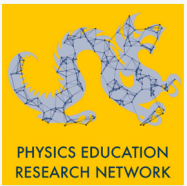# Predictors of faculty sentiment on their transition to online teaching

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Introduction

- Data collected from national survey of physics faculty – 662 participants, 364 open-ended responses
- Answers to 15 survey questions used as data, covering a range of topics:
  - Participants' institution, department, and teaching loads (5)
  - Prior experience with online instruction (1)
  - Preparation and transition to online instruction (4)
  - Comfort in teaching (4)
  - Open-ended response (1)

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Research Questions

1. What is the overall sentiment of participants' experiences during their transition to online teaching?
   -- Perform sentiment analysis

2. Do participants' answers to survey questions predict the sentiment of their experiences?
   -- Train a machine learning model to generate sentiment score predictions using participants' answers to other survey questions

Sentiment Analysis

Sentiment scores found using TextBlob

Score range for all responses fell between {-1.0, 0.65}, with a mean score of +0.100874

Highest sentiment response (+0.65):

"I followed the Khan format and recorded notes. My students said that they liked the content I was producing. I think supplementing the face-to-face with online content will be the way I teach going forward. It is the closest I have found to a successful model of flipping the class without losing content."

Lowest sentiment response (-1.0):

"The challenges were with online labs and cheating on exams. No one seems to have a fail-safe solution to the cheating. Chegg was the worst offender."

Predictions and Analysis

- Data split into train/test sets 75%/25% (273/91 participants)
- Keras sequential model trained and used to generate score predictions
    - 99 predictions for 91 participants for 14 survey questions
- Medians of predictions for each participant found
- Correlation values found for predictions and original sentiment scores

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Results (so far)

Correlations found for median score predictions

- Question 7 (size of largest class taught): 0.147664881

- Question 41 (perceived job security): −0.179852068

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Limitations, etc.

- Data size

- Small lexicon

- No physics corpus for training

- The "black box" nature of machine learning

- Lack of accessible sentiment analysis model alternatives
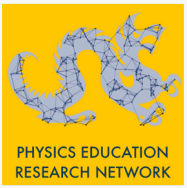
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Future Work

Model accuracy

　　Model evaluation using linear regression

Thank you!

References

J. M. Aiken, R. D. Bin, H. J. Lewandowski, and M. D. Caballero, *A framework for evaluating statistical models in physics education research* (2021), 2106.11038