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RELEVANT ASSESSMENT AND PEDAGOGIES FOR INCLUSIVE DIGITAL EDUCATION

IO 2.3

CASE STUDIES ON PEER REVIEW AND ASSESSMENT

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SUMMARY

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Abstract:	This document is part of the IO2 Open educational resources and e-course for flipped classroom (FC) and work based learning (WBL) presenting the Peer review and assessment used by project partners. It includes 10 different case studies on using peer review or peer assessment in flipped classroom and work-based learning teaching methods.
Key words	Peer review, Peer assessment, flipped classroom, work-based learning, COVID-19, pedagogy, learning experience, teachers, students

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PREFACE

With increasing student numbers entering Higher Education across the globe and with increasing need for flexibility in how education is delivered, lecturers are in need of more digital tools to help them in their teaching. As the recent COVID-19 pandemic has shown us, lecturers must be able to almost seemingly switch between online, blended, flipped classroom (FC), or face-to-face education in the case of on-campus education. At the same time similar tools are needed to support Work-Based Learning (WBL) and fully online or remote learning.

Over the past 20 years, computers have become an integral part of education across all domains, not just as a word processor, but also as a digital tool in the portfolio of tools that lecturers have available to them. It is unthinkable for an institution not to have a Virtual Learning Environment (VLE) available, be it Moodle, Brightspace or Blackboard as some examples of a digital educational tool.

One area where lecturers struggle is the required flexibility. Moreover, the increasing student numbers bring struggles in the area of assessment. Next to the debatable, all-important grade, it is also important that students are provided with feedback on their performance and their deliverables, so that they can learn and mature. However, this can have serious implications for the workload of the lecturers involved.

One possible solution to aid with the assessment of students is to engage students themselves in the process. This phenomenon is widely known as peer assessment (PA) and in one form or another has been in use in education for many years. Already in 1998 Keith Topping published a literature review on the use of Peer Assessment in Higher Education [1]. He defined PA as:

"*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, p.250).

Peer Assessment (PA) can take many different formats and can be used in different educational activities to assess products such as essays, performance such as teaching or presentations, designs and prototypes or behaviour in team settings such as design projects. In an attempt to create some order in the chaos within the context, PA can be subdivided into three distinct categories:

1) The first type is *peer review*, that is students review each others' (written) output and give each other feedback, which the recipient of the feedback may or may not have to account for in a next iteration of the output created. Examples of these can be essays or reports to prototypes or computer code.
2) The second type is *peer grading, which* is where students grade (formative or summative) each other's work against a set of given criteria. Examples are grading each other's homework assignments or essays. This type of feedback does not necessarily require students to give detailed feedback, rather the feedback

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is limited to whether or not the answer is correct or to what extent the student has delivered what was asked.

3) The third type is *peer evaluation*, that is where students evaluate each other in the context of a group process and reflect and give feedback on transversal skills within this process, such as the ability to work together in teams. This can be done using a rubric but also in written or verbal form.

Whereas PA in the 20th Century was very much a paper-based or verbal exercise, these days optimal use can be made of the VLEs and the digital software tools available to educators.

In March 2021, the European Project RAPIDE started. The RAPIDE project, "*Relevant Assessment and Pedagogies for Inclusive Digital Education*", is approved by Erasmus+ programme - KA2 - Cooperation for innovation and the exchange of good practice, KA226 - Partnerships for Digital Education Readiness. The aim of the project is to co-create, implement and share innovative pedagogies and aligned assessment for relevant and inclusive digital education in order to deal with the COVID-19 induced and similar crises and to support meaningful digital transformation of HEIs. Involved partners are the Faculty of Organization and Informatics, University of Zagreb, Croatia (coordinator); Delft University of Technology, The Netherlands; Goethe University, Germany; School of Medicine, University of Zagreb, Croatia;, The Open University, United Kingdom; and the University of Rijeka, Croatia.

As part of this project, studies were carried out into the use of PA in a digital setting, one of them being a case study including Best Practice examples from all project partners.

The case study that lies before you contains 10 case studies on digital Peer Assessment from all partners, each introducing their case followed by a structured reporting of the metadata of each case, relevant learning outcomes, the design of the peer process and evidence of effectiveness as well as some conclusions and recommendations given by the responsible partner.

