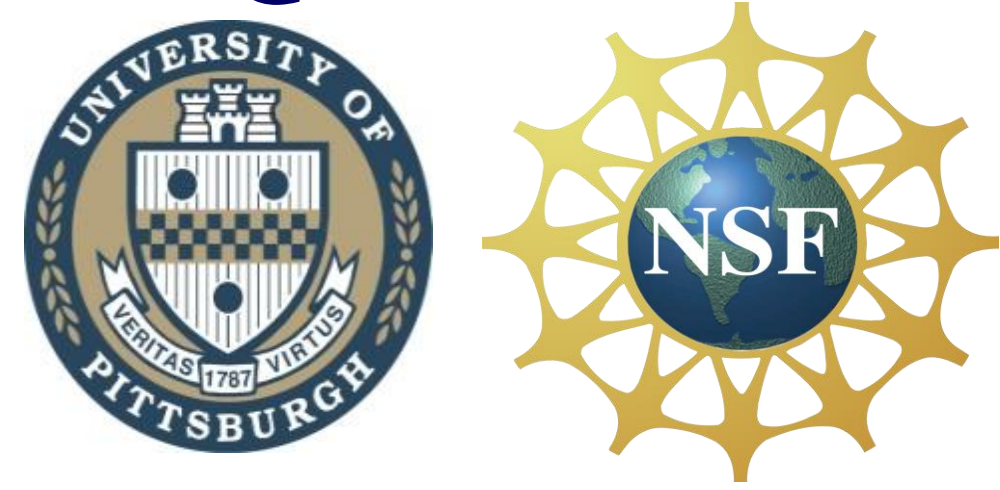


Quantitative biology: how educators that “buy-in” demonstrate greater productivity in teaching scholarship



Leah Balsan and Connor McLaughlin

Dr. Samuel Donovan and Dr. Alison Hale

First Experiences in Research, Dietrich School of Arts & Sciences, University of Pittsburgh



Introduction

Teaching within the biological sciences is changing as a result of the growth of technology and the increasingly quantitative nature of biological research. The Quantitative Undergraduate Biology Education and Synthesis “QUBES” project is an online initiative (<http://qubeshub.org>) with the overall goal of integrating quantitative reasoning and research into undergraduate biology classrooms. In order to successfully achieve this, QUBES facilitates Faculty Mentoring Networks (FMNs) a mentoring structure that allows for the learning and sharing of quantitative biology resources between educators. To assess the function of established FMNs, we posed this research question:

Do faculty who invest in an online community show higher levels of participation in online discussions?

We predicted that more "buy-in" would correlate with a higher level of participation.

Figure 1. Example of a QUBES profile. The starred areas are what the user has filled in, while the lighter text hasn't been completed.

Results

- **InTeGrate FMN**: focus was on integrating geoscience modules about sustainability into biology classrooms.
- **DryadLab FMN**: an extension of the Dryad Digital Repository, an online archive for data from scientific publications, whose focus was on using real scientific data in biology classrooms to help students learn data analysis and interpretation.
- **Data Discovery FMN**: sponsored by the Ecological Society of America and focused on using ecology-related modules.

