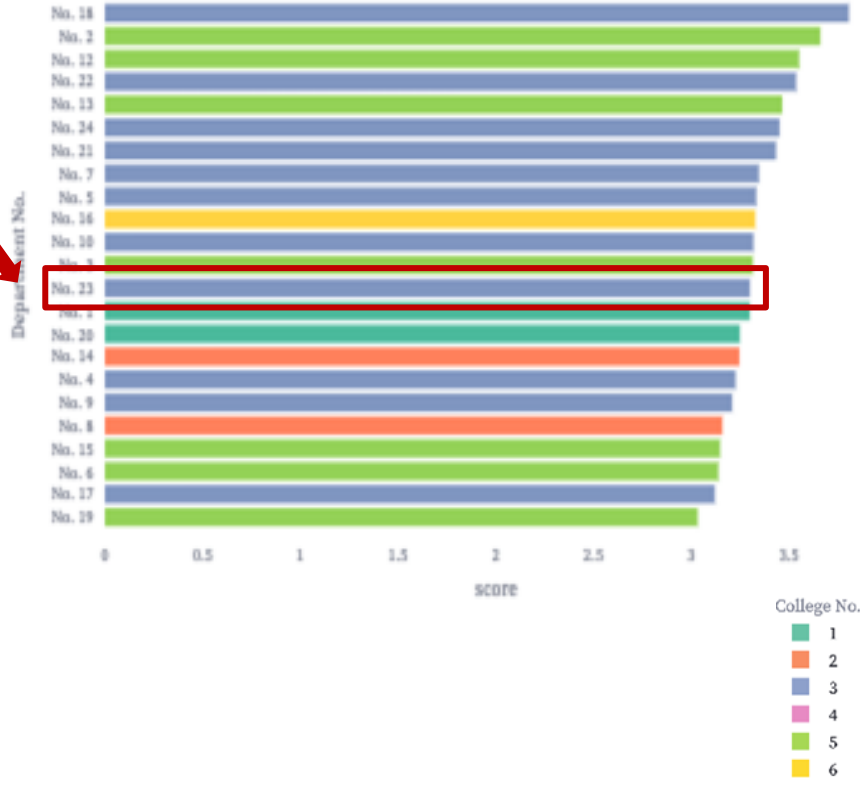
Gender Group 1

Departmental average instructional effectiveness score



Gender Group 2

Departmental average instructional effectiveness score



Comparing Performance for Individual Instructors

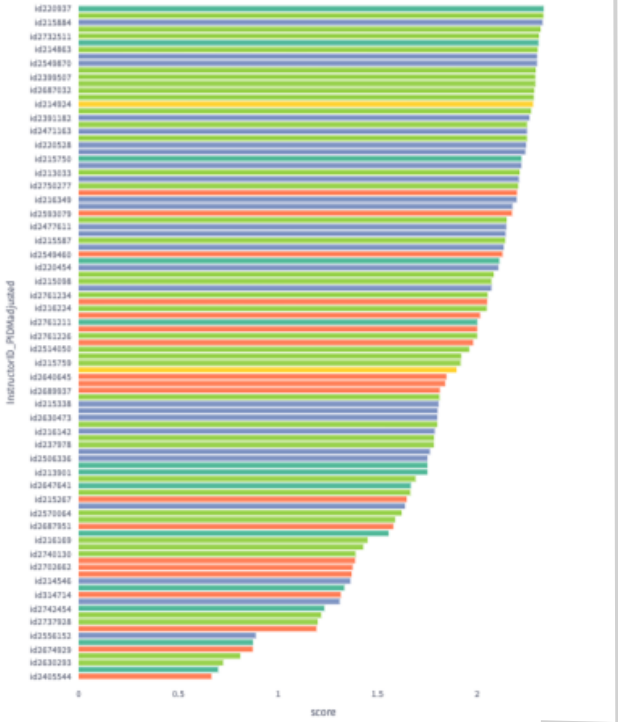
Top 50 Instructors

Instructor individual effectiveness score

Scores more or less similar

Bottom 50 Instructors

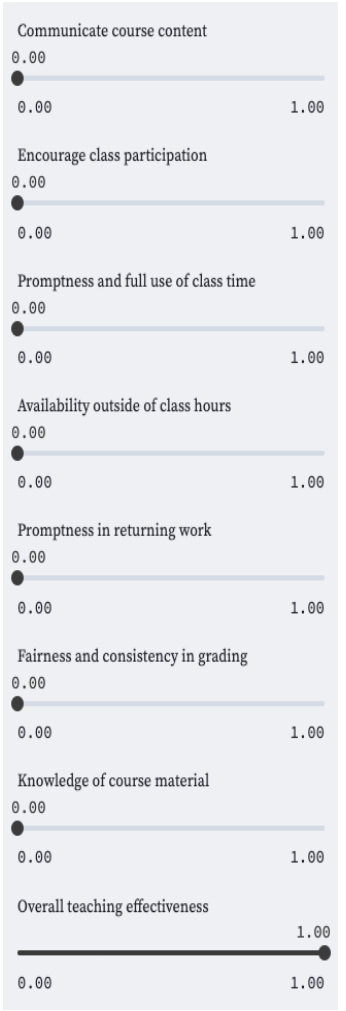
Instructor individual effectiveness score



Score vary widely

Reflections

- We observed that the overall teaching effectiveness score **varies widely** among different groups
- The instructor's performance can be measured using **other factors** too
