The power of peers: Using peer-assisted learning to develop critical appraisal skills for evidence-based practice

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Abstract

Aim

Critical appraisal is an important skill in health research and evidence-based practice. Utilizing a process similar to conducting a systematic review, a critical appraisal assessment was developed employing peer-assisted learning (PAL) to provide an opportunity for students to develop real-world capabilities, improve critical appraisal skills, and providing professional feedback to others.

Methods

An anonymous online-survey modeled on the pedagogy of PAL was completed by postgraduate epidemiology students to explore the experience of engaging in assessments based on PAL. Collection included demographic and enrollment information, methods and duration of peer discussion, assessment performance, and type of submission.

Results

Eighty-seven (39%) of 223 enrolled students completed the survey. Most students reported that sharing and discussing their work deepened their learning (78%) and helped to identify limitations in their understanding (77%). Review of their partners work helped improve understanding (77%) and application (70%) of epidemiological concepts. Most felt that contribution and benefit were equal in the partnership (62%), although a quarter believed that their partner benefited more than they did.

Conclusions

Students were using the exercise to calibrate and improve their work. Peer-discussion activates PAL, a powerful, innovative, and authentic approach to teaching critical appraisal skills in evidence-based practice. The success of PAL activities is important as students develop the capacity to critically discuss research, which can be transferred to their professional work. This finding suggests that peer-discussion is an important element in developing critical appraisal skills whether it be in higher education, continuing professional development, or systematic review preparation.

Introduction

Critical appraisals of research (CA) are often taught in higher education epidemiology to support the development of critical thinking skills and determine the trustworthiness of research. In higher education, CAs are commonly utilized as summative assessments through independent appraisal.

Peer-assisted learning (PAL) describes pedagogies with roots in constructivism and social theories of learning emphasizing interpersonal relationships (1). PAL is used extensively within medical education, and research demonstrates its usefulness in higher education, encouraging students to take responsibility for their learning and generate new perspectives (2). One example of PAL is peer instruction (PI), a teaching method where students explain content of the educators "expert blind spot" and accept feedback from peers (3). PI mutually benefits high and low performing students (4). Implementing PAL enables higher education students to improve team working skills and the capacity to evaluate the work of others through professional feedback critically. In applying these learning principles, CA assessment serves as both summative and formative learning (5).

This study examined the use of PAL through a CA assessment essay in a postgraduate epidemiology subject. In this assessment (worth 45% of the final grade), students performed a CA of a study in pairs using the *Effective Public Health Practice Project* (EPHPP) tool (6). The EPHPP tool assesses the quality of a study in five components, all covered extensively in the subject. Each component is rated as 'strong', 'moderate', or 'weak'. Students critically appraised the study individually, providing an explanation for their assessment and then discussing their findings with their peer. Students could submit the final assessment individually or with their peer.

This research explored: a) the effect of the PAL approach upon students' learning experience and outcomes, b) students' preferences for collaborative methods, c) transferability to other subjects, and d) further development of the pedagogy of peer learning.

Study design

Setting

This cross-sectional survey employed both quantitative and qualitative methods. All students (N=223) enrolled in postgraduate epidemiology at Queensland University of Technology (Brisbane, Australia) were invited to participate in an anonymous online survey after the release of final results. The subject was provided both internally (on-campus) and externally (online). Ethical approval was obtained from Queensland University of Technology Human Research Ethics Committee (: #18000011242018).

Online survey

Demographic and enrolment information were collected: gender, domestic/international status, continent of birth, semester of study, and enrolment status ('internal'/'external'). Participants were questioned on communication methods, submission methods, modification of work following review and discussion, and feedback literacy. We asked about their experience and perception of contributions and benefits, including whether they would recommend the method and its transferability to other subjects.

Statistical analysis

Stata SE v15.1 was used for all analysis. Frequencies and percentages were generated for categorical variables. The values of variables were grouped where necessary due to small sizes. Although assumptions of chi-squared tests were not always violated, we used one-sided Fisher's exact tests given the study's small sample size.

Results

A total of 87 (39%) of 223 enrolled students completed the survey. Most participants were women (60%) and domestic students (62%). About half were enrolled internally (51%). Most domestic students enrolled externally/dual (79%, *n*=38).

Method of submission (individually versus joint)

Most students submitting individually were domestic (83%) and enrolled externally (75%), whereas most submitting jointly were international (61%) and enrolled internally (79%). Student type and enrolment status were significantly associated with the method of submission ($p \leq 0.01$).