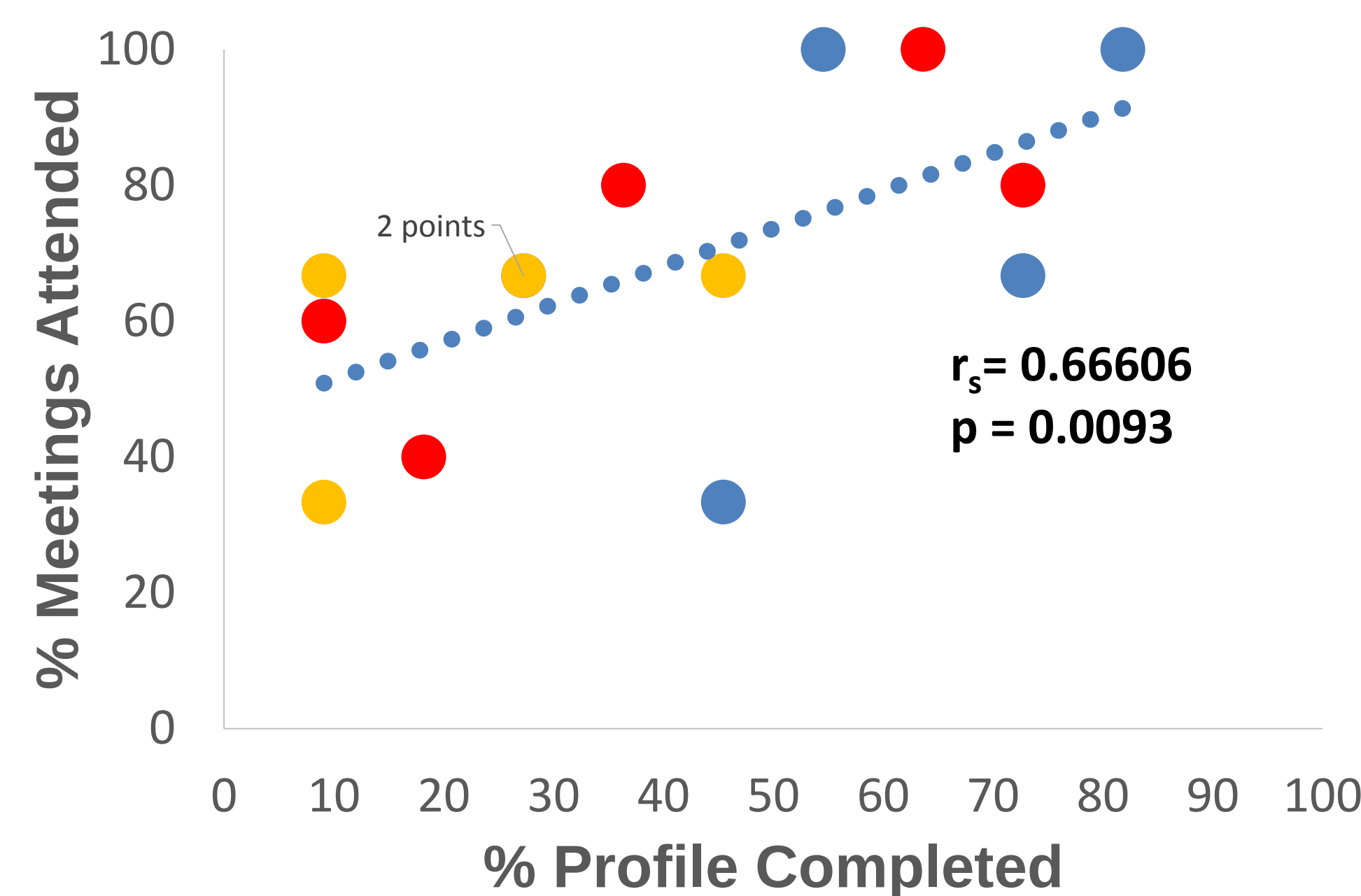


Figure 2. The percentage of meetings attended vs the percentage profile completed shows a positive correlation that is significantly relevant with a correlation coefficient of $r_s=0.67$ and a p value < 0.05 .