- Yet there is no standard weighting strategy for these factors
- Our dashboard allows to observe instructor performance by **adjusting the weights**



Load previous work

Communicate course content
0.00
0.00 1.00

Encourage class participation
0.00
0.00 1.00

Promptness and full use of class time
0.00
0.00 1.00

Availability outside of class hours
0.00
0.00 1.00

Promptness in returning work
0.00
0.00 1.00

Fairness and consistency in grading
0.00
0.00 1.00

Knowledge of course material
0.00
0.00 1.00

Overall teaching effectiveness
1.00
0.00 1.00

Teaching method
FF ×

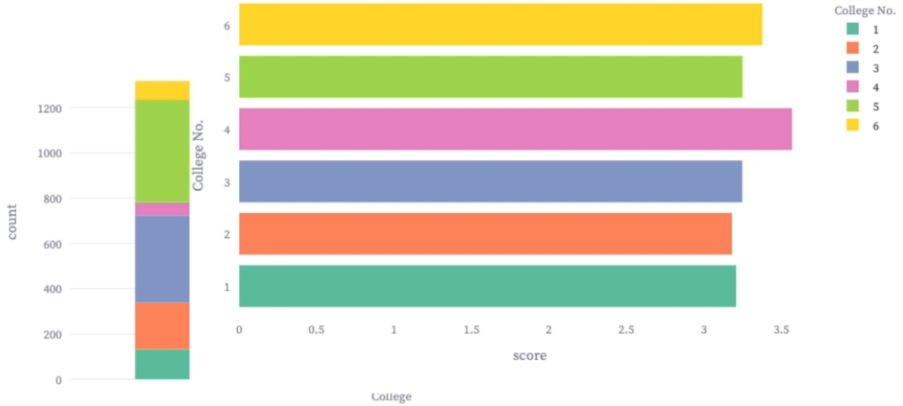
Explore ranking of instructional effectiveness

Color by:
College No.