We hope you will enjoy the read!

The Editors,
Priya Sarkar
Gillian Saunders-Smits

Delft, The Netherlands, April 2022

Reference :

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CASE STUDIES

1. The Use of Peer & Self Evaluation in Project Based Learning at Aerospace Engineering

Introduction

At the faculty of Aerospace Engineering of TU Delft project-based learning is embedded in the Bachelor degree with 5 team design projects resembling the Engineering design cycle [1]. In each of these projects use is made of self- and peer evaluations to evaluate some of the transversal skills of the students in a formative way and allow students to reflect on and improve their performance [2]. Initially, use was made of a rubrics created by the US Air Force Academy embedded in the 360 degree feedback programme Scorion [3], but since 2020 Buddy Check is used based on the CATME by Purdue [4]. Buddy Check is centrally maintained and available for use in all courses at TU Delft.

Details of the Case

Metadata of the Case	
Applications Domain	Aerospace Engineering
Place in Curriculum (Bachelor, Master, etc.)	Bachelor
University, Location	Delft University of Technology, Delft, The Netherlands
Course Format (which year in degree, # ECTS, length of course, type of course)	5 engineering team design projects in the Bachelor of Aerospace Engineering: Year 1: Two 5 EC projects (1 per semester) Year 2: Two 5 EC projects (1 per semester) Year 3: One 15 EC Capstone Design Project (offered twice per year, 10 weeks full time)
Delivery (online, face-to-face or blended)	Online, Face-to-Face and Blended versions have run successfully
Cohort and Individual Group size	Year 1: circa 440 students in groups of 8-10 Year 2: circa 350 students in groups of 8-9 Year 3: circa 300 students in groups of 9-10
What is being assessed, evaluated or reviewed? (e.g. skills,	Skills, See Ref [1], [3], and [4]

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assignments, exams, design, code or prototype, writing)	
Purpose of peer process	1. For students to receive feedback on their interpersonal skills from their team members in the design project and compare it to their own assessment of their skills 2. For students to reflect on their performance 3. For staff as input in their assessment of every student's participation in the project
Digital Tools used in Peer Process	Buddy Check based on CATME [4] and previously Scorion[5]
Analogue Tools	Lecturers are recommended to have individual and group discussion on the outcomes

Relevant Learning Outcomes related to Peer Assessment	
Domain Skills	Team working skills in Engineering Design Environment and application of knowledge, design and research Skills
Critical Thinking, Problem Solving	N/A
Metacognitive Skills	Reflection of own performance, evaluation of peer work and adapting based on reflection and evaluation
Judgement	Allows students to form judgement
Social Skills	Group discussion and team work
Cultural and Intercultural Skills	Collaboration in a diverse and international environment

Design of Peer Assessment Process	
Group formation	Year 1 and Year 2 : Students are assigned to groups by the course staff Year 3 : Student groups are formed based on topics of interest

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	All teams are created ensuring a safe space in terms of gender and language.
Number of Iterations	2 iterations per project : mid way and end of the project
Who defines criteria?	In Buddy Check set by CATME [4] In Scorion any Rubric can be added [5]
Qualitative Criteria	N/A
Quantitative Criteria	Likert scale using descriptive Rubrics: CATME rubric developed by Purdue University [4] and US Air Force Rubric [1]
Trust & Anonymity	- Submissions are not anonymous - Only aggregated results are displayed - Optionally, students can comment publicly (to whole team) or privately (to lecturers)
Distribution of Submissions	Each student performs self evaluation as well as evaluates every member of the team. Students can access their own evaluations given by other team members as well as the aggregate average score given to them by their teammates.

Evidence of effectiveness	
Effects found (if studied please provide references below)	No formal assessment done, only anecdotal evidence, See [1] and [2]. CATME[4] is widely evaluated, see ref. [6]
Limitations	- Works well for rubric based evaluations - Dependance on institutional culture towards peer and self evaluation - Needs to be carried out in safe and secure environment

Recommendations and Conclusions

Peer and Self Evaluations are an excellent formative way to have students reflect on themselves as well as learn to form judgement on other students. They learn to give feedback, especially in large classes consisting of many groups (200+). It also gives lecturers an additional source of information when it comes to monitoring and assessing the ongoing team process and the development of students' team skills. A safe learning space is provided and lecturers actively engage with students to discuss the outcomes with both the group as a whole and with

individual group members. It is a great tool to use in group design work such as used in Engineering. As always with tools, it is only as good as the lecturers that use it.

