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Gender parity in peer assessment of team software development projects

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Team Projects in Computing?



- Commonly used to enable demonstration of software engineering competencies
- Not universally well-received by learners [6]
- Employability dimension [7]
- Professional Body Accreditation Requirement [3]
- Promoted by QAA Computing Subject Benchmark
- Assuring fair contributions to collective tasks can present a challenge [8]
- Peer assessment long argued to be an approach to help address the challenge [6]

Category / peer rating system

- Each learner assesses every other learner in the team by a given metric
- *Peer Weighting* =
$$\frac{\text{Mean of a Team Members Peer Scores}}{\text{Mean of Whole Teams Peer Scores}}$$
- Tools – WebPA, BuddyCheck.io, SparkPlus
- Is it fair? Is there gender bias in peer assessment?
 - Observed [4, 9]
 - Not observed [5, 10]
- Metric used and how situated may be critical
 - Maybe we should check?



Peer Assessment Scheme used -Team Q [2]

Never=0;
Sometimes=1;
Usually=2;
Regularly=3;
and Always=4

Component	Description
Contribute to team project	Participates actively and accepts a fair share of the group work
	Works skilfully on assigned tasks and completes them on time
	Gives timely, constructive feedback to team members, in the appropriate format
Facilitates contributions of others	Communicates actively and constructively
	Encourages all perspectives be considered and acknowledges contributions to others
	Constructively builds on the contributions of others and integrates own work with work of others
Planning and Management	Takes on an appropriate role in the group (e.g. leader, note take, etc)
	Clarifies goals and plans the project
	Reports to team on progress
Fosters a team climate	Ensures consistency between words, tone, facial expressions, and body language
	Expresses positivity and optimism about team members and project
Manages potential conflict	Displays appropriate assertiveness: neither dominating, submissive nor passive aggressive
	Contributes to appropriately healthy debate
	Responds to and manages direct/indirect conflict constructively and effectively

Where is it situated (1)

- Final Year Undergraduate Computer Science Degree
- Semester 2 – January –May 2021
- Cohort size 170
- 121 learners provided consent to participate (formal opt in)
- “What gender do you identify as” – optional open text field
 - 108 Male (“male”, “man”, “masculine”)
 - 13 Female (“female”)
 - 3 “I don’t know”, “non-binary”, “nothing”
 - Null responses taken as not consenting (in addition to above consent)

Where is it situated (2)

- Team allocation – choice of self selection or allocated team
- Project selection – “live” development projects sourced either by module team or the students themselves
- Learning agreements
- Development approach – Full-stack development
- Support – weekly 30 minute progress meetings with a supervisor
- Assessment (10% Proposal, 50% Application and Demo, 40% report)
- Peer Assessment – two rounds (formative and summative)

Does it work?

Small sample size and low incidence of female learners

		Mean Team-Q Score	Number
Marker Gender	Female	46.94	32
	Male	47.15	323
Marker Gender / Marked Pair	Female – Female	50.60	5
	Female – Male	46.41	27
	Male – Female	46.30	27
	Male - Male	47.22	296

Female (46.94) and male (47.15) learners t-test ($t=-0.087708$, $df =35.438$, $p=0.9306$)

ANOVA “female marking male” (46.41), “male marking female” (46.30) or “male marking male” (47.22) pairs (markers gender $F=0.104$, $p=0.748$ and marked gender $F= 0.177$, $p=0.674$)

Female-to- female marking pairing mean (50.60) is not statistically significantly different to the other pairings (t-test $t=0.697$, $p=0.487$)

What will you do next?

- Learning in Pandemic may not be typical
- Grow sample size
- Other factors, for example
 - -7.06% Attainment Gap* between BAME and white students [1] p 164
- Statistics are one thing:
 - Learner perception present an urgent set of research work to explore view of inclusion and perceptions of microaggressions and bias in team work

* (percentage of UK domiciled white qualifiers receiving a first/2:1) – (percentage of UK domiciled Black, Asian and Minority Ethnic qualifiers receiving a first/2:1)



Why are you telling us this?

- Team Q peer model is synthesised from wider research, and represents a comprehensive model for what constitutes effective team working
 - Not solely technical skills
 - Benchmark for good teamworking
- Literature inconclusive as to peer assessment exhibiting parity
- Given the low overhead of evaluating the statistical impact of self-identified gender upon peer assessment results, doing so is a practice recommendation

References

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Questions?





Supporting Material

T test male / female markers

Component	Description	T	P
Contribute to team project	Participates actively and accepts a fair share of the group work	-0.11	0.91
	Works skilfully on assigned tasks and completes them on time	0.37	0.71
	Gives timely, constructive feedback to team members, in the appropriate format	1.04	0.30
Facilitates contributions of others	Communicates actively and constructively	-0.45	0.66
	Encourages all perspectives be considered and acknowledges contributions to others	-0.16	0.87
	Constructively builds on the contributions of others and integrates own work with work of others	0.07	0.95
Planning and Management	Takes on an appropriate role in the group (e.g. leader, note take, etc)	1.09	0.28
	Clarifies goals and plans the project	0.08	0.93
	Reports to team on progress	0.13	0.90
Fosters a team climate	Ensures consistency between words, tone, facial expressions, and body language	-0.02	0.98
	Expresses positivity and optimism about team members and project	-0.79	0.43
Manages potential conflict	Displays appropriate assertiveness: neither dominating, submissive nor passive aggressive	-0.36	0.72
	Contributes to appropriately healthy debate	-0.82	0.42
	Responds to and manages direct/indirect conflict constructively and effectively	-0.09	0.93

ANOVA male / female marker pairs

- No significance for any of the pairings to individual criteria