Peer-Assessment in Higher Education: A Review of Recent Studies

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Outline

1. Introduction
2. 20th Century Peer-Assessment
3. 21st Century Peer-Assessment
   - Inclusion Factors
   - Themes of Interest
     - Literature Reviews
     - Case studies, action research and peer assessment instruments
4. Discussion
5. Recommendations
6. End of Talk

Introduction

- Assessment in education - varies with goals

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- Terminologies - Summative and Formative

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- Criterion-referenced (absolute grading) or normative (relative to other students)

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- Should not contribute towards final grades

Non-Traditional forms of Assessment

- The teacher is not the sole assessor

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Non-Traditional forms of Assessment

- The teacher is not the sole assessor
- significant involvement of students
- purely formative, or a blend
- E.g. Self-assessment, peer-assessment

Peer-Assessment

"... an arrangement in which individuals consider the amount, level, value, worth, quality, or success of the products or outcomes of learning of peers of similar status."

Topping(1998)

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- Over two-decades of research in peer-assessment

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  - to identify challenges and opportunities
  - to recommend ways to tackle challenges in the practice

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- Identified many variables among the studies
  - what subject?
  - nature of the PA task assessed: educational vs. professional
  - formative or summative?
  - what is being assessed?
  - do peer-assigned scores agree with those of the teacher's?

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  - do peer-assigned scores agree with those of the teacher's?
- His conclusion:
  - too many variables
  - no concrete evidence regarding the soundness or practicality of PA in higher education

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  - nature of assessment criteria
  - number of teachers and students involved per assessment task
- Their conclusion: On average, student marks agreed with teacher marks:
  - mean *r=0.69* - the higher the better
  - mean effect size *d=0.24* - the lower the better

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- Involving students in the development of assessment criteria $\rightarrow$ better agreement

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The Selection Process

- Keywords - peer assessment, peer grading, peer evaluation, peer review, peer feedback, peer interaction
- Google Scholar
- Journal articles and conference proceedings published since 2000
- Not computer-based or web-based (Luxton-Reilly (2009) provides a comprehensive review)
- Final list included 64 studies

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- Case studies, action research and peer assessment instruments
  - The value of peer-feedback
  - Peer-assessment design strategies
  - Perceptions of students and teachers
  - Psychological and social factors in peer-assessment
  - Validity and reliability of peer-assessment

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- Falchikov (2003), Leenknecht et al. (2011), Bloxham & West (2004), Sluijimans et al. (2004)
  - PA must actively involve students to be effective
  - PA experiments should allow replication
  - clear instructions for students regarding processes involved

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- Identified four variable categories
  - Psychometric qualities
  - Domain-specific skills
  - Peer-assessment skills
  - students' attitudes towards PA

Variables of peer-assessment

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  - Do peer-peer relationships affect the practice?
  - Should peer-feedback be iterative or one-off?
  - Is assigning multiple students to the same assessment task effective?
  - inconsistencies, contradictory results, flaws or limitations of studies are revealed

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- Important for optimal peer-assessment design
  - What is being assessed? Written work? Oral presentation?, ...
  - Is PA as substitute for teacher's assessment?
  - Is it mutual, anonymous?
  - Is contact face-to-face?
  - in-class, take-home?
  - Are there any incentives?

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- Van den berg et al. (2006b) build upon previous research
- Impact of variables on oral and written feedback
- Peer-feedback is optimal when:
  - PA conducted in small groups, formative or summative
  - Written feedback should be orally explained and discussed with the assessed
  - But what about large classes?

Variables of peer-assessment

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- Van Gennip et al. (2009) - interpersonal variables in group-based PA
  - Psychological safety
  - Value diversity
  - Interdependence - responsible involvement (not specific to group-based PA)
  - Trust

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  - Generalisability - can outcome be generalised to those of tasks measurin the same achievement? - comparability, reproducibility, educational consequences

Quality of Peer-Assessment

- Gielen et al. (2011) - A contrasting view
- The quality being sought is determined by the goal of the PA task
- Perhaps more practical; PA is implemented in many contexts
- A single set of quality criteria may not be fitting to all

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- Lin et al. (2001) - In general, specific feedback more helpful than holistic feedback in improving performance

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- Hu (2005), Min (2006), Sluijsmans and Prins (2006), Saito (2008) - Training students in providing feedback and in PA skills, in general, improved quality of feedback and work being assessed.
- Chen & Tsai (2009) - Subsequent feedback tends to produce marginal improvement in the quality of work being assessed

Peer-Assessment Design Strategies

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- PA conducted in a class of 12 grad students
- Formative
- Product assessed - end-of-second-term academic report
- Mandatory participation, PA results did not contribute to final marks
- Out-of-class, anonymous, reciprocal
- 14 specific criteria provided
- Study sought to investigate peer and teacher score agreements

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- Study sought to investigate peer and teacher score agreements
- Conclusions:
  - Adequate reliability and validity of the approach
  - May, however, not generalise to other settings

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- A three-phase study spanning a two-year period
- 1654 students and 30 staff from three departments
- PA procedures outlined and revised together with students
- Shortcomings - assessment was manual, anonymity was not preserved in some departments
- Increase in student load - required to meet outside class to exchange assignments and agree on final grades, risk of bias
- Otherwise a thoroughly designed high quality study

