Students' Perceptions of Fairness in Assessment: Big Data Mining of Social Media Texts Using Machine Learning/AI

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Abstract

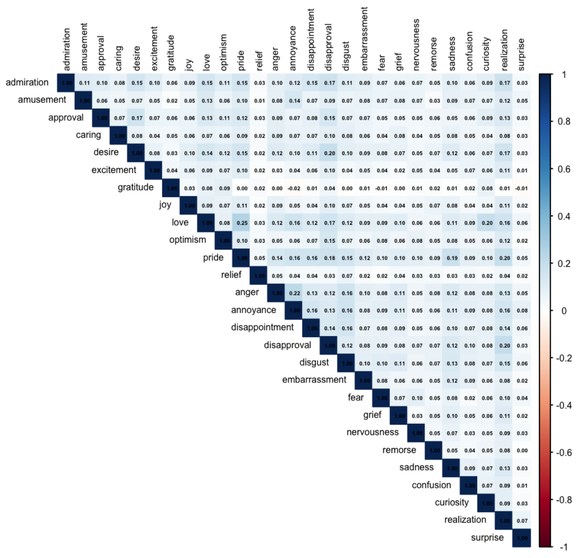
Fairness in academic assessment plays a crucial role in shaping students' learning experiences and educational outcomes. This study explores students' perception of fairness in assessment using big data mining of Reddit discussions. Through network analysis, we discovered disctinct emotional patterns across assessment types. Our findings provide insights into students' emotional responses to different types of assessments, with implications for educational policy and fairness in evaluation

Introduction

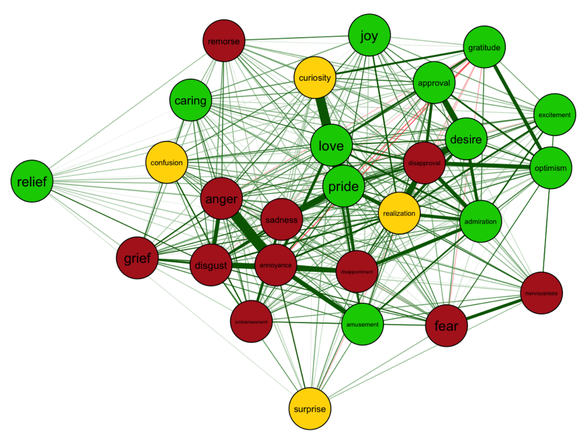
Fairness in educational assessment is formally defined as one that ensures all test-takers received an equitable treatment, free from bias or irrelevant influences so that test scores are valid for interpretations [1]. Studies have shown that students' perception of assessment heavily influences their learning experiences and academic progression [2]. Despite its importance, quantitative insights into student perceptions of assessment remain limited [3]. This study aims to fill the gap in current literature and provide actionable insights for educator and policymakers utilizing big data mining, social network analysis and statistical inference.

Results & Discussion

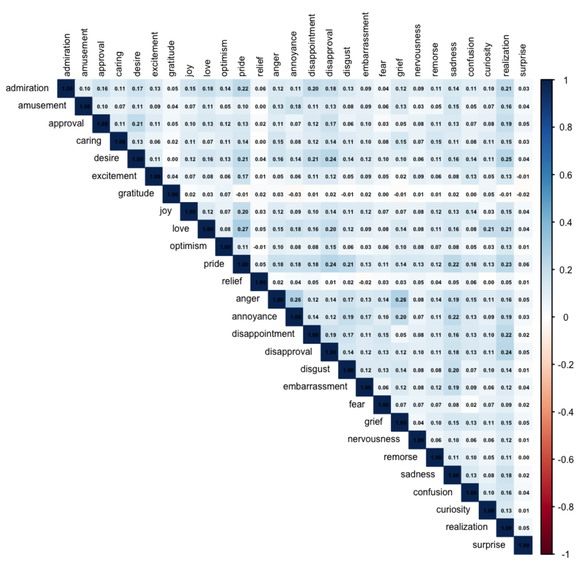
Below are the results for each assessment weightage – see Figure 2.