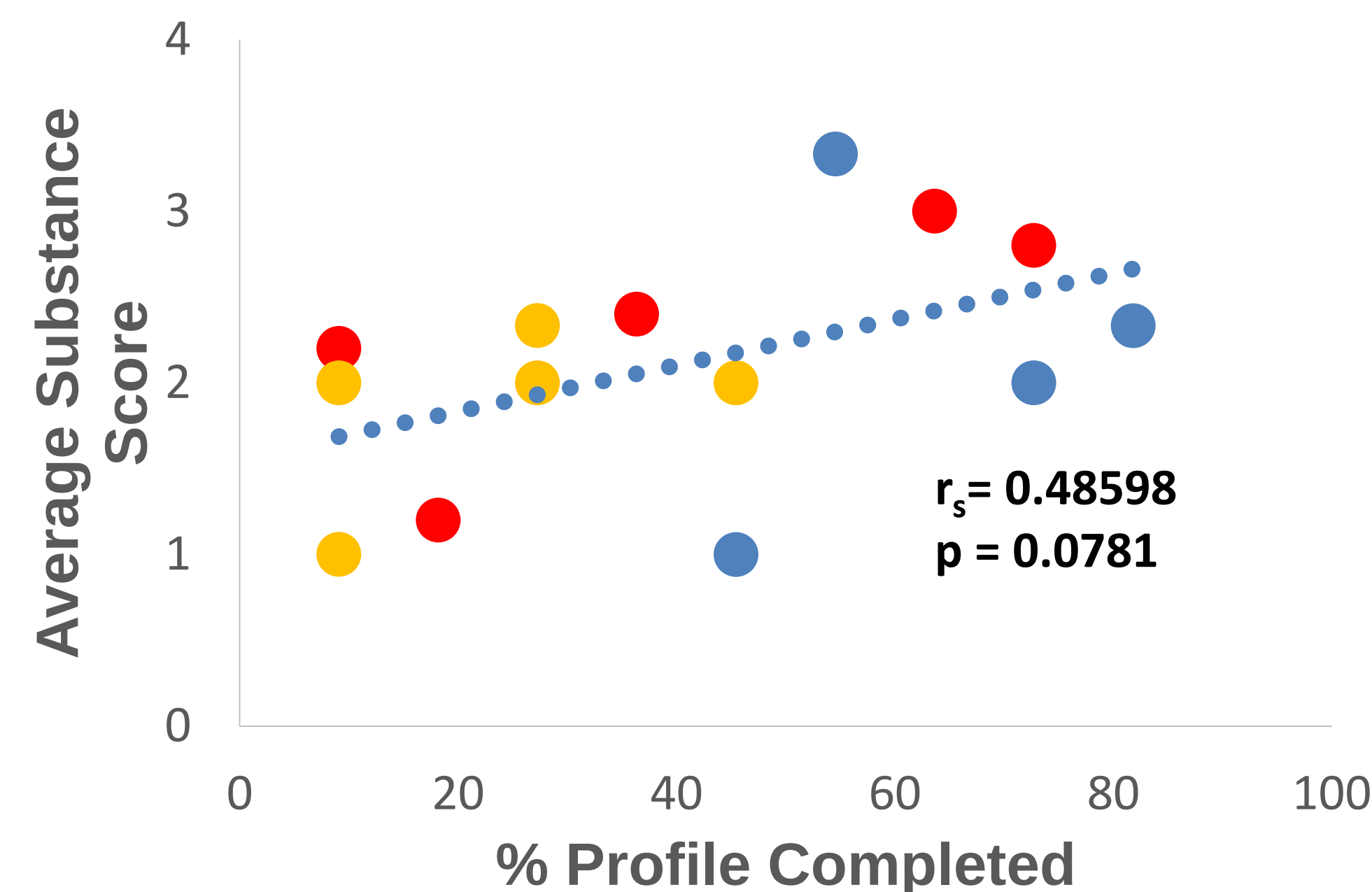


Figure 4. The p and r_s values are not significant, but the graph does show a positive trend between the average substance score and the percentage of profile completed.