Contact

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2. The Use of Peer Assessment in *Methods of Teaching Informatics* and *Teaching Practice* Courses

Introduction

At the University of Rijeka, Faculty of Informatics and Digital Technologies (formerly the Department of Informatics) peer assessment integrated with work-based learning (WBL) is introduced to students - pre-service teachers of the Master study program of Informatics for future teachers of informatics in primary and secondary schools. The peer assessment is preceded by a WBL activity in which pre-service teachers evaluate a lesson delivered by a teacher (mentor/expert) to pupils in a junior high school. Pre-service teachers observe the lesson and evaluate the teacher using rubric. Then they discuss possible changes to the rubric. In the peer assessment pre-service teachers observe their peers' lessons and use the rubric for peer evaluation. Pre-service teachers are also asked to complete a self-assessment.

Details of the Case

Metadata Case	
Applications Domain	Informatics
Place in Curriculum (Bachelor, Master, etc.)	Master

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University, Location	University of Rijeka, Rijeka, Croatia
Course Format (which year in degree, # ECTS, length of course, type of course)	3rd semester of the Master's degree program of Informatics for future teachers, 7 ECTS, one semester (15 weeks)
Delivery (online, face-to-face or blended)	Face-to-face
Cohort and Individual Group size	10-15 students (pre-service teachers)
What is being assessed, evaluated or reviewed? (e.g. skills, assignments, exams, design, code or prototype, writing)	Lessons delivered by pre-service teachers to peers (role-play activity)
Purpose of peer process	1. For students to receive feedback about the lessons delivered 2. For students to reflect on their performance and performance of their peers
Digital Tools used in Peer Process	The rubric for peer assessment is implemented as a questionnaire in the Merlin (Moodle) LMS
Analogue Tools	Discussion in the classroom about the outcomes of the assessment

Relevant Learning Outcomes related to Peer Process	
Domain Skills	Students learn the elements that are important for quality lesson performance (e.g. presenting the goal of the lesson, subject matter expertise, appropriate teaching methods and activities, etc.)
Critical Thinking, Problem Solving	Students critically think about a real-word problem
Metacognitive Skills	Students conduct assessment and provide constructive feedback to their peers
Judgement	Students form judgement about peers' teaching skills
Social Skills	Group discussion

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Cultural and Intercultural Skills	N/A

Design of Peer Process	
Group formation	Students are assigned to groups by the course teachers
Number of Iterations	1 iteration
Who defines criteria?	Teacher defines the first version of the rubric and students collaborate in preparing the final version
Qualitative Criteria	Mandatory comments (qualitative feedback) on questions: ● What was best during the lesson? ● Do you have any suggestions on how the teacher can improve some elements of this lesson?
Quantitative Criteria	Rubric consisting of 8 elements, students give 0-3 points for each element): 1. Presenting the goal of the lesson 2. Subject matter expertise 3. Teaching methods and activities 4. Use of digital tools 5. Assessment for learning and assessment as learning 6. Structure and duration of the lesson 7. Interaction with students 8. Presentation skills
Trust & Anonymity	Submissions are not anonymous; the teacher and all students can view the points and comments for all other students
Distribution of Submissions	Students are supposed to fill in the Moodle questionnaire and evaluate the performance of the other students as well as to self assess their own performance. It is mandatory to give points for all 8 elements in rubrics and to provide comments

Evidence of effectiveness	

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Effects found (if studied please provide references below)	No formal assessment has been carried out.
Limitations	Only one group was formed in the academic year 2021/2022 due to the small number of students (6).

Recommendations and Conclusions

Peer assessment integrated with work-based learning has proven to be a good way to encourage students to reflect and self-reflect. Involving students in the development of the assessment rubric encouraged thinking about the outcomes of the course and contributed to the promotion of judgement, critical thinking and problem solving as important skills for future teachers. Although student participation in peer assessment and self-assessment was not summative (did not contribute to the final course grade), students were satisfied with the overall process and found it useful for their future work.

