



Exploring Learner Resilience and Performance of First-Year Computer Science Undergraduate students during the COVID-19 Pandemic

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- Working definition of resilience:
 - "the ability bounce back from tough times or even triumph in the face of adversity; to display tenacity, but not at the expense of reason" [13, p. 1]
- Has been reported that learner resilience contributes to effective learning in higher education [37,41,71] including computer science [24,50]
- Resilience is one aspect of positive psychology which some studies suggest it is possible to enhance/develop.

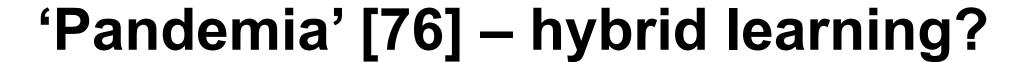
'Pandemia' [76] – emergency remote teaching/shift to online





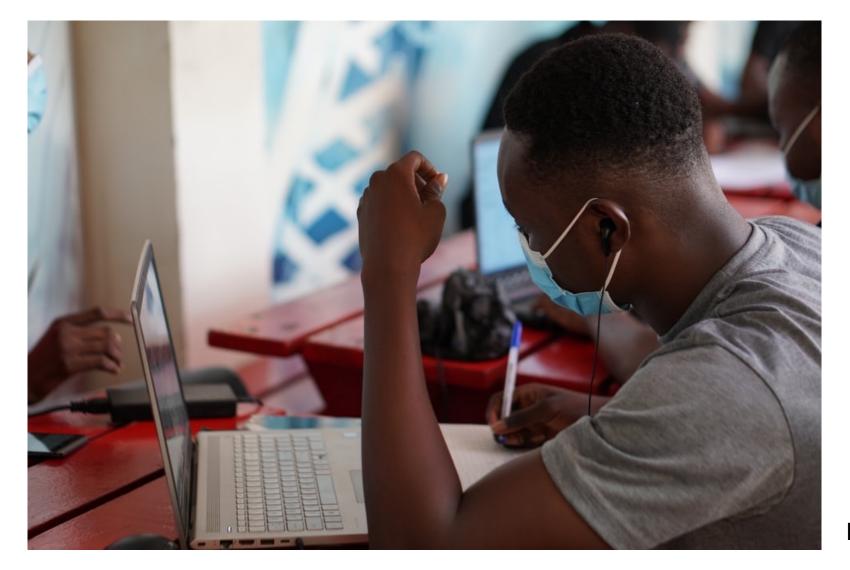


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Northumbria University NEWCASTLE



Covid: Northumbria University confirms 770 cases among students

(3 October 2020





'Pandemia' [76] – oops

'Pandemia' [76] — more hybrid, a new (ab)normal?







Photo by Maria
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Resilience



"the ability bounce back from tough times or even triumph in the face of adversity; to display tenacity, but not at the expense of reason" [13, p. 1]

Nicholson McBride Resilience Questionnaire (NMRQ) short version [13]





Strongly Disagree (1)

Disagree (2)

Neither Agree nor Disagree (3)

Agree (4)

Strongly Agree (5)

	Question	
Q1	In difficult situations, my thoughts turn immediately to what can be done to put things right	
Q2	I influence what I can rather than worry about what I cannot	S
Q3	I don't take criticism personally	
Q4	I generally manage to keep things in perspective	N
Q5	I am calm in a crisis	
Q6	I am good at finding solutions to new problems	A
Q7	I wouldn't describe myself as an anxious person	S
Q8	I don't tend to avoid conflict	٥
Q9	I try to control events rather than be victim of circumstance	
Q10	I trust my intuition	
Q11	I manage my stress levels well	
Q12	I feel confident and secure in my position	







- RQ1: Are there differences in resilience between pre and post pandemic learners?
- RQ2: What is the relationship between first-year CS learner success and resilience during the COVID-19 pandemic?
- RQ3: What is the relationship between first-year CS learner success and individual NMRQ factors during the COVID-19 pandemic



Data Collection and analysis



- Data collected for first year BSc(Hons) Computer Science;
- Semester 2 core module (January to May);
- Microsoft Forms data collection
 - Students asked to opt-in for the use of their data in the project
- Students supported in interpretation of results and provided guidance how to enhance in the context of studies;
- Student performance data obtained at end of year and consists of NMRQ data and student results over both semesters;
- Statistical analysis with R (v4.1.2).