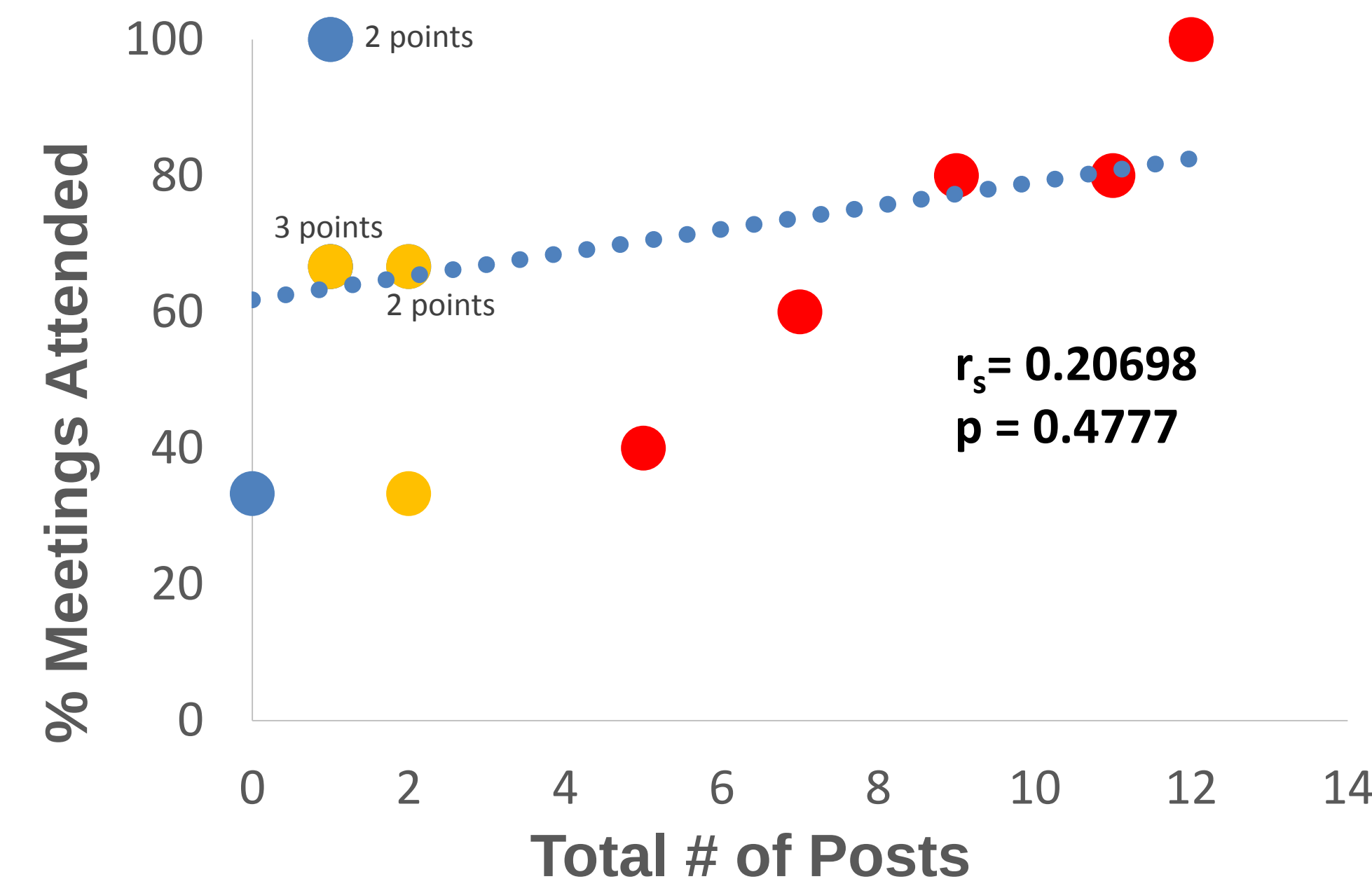


Figure 3. Although the p is not significant and r_s value is low, there is still a positive trend between the percentage of meetings attended vs the total number of posts.