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3. Peer and Self-Assessment Experience within the Maritime and Transportation Law Course

Introduction

Peer and self-assessment within the Maritime and Transportation Law Course at University of Rijeka,were carried out using the activity Workshop on the course repository based on Moodle system. Students had to write an essay

about “Territorial scope of application of the Art. 812 of the Croatian Maritime Code”. It is an ambiguous provision that can be subject to two different interpretations. Students were given a developed grading rubric to use as a guideline while writing their essays. The purpose of this assignment was to practise the analysis and correct interpretation of the legal provision, to improve the skill of legal argumentation and to develop the skill of legal writing. Following the submissions, students used the same rubric to conduct peer and self-assessment, which showed to be very useful to develop critical and self-critical thinking.

Details of the Case

Metadata Case	
Applications Domain	Law
Place in Curriculum (Bachelor, Master, etc.)	Integrated Undergraduate and Graduate University Study of Law
University, Location	University of Rijeka, Rijeka, Croatia
Course Format (which year in degree, # ECTS, length of course, type of course)	7th semester, 9 ECTS, one semester (90 hours), compulsory course (75hours lectures + 15hours exercises)
Delivery (online, face-to-face or blended)	Face-to-face
Cohort and Individual Group size	152 students
What is being assessed, evaluated or reviewed? (e.g. skills, assignments, exams, design, code or prototype, writing)	The analysis and correct interpretation of the legal provision, skills of legal argumentation, skills of written (legal) expression, as well as critical and self-critical thinking.
Purpose of peer process	The purpose of the self-assessment and peer-assessment is to enable students to learn from papers written by their colleagues and to inspire them to think critically about their work and the work of their colleagues.
Digital Tools used in Peer Process	Merlin - based on Moodle LMS – Workshop activity
Analogue Tools	N/A

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Relevant Learning Outcomes related to Peer Process	
Domain Skills	- The student will be able to analyse and correctly interpret specific sources of maritime law - The student will be able to provide reasoning for a legal opinion in the field of maritime law
Critical Thinking, Problem Solving	- The student will be able to express themselves clearly, by supporting their arguments - The student will be able to solve a practical problem by conducting legal research and developing conclusions with supporting arguments by using relevant legal sources
Metacognitive Skills	- The student will be able to compare different essays, asses them and to think about the possible improvement of its work based on the knowledge acquired by peer-assessment
Reflection, Self Regulation	- Part of the task was a self-assessment - Reflection was also done through a survey, where students had the opportunity to comment on the assignment as such and their impressions of the work they did
Judgement	- The student will be able to make a judgement on the performance of the assignment (own work and the work of two of their colleagues)
Social Skills	- The student will be able to write a constructively critical review (knowing that their colleagues know who evaluated them)
Cultural and Intercultural Skills	N/A

Design of Peer Process	
Group formation	1 group / 1 assignment for 152 students (not all of them participated) Every student did 2 peer-assessments and a self-assessment
Number of Iterations	1

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Who defines criteria?	Teachers
Qualitative Criteria	The grading rubric, containing 7 criteria and 3 different levels of performance per each criteria described and associated with the corresponding points (1-3), contains predominantly qualitative criteria: 1. organisation and cohesiveness of the essay 2. clearness in setting the problem 3. presentation of arguments pro and contra both thesis 4. presentation of conclusion based on student's arguments 5. quality of references to legal sources 6. the usage of appropriate legal terminology Additionally, peers could have added comments (general, no specific questions).
Quantitative Criteria	The grading rubric (explained supra) contained only one quantitative criteria: 1. length of the essay Quantitative criteria were used for grading the quality of peer and self-assessment. The more objective students are in peer and self-assessment, the more points they earn. Awarding higher (or lower) points had a negative impact on the student's grade.
Trust & Anonymity	Submissions are not anonymous but they are not visible to all students, but only to peers. Peers know whose work they assess and assessed students know who assessed them.
Distribution of Submissions	Submissions are assigned to students randomly by the system.

