

Cambridge Computing Education Research Symposium 2020

*Exploring Resilience for Effective
Learning in Computer Science
Education*

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Overview

Background and Context

Research Methods

Findings

Limitations and Constraints

Conclusions and Implications

References

Computer Science is challenging and learning programming particularly challenging [1][6]

Maintaining *effective learning* requires *competence* and *resilience* [4][5][10]

This is a preliminary study into two measures of positive psychology [8] and student success: Duckworth's 12-item Grit Scale [3] and Nicholson McBride Resilience Quotient (NMRQ) [2]

Grit 12-Item Scale: the passion and perseverance for a singularly important goal [3]

<https://angeladuckworth.com/grit-scale/> (*This is the 10 point scale - we use the 12 point scale*)

Nicholson McBride Resilience Quotient: quality that helps you turn adversity into advantage and threat into opportunity [2]

We use short 12 question version (<https://bit.ly/CambridgeNMRQ>)

Ethical approval obtained

In February 2019 students completed the two surveys in a lecture via the University's electronic learning platform

Students were:

- Provided their results
- Interpretation of their results
- Guidance provided and further support offered
- Consent explicitly gained

At end of year subject marks and attendance obtained

A first-year BSc(Hons)/MComp Computer Science cohort.

Sample size

Grit: **N=58**

Resilience: **N=50**

Analysis

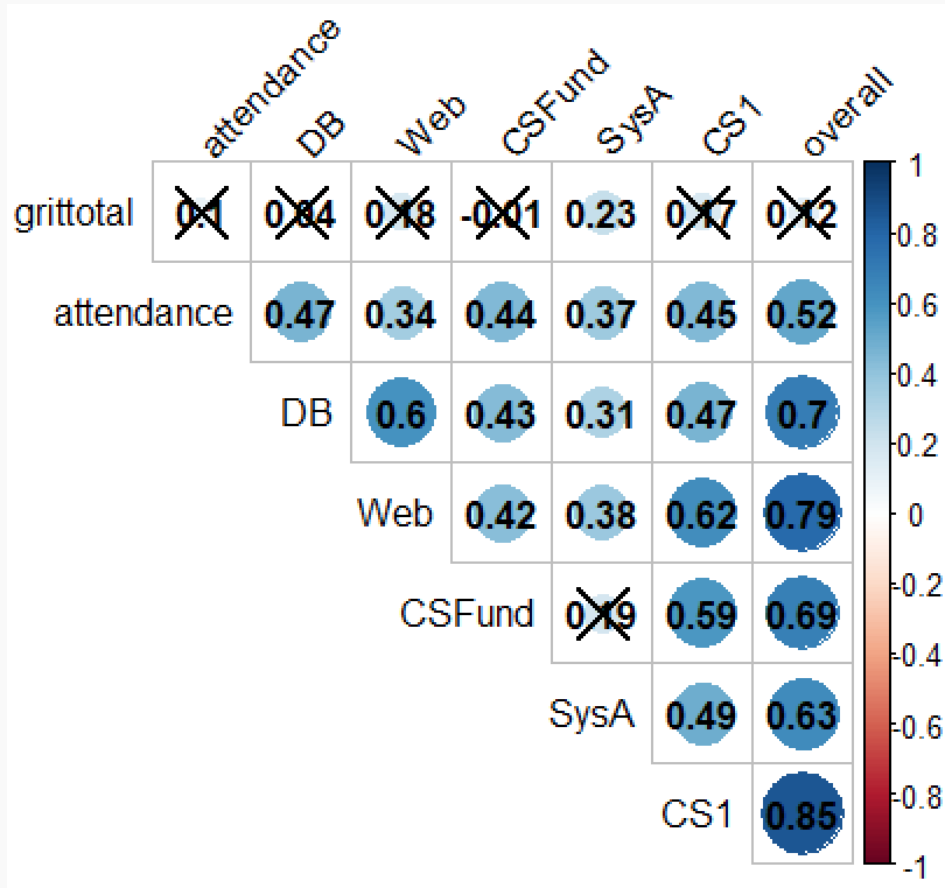
1. Correlation Analysis
2. Exploration of predictive strength via logistic regression