Communication

Communication methods varied according to enrolment: 85% of internal students opted for an in-person meeting (*n*=34) compared to 16% (*n*=6) of external students. Emails were more likely used by external than interal students (p=0.001) with 84% (n=32) and 50% (n=20), respectively. Voice calls were more used by external/dual (42%, *n*=16) than internal students (25%, *n*=10). However, mobile communication applications were used more by internal (25%, *n* =10) than external/dual students (8%, *n*=3; p=0.005). Video communication was more common for external/dual (18%, *n*=7) than internal students (5%, *n*=2). Survey comments suggest timely and consistent communication was a problem for some.

Discussion and engagement

International students spent more time in discussion then domestic (*p*=0.021), and were more likely to spend more than an hour discussing (*p*=0.003). The association between discussion time and improvement in grade after mid-term was not significant.

Most students (73%) described themselves as (highly) engaged. Internal students were more likely to engage with partners than external students (83% vs 63%; *p*=0.047), and spent the longest time in discussion with their partner, with 60% (*n*=24) of internal students spending two hours or more compared to 31% (*n*=11) of external students. This may be related to the mode of submission, as 61% of students submitting jointly spent two (*n*=23) or more hours in discussion compared to 30% (*n*=12) of those submitting individually.

Self-identified effects of discussion

Most students agreed partner discussion deepened learning (78%) and honed limitations in their understanding (77%). Most also agreed that reviewing their partner's draft helped improve their understanding (70%) and apply learnings (68%).

Examining the effect of the exchanging drafts, 42% (n=33) modified their own essay after reading their partner's draft, with more (76%, n=59) modifying after discussing with their partner. International students were more likely than domestic students to modify their own essays after reading their partner's draft (50% vs 38%; p=0.197), while internal students were more likely than external students to modify their own essays after discussion (53% vs 32%; p=0.05).

Preparedness for discussion

Most students identified themselves as prepared for the discussion (85%). Internal students were more likely to be prepared than external students (98% vs 71%; p=0.001). International students were more likely to perceive themselves to be prepared than domestic students (97% vs 77%; p=0.017). Some students were concerned that the partner could plagiarise their work.

Contribution and benefit

Most students (62%, n=46) stated 'both of us contributed equally', although 35% stated 'myself' (n=26) and 3% stated that their partner contributed the most. Respondents identified that they benefited equitably (55%; n=41), 27% thought that their partner benefited the most, 8% that they benefited the most, and 10% that neither of them benefited.

Improving the grade was identified as a benefit, with 60% agreeing that 'The discussion helped me get a better grade', while 21% disagreed and 20% were unsure. Student comments showed that explaining their findings to a peer helped them to understand epidemiological concepts. Some students felt that they were 'too much of a teacher' and had to invest significant time into explaining concepts to others without perceived positive effects for themselves.

Transferability of the approach

Students generally recommended this approach (77%) and agreed about its transferability to other

subjects (78%). International and internal students were more likely than domestic and external students (p=0.006) to recommend PAL.

Discussion

Our study found evidence that students calibrated and modified their work after reading their partner's draft as providing and receiving peer feedback can promote learning (2). Although 29% of students thought their partner benefited more from the collaboration, they may have underestimated the personal benefit of giving feedback and receiving feedforward. Learning occurs through the articulation to others of what we know. Significantly, and in line with other recent work, providing and receiving feedback can benefit the learner (2).

This learning and assessment approach enabled students to receive comprehensive feedback on their work with a remarkable 45% of participants spending two or more hours in peer discussions. The extensive discussion and the resulting revisions indicate students acted as agents of their own change.

Students often find peer assessment 'challenging and socially uncomfortable' (7), and a small number of participants in this study described partnership conflicts; an inherent risk of any group work. Commenting on a peer's work provides the opportunity to develop objectivity in relation to a standard and then transfer it to their own work (5).

Comments indicate some students were initially sceptical of the approach, but experience changed their perspective. While researchers identified students' unhappiness with group work, particularly in cross-cultural teams (8), about half submitted as a pair when given the opportunity to choose between individual or joint submission.

Significantly, almost all students were able to have a meaningful peer discussion. Requiring peer discussion of independent critical appraisal, embedded in pedagogy, and making joint submission optional, rather than mandatory, seems to be a highly credible approach.

One of the main barriers to effective feedback is low levels of feedback literacy (9). Our findings suggest using modified peer instruction as a core component of the assessment design of critical appraisal facilitates feedback literacy.

Application to professional practice

PAL is a fundamental component of professional practice in health fields. Professionals participate in active learning through peer discussion (e.g., critical appraisal exercises) and authoring systematic reviews (10). PAL provides an authentic learning experience by modelling professional practice in critical appraisal. Application may extend beyond the higher-education sector, as critical appraisal and independent work are employed widely. This study identifies PAL and modified PI as powerful approaches to teaching critical appraisal within summative assessments and develop feedback literacy that can enhance student learning and support life-long learning.

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