Focus on total instructor ranking
1 1296
1 1296

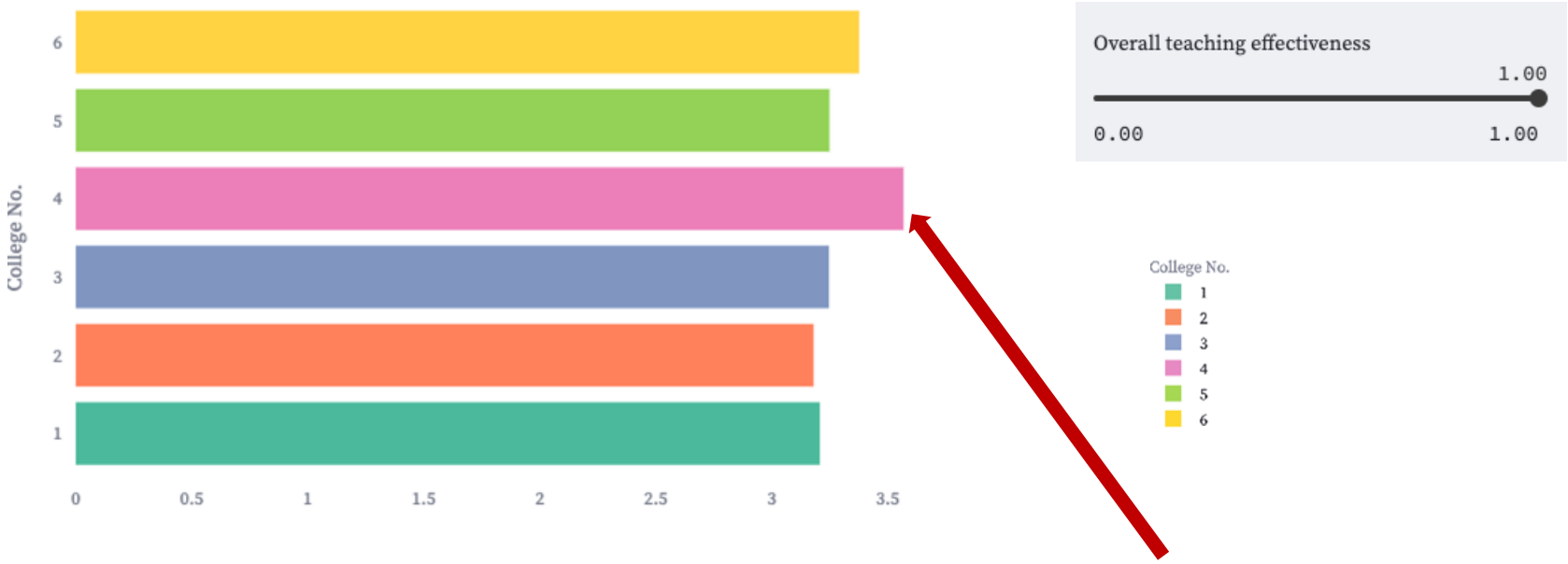
Instructor distribution among colleges

College average instructional effectiveness score



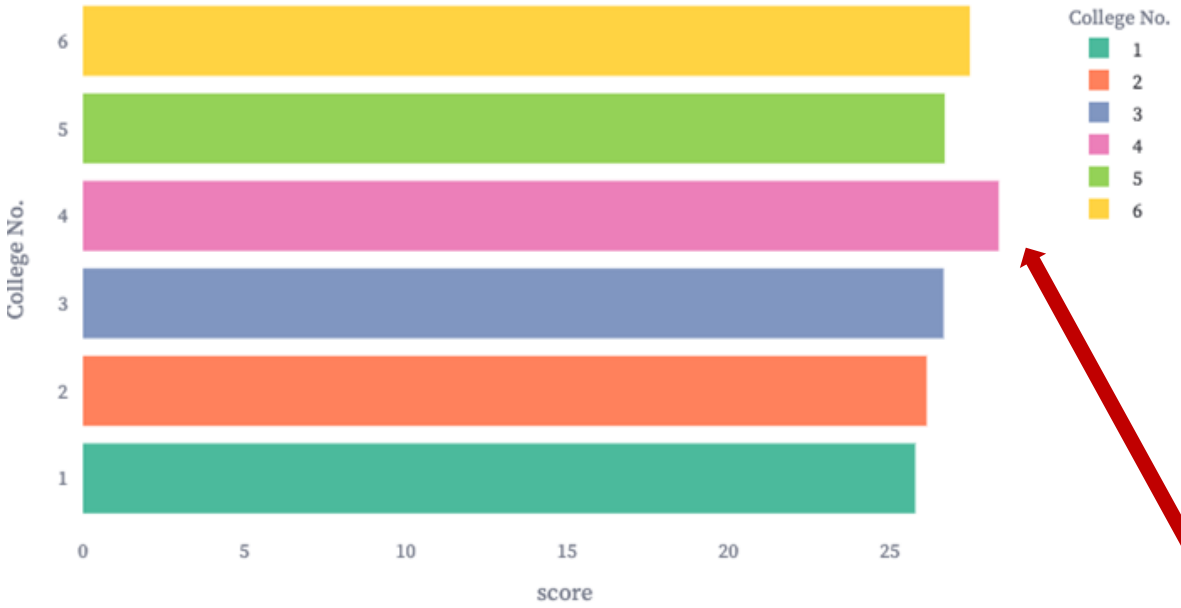
Department average instructional effectiveness rank & score