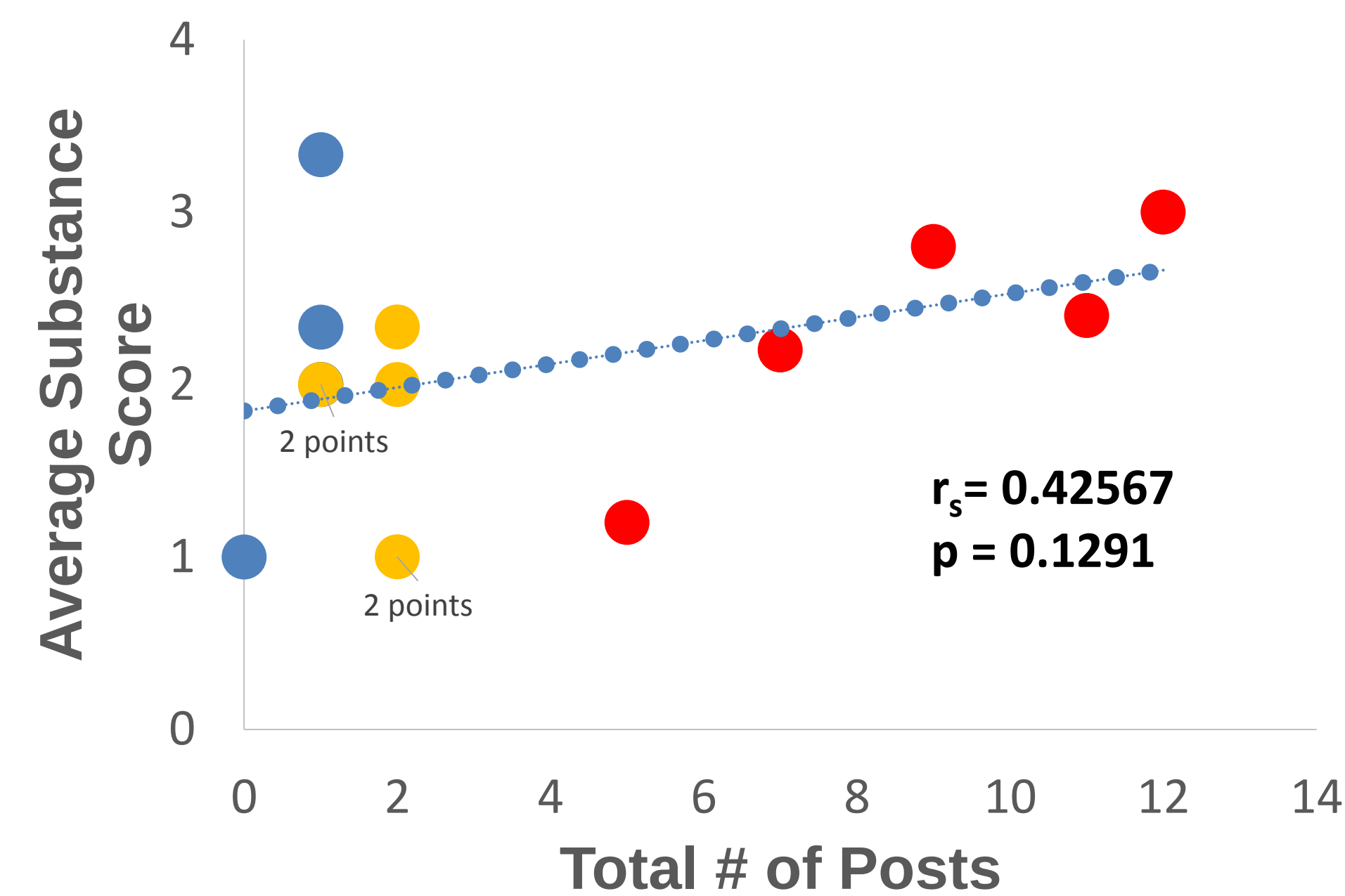


Figure 5. The the p and r_s values are not significant, but there is a positive trend between the average substance score and the total number of posts.

Methods

This study focused on 3 existing FMNs (descriptions above). The average size was 4 to 5 faculty participants, with 2 to 4 mentors. In order to characterize faculty investment, we assessed “buy-in” by measuring the % of profile completion and the total # of posts from the QUBES website. To quantify group participation, we measured the % of meetings attended and the average substance score of contributions. We used Spearman correlation analysis to assess the relationship between buy-in and group participation (significant if $p < 0.05$).

Discussion

- Analysis of our data offers some support for the predicted relationship between “buy-in” and productivity.
- Faculty profile completion was highly correlated with their attendance at meetings ($r_s = 0.67$; $p = 0.0093$).
- While we did not see a significant relationship between our other measures of “buy-in” and group productivity, they do seem to show a positive, linear relationship suggesting that as buy-in increases, productivity also increases.

Further Research

- In the future, we suggest that larger sample sizes be used to fully explore these trends in the data.
- Further research on the relationship between the personal investment in an online community and the quality of an individual's contributions to online meetings will be valuable for projects seeking to build online communities, such as QUBES.

Acknowledgements

This research was supported by the National Science Foundation under Grant No. 1446269. We would like to thank H. Orndolf for her advise on data analysis. Data compiled, in part, by K. Grobengieser and L. Liu. We would also like to thank the participants of the DryadLab, ESA Data Discovery, and InTeGrate FMNs.