We are not building a predictive model

Findings - Grit Correlation Analysis

Your thoughts:

<https://bit.ly/CambridgeResilienceFeedback>



Not statistically significant at 1% level

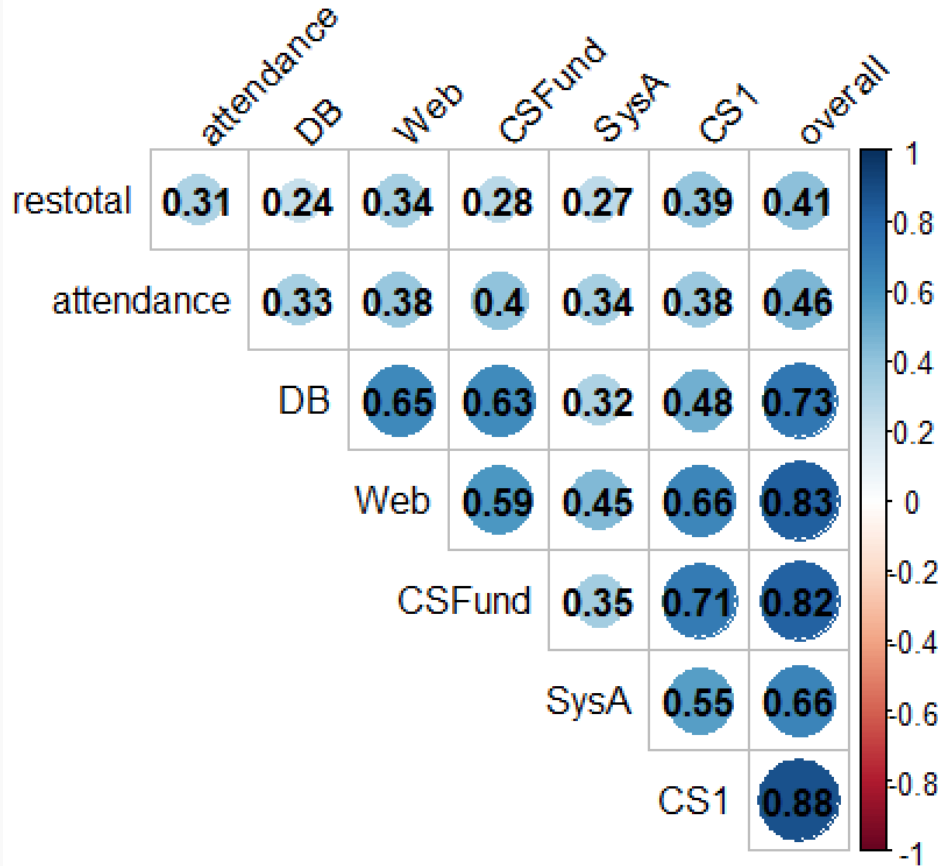
Similar outcome for Logistic Regression

More details in our forthcoming ITiCSE 2020 paper [7]

Findings - Grit Correlation Analysis

Your thoughts:

<https://bit.ly/CambridgeResilienceFeedback>



Statistically significant at 1% level

Logistic Regression suggests there is a predictive significance

More details in our forthcoming paper [7]

Single institution

Higher education / first-year of a degree

Correlation not causation

Small sample size

Sample bias - non attendees

Solely quantitative study

Sample size not large enough for consideration of other factors (for example, gender)

- Risk of identification of individual students

12-item resilience scale could be a factor in promoting success

Not true for the 12-item grit scale

Consistent with other work [9]

A number of possibilities for future work related to:

- Transition
- learner attitudes, behaviours and dispositions,
- teaching and assessment

Possible further work:

- i) Initiatives related to the active development of student resilience can be deployed and evaluated
- ii) Replicating the study with larger cohorts and at other schools / colleges / universities to validate, increasing the sample size and strengthening the statistical basis.
- iii) Using resilience in predictive models alongside other key factors in order to further augment and enhance the prediction of student success.

References

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Any questions?

Questions by email welcome to:

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Your thoughts also welcome at:

<https://bit.ly/CambridgeResilienceFeedback>