Evidence of effectiveness	
Effects found (if studied please provide references below)	Following the closure of the Workshop, two surveys were conducted – one for the students who participated in the Workshop to hear their feedback, and the other for students who didn't participate in order to find out what was the reason for their passiveness. Students consider the self-assessment very useful and interesting. Peer-assessment was evaluated as useful because students had a chance to learn from papers

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	written by their colleagues, and it inspired them to think critically about the works of others and their own. However, at the same time, they felt uncomfortable because they knew who wrote the essay and therefore they could not have been objective. Due to this fact they were restrained from writing comments, especially criticism. Students would have preferred to have an anonymous peer assessment. Students were very grateful for comprehensive individual feedback.
Limitations	Comprehensive individual feedback is possible only in smaller groups or in cases where more teachers conduct the course.

Recommendations and Conclusions

Peer and self-assessment as designed within Moodle's Workshop is a great tool, inspiring students to think critically about their peers' work especially having in mind criteria identified and elaborated by teachers as essential. Carrying out peer-evaluations consequently leads to students' reflection on their performance of the assignment. The survey conducted following the Workshop showed that students prefer blind or anonymous peer assessment. Because the peer-assessment wasn't blind they felt uncomfortable while assessing, they could not have been objective and restrained to write critical comments. To encourage students to express their standing, provide critical analysis and provide proposals for improvement, it seems that peer-assessment should be anonymous. Where points are awarded teachers should be careful in awarding points equivalent to workload. Where possible, individual feedback is desirable.

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4. Using Student Peer review as One of the Processes of Knowledge Creation within the Flipped Classroom Method

Introduction

At the Faculty of Medicine, University of Zagreb, implemented a flipped-classroom (FC) approach in the physiology course. Our aim was to test whether this FC approach can encourage students to become more active and engaged during class time and encourage them to work as a team. Physiology is a second-year course in which 340 students were divided into ten groups. One of those groups was selected randomly and used for the study. In this group, 34 students were divided into seven subgroups. Students of all subgroups were additionally encouraged to work as a team. They worked together on problem-solving cases. Each group had to design and produce two thematic video lectures, which were then peer-reviewed by other students. Students of each subgroup had to evaluate the

work of other groups. Peer review was first done anonymously by a survey. Later, live peer comments helped students to reflect on and improve their performance.

Details of the Case

Metadata Case	
Applications Domain	Medical physiology, physiology of cardiovascular system
Place in Curriculum (Bachelor, Master, etc.)	Year 2 of the undergraduate medical study
University, Location	University of Zagreb, Zagreb, Croatia
Course Format (which year in degree, # ECTS, length of course, type of course)	1. One randomly selected group of students of Year 2 medical studies, 2. Physiology course, undergraduate study, basic science 3. 1 semester course (12 weeks long) 4. 21 ECTS
Delivery (online, face-to-face or blended)	Blended
Cohort and Individual Group size	1. Cohort of 320 students (Year 2); 2. One group size is 30-35 students 3. Selected group size is 34 students which were divided in seven subgroups
What is being assessed, evaluated or reviewed? (e.g. skills, assignments, exams, design, code or prototype, writing)	Evaluation of student group assignments. It assesses the ability of students to present their knowledge through video lectures on self-selected topics in the physiology of the cardiovascular system
Purpose of peer process	1. For subgroups of students to receive feedback from their peers in presenting selected knowledge through video lectures 2. For students to reflect their knowledge through evaluation of other peer's assignments 3. For staff as an input in their assessment of every student's participation in the assignment
Digital Tools used in Peer Process	moodle activity (feedback)
Analogue Tools	Discussions in the class between subgroups and individually between peers

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Relevant Learning Outcomes related to Peer Process	
Domain Skills	1. Teamwork, application of specific knowledge/cognitive skills 2. Planning, designing and structuring the specific subject of video presentation 3. Evaluation skills
Critical Thinking, Problem Solving	1. Open-mindedness, ability to analyse the quality of presented topics, 2. Evaluation and decision-making, 3. Self-improvement
Metacognitive Skills	Using existing knowledge to evaluate the quality of other peer's projects
Reflection, Self Regulation	Reflection of own knowledge with topics presented in video presentations
Judgement	Allows students to form own judgement
Social Skills	Teamwork in creating video presentation, group discussion on presented topics
Cultural and Intercultural Skills	N/A