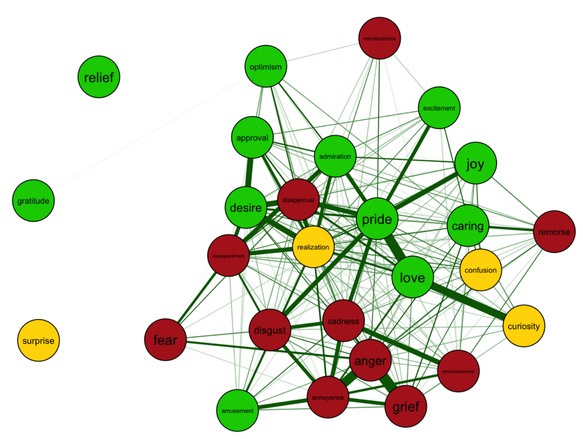
a) Pearson Correlation Matrix for Weightage 0



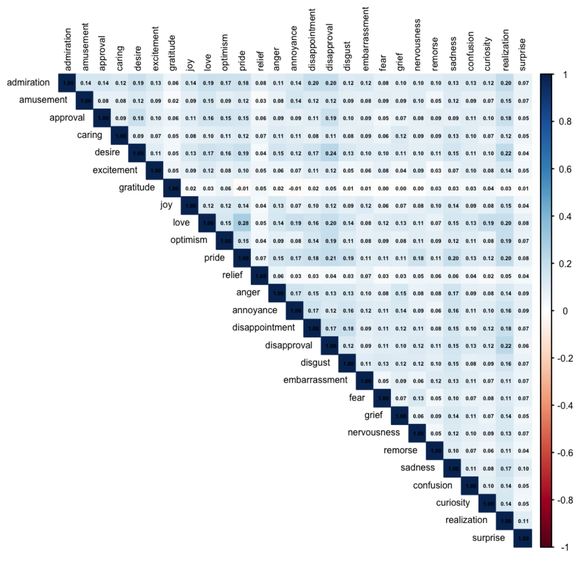
b) Psychological Network for Weightage 0



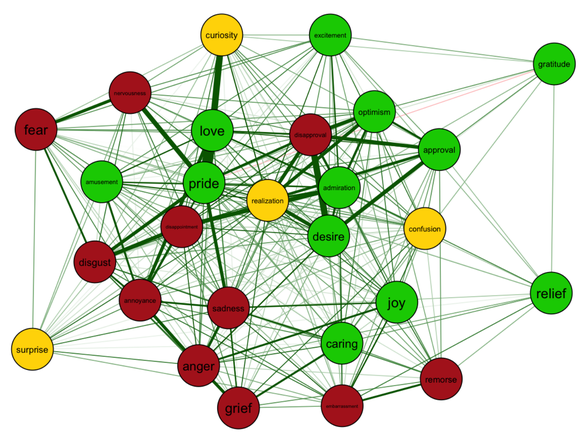
c) Pearson Correlation Matrix for Weightage 1



d) Psychological Network for Weightage 1



e) Pearson Correlation Matrix for Weightage 2



f) Psychological Network for Weightage 2

Figure 2: Results for each Assessment Weightage

Our findings have shown that as the assessment stakes got higher, students expressed more negative emotions on the fairness of assessment When the stakes are low, positive emotions are present and negative emotions are strongly connected. As the stakes got higher, negative emotions became more tightly interconnected (realization-disapproval, anger-grief, etc).