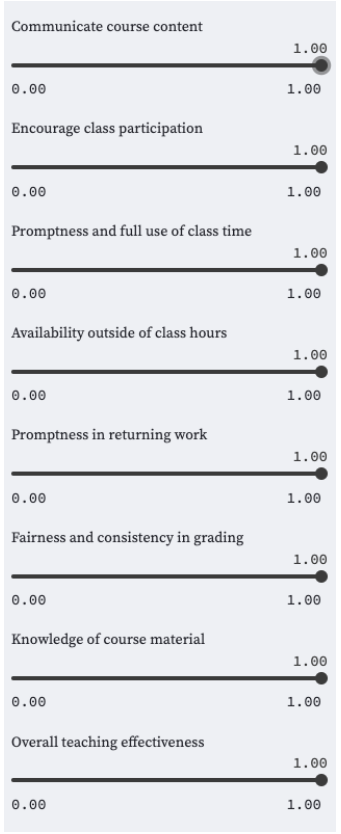
Comparing Performance at College Level Using Weighted Factor



We observed that using *overall teaching effectiveness* as the only factor, College 4 ranks as the best college

Comparing Performance at College Level Using Weighted Factors





However, using equal weights to all factors, College 4 still ranks as the best college

Thus showing a consensus among the factors at the college level

Comparing Performance at Instructor Level Using Variable Weights

Top Five Instructors for College 4

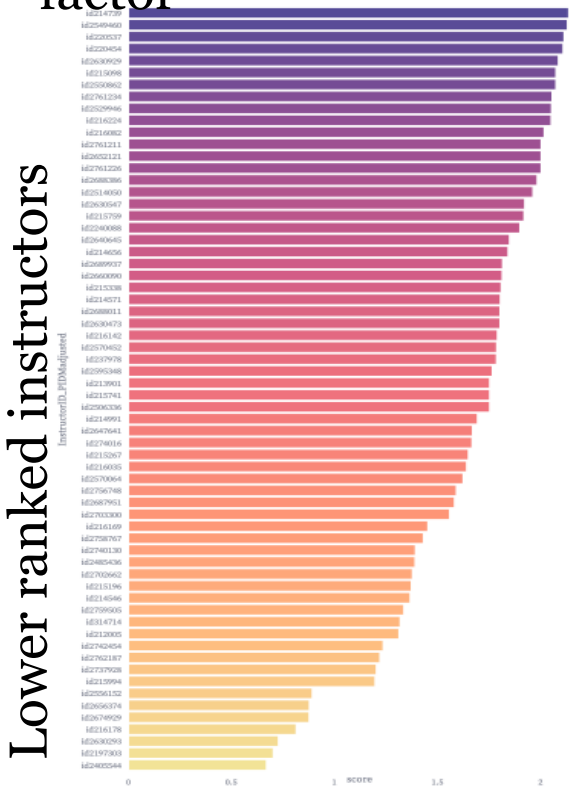
Overall teaching effectiveness as the only factor

Disagreement

Equal weights to all factors

Comparing Performance at Instructor Level Using Variable Weights

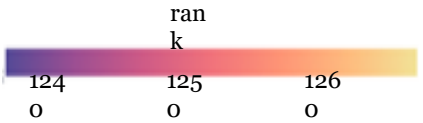
Overall teaching effectiveness as the only factor



Equal weights to all factors

The top and the bottom performing instructors remain almost similar

Thus, it can differentiate at the instructor level while still maintaining similarity across different groups.



Conclusions

- By employing a weighted score that considers all factors rather than relying solely on a single factor, we can achieve more objective results applicable to a diverse group of instructors
- Our visual analytic dashboard enables the analysis of instructors' performance across various groups by applying different weights for each of the factors
- By utilizing these visualization techniques, administrators can uncover patterns, including consensus and outliers, facilitating informed decision-making processes.
- This analysis can pave the way for the development of a more robust metric to assess an instructor's performance effectively.

Thank you

- If you have any questions, please contact us via yi.meng@njit.edu or aritra.dasgupta@njit.edu .
- Interactive Dashboard:
  https://courseeval-jm72njuhxq.streamlit.app/
  https://courseeval-bhw1mh8hf2c.streamlit.app/