Design of Peer Process	
Group formation	34 students of the class were assigned into seven subgroups by the course staff
Number of Iterations	1 - in the middle of the first part of the physiology course
Who defines criteria?	Teaching Staff
Qualitative Criteria	Open ended question
Quantitative Criteria	Likert scale

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Trust & Anonymity	- Submissions were not anonymous - Peer review were anonymous - During the class students commented publicly to the whole class
Distribution of Submissions	Each group presented their assignment (how they choose the topics, discussed the strategy, created the lecture and the way of presentation) Students can access all evaluations given by other groups

Evidence of effectiveness	
Effects found (if studied please provide references below)	Students gained additional skills and knowledge. The effects have not been studied.
Limitations	There is no tradition in students' peer review and evaluation at the medical school at University of Zagreb

Recommendations and Conclusions

Student peer review is a useful formative assessment method that provides feedback to improve a student's knowledge. It can be an important academic skill, which allows students to form judgement on other student group's work. Additional discussion about reviewed topics can provide a valuable contribution to other peer's learning as well as it can have students reflect on their existing knowledge. They learn how to discuss using objective arguments and to give useful feedback to class members. It also gives lecturers an additional source of information about students' performance and knowledge they gained. Lecturers actively engage with students to discuss the outcomes with the group as a whole and with individual students. It is a great tool to use in group design work.

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5. Self-reflection and Peer assessment in Providing Authentic Project-Based Learning to Large Class Sizes

Introduction

When students can self-select their group members, a common assumption is that students prefer to select friends from similar cultural backgrounds. However, when teachers randomise students in groups from different

cultural backgrounds, students learn to work together. Using the quantitative method of Social Network Analysis in a pre–post test manner, this case study aims to understand the impact of two group selection methods about how students from diverse cultural backgrounds build learning and work relations. In a quasi-experimental study with 2 times 69 students (across two years) two conditions were tested. In the first condition the students were randomly allocated to groups by staff and in the second condition, the students were allowed to self-select their group members.

Details of the Case

Metadata Case	
Applications Domain	Event management
Place in Curriculum (Bachelor, Master, etc.)	Postgraduate program (Master)
University, Location	University of Surrey / Open University
Course Format (which year in degree, # ECTS, length of course, type of course)	International Events Management MSc 1 year plus dissertation - 90 ECTS credits FHEQ Level 7 Case study took place in one of the modules at spring semester
Delivery (online, face-to-face or blended)	face-to-face
Cohort and Individual Group size	Large size of about 70 students
What is being assessed, evaluated or reviewed? (e.g. skills, assignments, exams, design, code or prototype, writing)	Students had to work in groups on three group products throughout the module and evaluate the work conducted.
Purpose of peer process	To work on three group products. The first group product was an event feasibility plan, whereby students had to conduct research and gather evidence regarding whether their proposed event was financially and organizationally feasible to implement. The second group product was the actual planning, organising, and running of a profitable event. The third and final group product was a (reflective) written report about the planning, organising, and running of the event.

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Digital Tools used in Peer Process	N/A
Analogue Tools	Questionnaires

Relevant Learning Outcomes related to Peer Process	
Domain Skills	Programme and event management
Critical Thinking, Problem Solving	Identification Research
Metacognitive Skills	Planning for a task. Gathering and organising materials Evaluating task success
Reflection, Self Regulation	Reflective process for improvement of product design
Judgement	N/A
Social Skills	Collaborative work Public presentation of project
Cultural and Intercultural Skills	Ability to work in culturally diverse groups

Design of Peer Process	
Group formation	They were assigned at the beginning of the module either by self-selection or random
Number of Iterations	2
Who defines criteria?	Criteria was formed by research team and teachers
Qualitative Criteria	N/A

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Quantitative Criteria	Questionnaire
Trust & Anonymity	Data was anonymized but groups were identifiable
Distribution of Submissions	One peer review was assigned to the groups, one at a time for each of the three groups' outputs. It was evaluated anonymously

Evidence of effectiveness	
Effects found (if studied please provide references below)	When students have to work together in teams for a substantial period on original and complex group products, students seem to be able to develop sufficient coping strategies to overcome initial cultural differences and develop a strong team identity.
Limitations	No measurement indicating the role of the teacher in daily teaching activities to encourage cross-cultural learning beyond the instructional design intervention

Recommendations and Conclusions

The results indicate that students in the self-selected condition primarily selected their friends from a similar cultural background. The learning networks after 14 weeks were primarily predicted by the group allocation and initial friendships. However, students in the random condition developed equally strong internal group relations but more “knowledge spillovers” outside their group, indicating that the random condition led to positive effects beyond the group.