Methodology

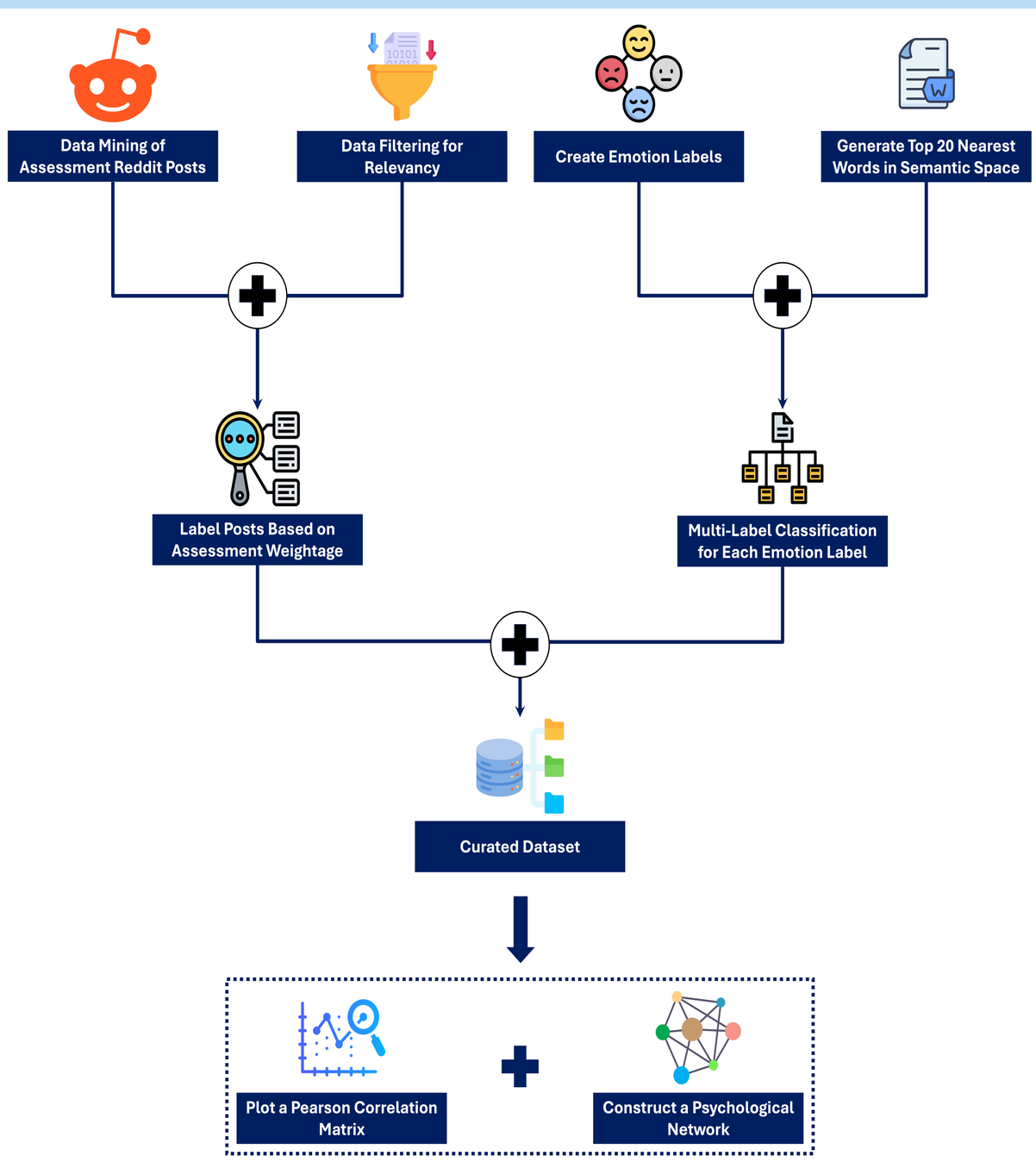


Figure 1: Pipeline. Data is extracted from Reddit Posts and is filtered using regular expression for relevancy (student discussions on assessment in Singapore's primary and seconadry school). Each post is then labeled according to assessment weightage: **0 (low stakes), 1 (medium stakes), and 2 (high stakes)**.Next, we generated 27 emotion labels along with a word bank using a **GloVe Wiki-Gigaword-300 embedding model** by extracting top 20 words with closest semantic distance to each label. Using the emotion word bank, we classify the data for each emotion label (0,1). Once the dataset is curated, we plotted the **Pearson Correlation Matrix** and constructed a **Network Analysis** using the **bootnet** package in R via **glasso** with **EBIC** for model selection, and laid out using the **Fruchterman-Reingold algorithm** for each assessment weightage categories.

Conclusion

1. Network analysis of Reddit Posts revealed interconnected emotions for different assessment weightages.
2. Different range of emotion indicates different students' perceptions on fairness in assessment
3. Perceived fairness is closely linked to emotional responses, which can impact academic performance and well-being

References

[1] Neil J Dorans and Linda L Cook. *Fairness in educational assessment and measurement*. Taylor & Francis, 2016.

[2] Ali Darabi Bazvand and Amirhossein Rasooli. Students' experiences of fairness in summative assessment: A study in a higher education context. *Studies in Educational Evaluation*, 72:101118, 2022.

[3] Amirhossein Rasooli, Jim Turner, Tünde Varga-Atkins, Edd Pitt, Shaghayegh Asgari, and Will Moindrot. Students' perceptions of fairness in groupwork assessment: validity evidence for peer assessment fairness instrument. *Assessment & Evaluation in Higher Education*, 50(1):111–126, 2025.