Peer-Assessment Design Strategies

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- Automating peer-assessment tasks has several advantages
- teachers can enjoy PA advantages less the negative impacts discussed
- anonymity, efficient assignment distribution, discussion, and submission of grades easily guaranteed
- automation could also help calibrate grades assigned by multiple peers (Hamer et al. 2005)

Peer-Assessment Design Strategies

- Some variations

Peer-Assessment Design Strategies

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  - the teacher assessing the quality of feedback instead of analysing peer-assigned marks (Davies 2006)
  - PA without explicit assessment criteria (Jones & Alcock 2014)

Perceptions of Students and Teachers

- Overall positive perceptions of students reported by:
  - McLaughlin & Simpson (2004), Saito & Fujita (2004), Wen & Tsai (2006), Wen et al. (2008), McGarr & Clifford (2013)
  - Chang (2006), Kwok (2008), Wood & Kruzel (2008), XIao & Lucking (2008)

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- Increased responsibility for others and improved learning (Papinczak et al. 2007)
- Time-intensive, intellectually challenging, creates a socially uncomfortable environment (Topping et al. 2000, Hanrahan & Isaacs 2001, Arnold et al. 2005, Praver et al. 2011)

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- A large survey (1740 students and 460 faculty) found that summative PA is considered ineffective and students question the reliability and expertise of their peers (Liu & Carless 2006)
- Responses seem favourable of PA as students progress through subsequent PA tasks and editions (Sluijsmans et al. 2003)

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- A study of 40 students involved in a PA task (20 females) reported that female students found it a stressful task (Pope 2005).

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- $d = \frac{2*[mean(eg)-mean(cg)]}{sd(eg)+sd(cg)}$
- eg = experimental group, cg = control group

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  - Population characteristics reported?
  - Subject area reported?
  - What is assessed, at what level (intro, intermediate, advanced)
  - What instrument and criteria were used, if any?
  - What statistics were reported?
  - # of teachers and students involved per assessment task
  - Did assessment contribute to final grades?
  - Was assessment anonymous?

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  - Was assessment anonymous?
- Studies missing at least 4 criteria $\rightarrow$ poor design (N=3)
- The rest (N=12) $\rightarrow$ high quality (at least 2 missing in many)

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  - asking students to assess class participation or effort (Ryan et al. 2007)
  - using students who do not participate in creating the product being assessed (De Grez et al. 2012)

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- Partial anonymity, varied treatment of EGs and CGs (Xiao and Lucking 2008)
- Other missing information - age, gender, anonymity, contribution towards final grade, course level

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- Corroborates findings by Falchikov & Goldfinch (2000), although with much smaller studies
- Most studies varied in the design of assessment tasks
  - Products assessed - written work, oral presentation
  - Disciplines - education, business, law, medical education, computer science and engineering
  - Stats reported - correlation coefficients, one-way & multiple ANOVA, Cronbach's alpha, t-tests, intraclass correlation, mean and SD

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- How about impact of formative peer-assessment on students' performance on end-of-course exams?
- Manual peer-assessment lays more burden on both students and teachers

Outline

1. Introduction
2. 20th Century Peer-Assessment
3. 21st Century Peer-Assessment
   - Inclusion Factors
   - Themes of Interest
     - Literature Reviews
     - Case studies, action research and peer assessment instruments
4. Discussion
5. Recommendations
6. End of Talk

The Way Forward

- Exploring the applicability of educational games
- Some positive results of introducing educational games in the physical sciences
- Although most studies focus on K-12 education
- Thorough reviews of educational games - Randel et al. (1992), Wu et al. (2012)
- CS advances may help with efficient integration of educational games into peer-assessment practices
- a way of eliciting participation through collaborative and competitive games

The Way Forward

- Automation of peer-assessment tasks could help teachers introduce healthy competition into PA processes
- Automation also improves efficiency of PA processes - randomised distribution, collection, marking of PA tasks
- Automation helps conduct iterative PA experiments, and multiple rounds of feedback and review
- Automation can easily guarantee anonymity
- Automation opens the door to ubiquitous learning environments (Jones & Jo 2004, Sun & Shen 2014)
- Automation reduces teacher workload (Bouzidi & Jaillet 2009)

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Automation - Advanced opportunities

- application tools that detect academic dishonesty, automated essay scoring, social network analysis,
- automated calibration of peer-assigned scores (Hamer et al. 2005, Giovannella & Scaccia 2014)
- student performance prediction models based on peer-assessment data (Ahenafi, Riccardi & Ronchetti, 2015)

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- Is students' bias regarding their peers' abilities logical? - Anonymity may provide the answer
- Teacher plays a student in an automated peer-assessment environment

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- An opportune time for scholars in education and computer science to forge collaborations
- Not a practice within education anymore - **21st century PA is interdisciplinary**

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References

All references can be retrieved from the article discussed in this talk

- Michael Mogessie Ashenafi (2015): Peer-assessment in higher education twenty-first century practices, challenges and the way forward, Assessment & Evaluation in Higher Education, DOI: 10.1080/02602938.2015.1100711

Thank you all!

Questions?