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6. Reviewing Peer Assessment at the "Exploring Languages and Cultures" Module

Introduction

This case study evaluates the impact of a quasi-experimental peer assessment activity on Tutor Marked Assignments (TMA) scores with propensity score matching. Matching reduced the imbalance of student characteristics between students who voluntarily participated in the peer assessment activity and students who did not participate. The comparison of the peer assessment group with the group of matched students shows significant differences regarding TMA scores. The main focus of this study is about the statistical comparison of students that participated in the peer assessment activity.

Details of the Case

Metadata Case	
Applications Domain	OU - Arts & Humanities qualifications OU - Languages qualifications OU - Open qualifications
Place in Curriculum (Bachelor, Master, etc.)	Bachelor
University, Location	Open University
Course Format (which year in degree, # ECTS, length of course, type of course)	Exploring languages and cultures Year 1 introductory module 30 credits
Delivery (online, face-to-face or blended)	Online
Cohort and Individual Group size	Very large size of about 850 students
What is being assessed, evaluated or reviewed? (e.g. skills, assignments, exams, design, code or prototype, writing)	Writing and use of the language skills

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Purpose of peer process	Grading “Tutor marked assignments”, usually graded by a tutor
Digital Tools used in Peer Process	OU Moodle VLE platform
Analogue Tools	Word processors

Relevant Learning Outcomes related to Peer Process	
Domain Skills	Key concepts relating to languages, language learning, plurilingualism and intercultural communication
Critical Thinking, Problem Solving	Identifying biases Determining relevance Curiosity
Metacognitive Skills	Monitoring mistakes Evaluating task success
Reflection, Self Regulation	Comparing with their own work
Judgement	Using a rubric
Social Skills	N/A
Cultural and Intercultural Skills	Learn about different cultures and plurilingualism

Design of Peer Process	
Group formation	Students involved in the 2017 presentation of the module
Number of Iterations	1
Who defines criteria?	Rubric and evaluation process is defined by the lecturing team. Students are clustered in groups of 20 students based on their residence

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	The peer assessment activity is voluntary
Qualitative Criteria	N/A
Quantitative Criteria	Marking scheme or rubric
Trust & Anonymity	Double blinded approach
Distribution of Submissions	Two peer review TMAs (assignments) were assigned to each student individually. They were evaluated anonymously. The marking was discussed in the VLE (via a forum)

Evidence of effectiveness	
Effects found (if studied please provide references below)	Students who participated in the peer assessment activity had higher scores. The same approach has been repeated for several other activities and the results aid the validity of the main result.
Limitations	Validity of the results are based on one module and one presentation

Recommendations and Conclusions

This study is an in-depth analysis of the L161 17J peer assessment [1] activity. The main aim of the analysis is to evaluate whether students who submit the peer assessment activity perform better on TMA04 than students who did not submit this activity (the peer assessment activity is a voluntary activity). The analysis showed that both student groups differed regarding their student characteristics, which indicates that students participating in the peer assessment activity are different from the rest of the students. This made it difficult to conclude with certainty that the intervention made the difference as the results may have been influenced by the student characteristics. The analysis uses a statistical method to match those student characteristics. Balancing both groups regarding their student characteristics aided a fairer comparison of both groups.

Contact

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7. Collaborative Designing of Teaching Scenarios – Peer Feedback in HEI Teacher Trainings

Introduction

The case study is part of the eLearning certificate of Goethe University. It is a qualification program in which HEI Teachers learn how to design, plan and implement virtual or hybrid courses (e.g. seminars, lectures). The program is completely virtualized and is based on the FC concept. The individual modules offer an alternation of asynchronous self-learning phases (with videos, texts and interactive assignments), collaborative group work on the LMS and synchronous webinar sessions for discussion and reflection of the content.