RQ 1 and Overview of the sample

			NMRQ Score		Year Mean		
Year	Sample size	Cohort size	Mean	SD	Mean	SD	
19-20	113	183	43.6	4.9	68.8	18.0	
20-21	101	176	41.9	5.7	63.7	17.4	

19-20 semester 1 pre pandemic / 20-21 during pandemic

Welch's t-test - (H0: NMRQ mean scores are equal between years) t=-0.46 p-value=0.65

Welch's t-test - (H0: Year averages are equal between years) t = 0.45, p-value = 0.65

Hence NMRQ and Overall results statistically similar





RQ 2 - What is the relationship between first-year CS learner success and resilience during the COVID-19 pandemic?

- Pearson correlation coefficient between NMRQ and overall year mark 0.02;
- Overall NMRQ not significantly related with overall year mark;
- Different to that reported pre-pandemic [50] but...
- ...Pandemia! [71]





RQ3 - What is the relationship between first-year CS learner success and individual NMRQ factors during the COVID-19 pandemic

No	NMRQ question		Correlation			ANOVA			
		R	t	р	F	Р			
Q9	I try to control events rather than being a victim of circumstance	0.21	3.19	0.002	10.19	0.002			
Q10	I trust my intuition	-0.15	-2.20	0.03	4.83	0.030			
These are significant at the 5% level									

Results for the other NMRQ questions in the paper itself.





Threats to validity

- Statistics correlations are not causations;
- Response rate not 100%;
- Two cohorts / one institution / small sample;
- Data collection occurred across one week so may be differing learner behaviour at later seminars;
- Students know we are reading there responses;
- Social desirability factors.

Why? - I try to control events rather than being a victim of circumstance



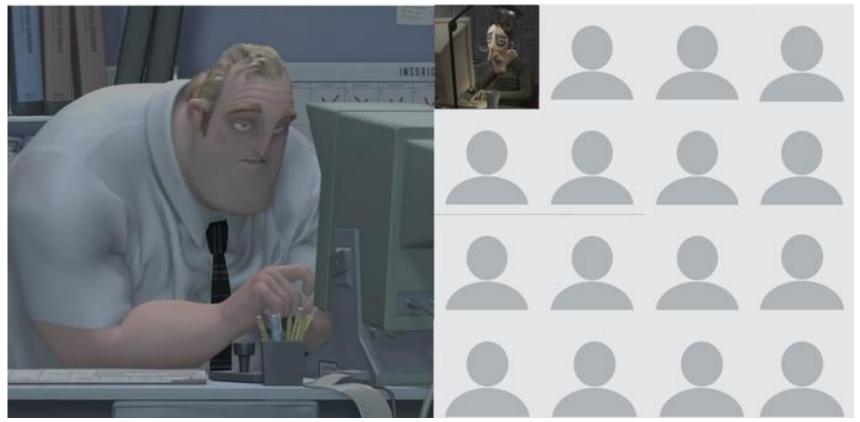


- Is this a crude measure of learner agency [43, 44]
 - the feeling of ownership and control learners have over the own learning.
- Hence, learner agency could be promoting effective learning.

Why? – "I trust my intuition" (ok it's a meme but...)

"good morning class"

"good morning professor"



https://knowyourmeme.com/pho tos/2091626-animated-dads-oncomputers





Further work

- Learning in pandemic likely not typical(!)
 - Impact of Resilience and Learner agency may be productive avenues for further work;
 - Learning mode may be critical (online, blended, face to face)
 - (as may the originally chosen mode as opposed to the delivered mode)
 - Supplement quantitative work with qualitative work;
 - Multi-institutional, cohort/longitudinal approach.





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Questions?

ITiCSE'22 paper available here:

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