In the final module for obtaining the certificate, university teachers create their own teaching concept for a hybrid or virtual course, while working in small virtual groups. In a first step, they develop an idea outline that is discussed in the group via webinar. Then the design process begins when the teachers create a draft concept and give each other written peer feedback within their group via the learning platform based on previously defined criteria. In addition, they receive feedback from the trainers, where the same review criteria is used. In a webinar, the notes from the peer feedback are discussed again. Afterwards, the trainers create the final concepts.

Details of the Case

Metadata Case	
Applications Domain	Academic Development Higher education didactics, media didactics
Place in Curriculum (Bachelor, Master, etc.)	Qualification Programme for HEI Teachers
University, Location	Goethe University, Frankfurt, Germany
Course Format (which year in degree, # ECTS, length of course, type of course)	1 semester (individually different due to modularized structure) Length of the final module (incl. peer feedback) is 3 months
Delivery (online, face-to-face or blended)	Online

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Cohort and Individual Group size	15-20 members (working groups for peer feedback: 3-4 members)
What is being assessed, evaluated or reviewed? (e.g. skills, assignments, exams, design, code or prototype, writing)	Draft concepts of virtual or hybrid teaching scenarios
Purpose of peer process	1. To enhance digital teaching skills by giving feedback on teaching scenarios by peers 2. To reflect on own teaching design considerations 3. To experience peer feedback from the learner's point of view. 4. To learn how to use peer feedback elements in an online environment by providing peer feedback in an online environment.
Digital Tools used in Peer Process	LMS OLAT: Forum "File Discussion for Peer Feedback Wiki for idea outlines, Zoom for discussion and reflection of Peer Feedback
Analogue Tools	N/A

Relevant Learning Outcomes related to Peer Process	
Domain Skills	Apply didactic principles for design, planning and implementation of virtual or hybrid teaching scenarios
Critical Thinking, Problem Solving	Analyse own and others' teaching situations, design possible solutions for didactic problems in online teaching
Metacognitive Skills	Self-assessment of solutions, assessment of solution approaches from feedback from other peers
Reflection, Self Regulation	Evaluation of solutions by other HEI Teachers and group or team work
Judgement	Judgement of a teaching concept based on criteria
Social Skills	- Teamwork in an online environment, - Providing, receiving and discussing feedback - Professional communication skills in an online environment (digital competence dimension: communication and collaboration)

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Cultural and Intercultural Skills	Working in heterogeneous teams (different gender, disciplines, backgrounds and status groups) and teachers from different educational institutions (university, school, adult education)

Design of Peer Process	
Group formation	Participants choose the groups (3-4 members) with the help of a small online game after presenting their concept ideas during the webinar (goal not specified: Groups from similar disciplines as well as groups with similar didactic approaches can be created).
Number of Iterations	1
Who defines criteria?	The trainers
Qualitative Criteria	4 criterias for Peer Feedback: SCENARIO How are synchronous (f2f or webinar) and asynchronous parts related to each other? How does this fit with the intended learning objectives? MOTIVATION As a learner, how would you describe your motivators and motivational inhibitors in this scenario? METHODS & MEDIA How detailed is the use of methods and media described? Alterations or alternatives (in the sense of a change of media and methods)? SUPERVISION / TEACHER ROLE How is the role and the tasks of the teacher described? Does the planned supervision effort seem realistic?
Quantitative Criteria	N/A
Trust & Anonymity	Non-anonymous

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Distribution of Submissions	In the small groups of 3-4 members, the participants each give feedback to all other group members.

Evidence of effectiveness	
Effects found (if studied please provide references below)	Results of the peer feedback process are reflected with participants in the form of a group interview during a webinar. The following points in particular emerge: - The participants take away valuable suggestions for revising and finalising their teaching concept - The participants extend the open form of criterion-based, written peer feedback to a virtual, collaborative working process: the working groups partly met independently on Zoom to discuss the feedback directly and to work together on the teaching concepts.
Limitations	Not studied

Recommendations and Conclusions

The use of peer feedback described in this case study is well suited to improving digital teaching skills and provides a valuable opportunity for reflection on one's own teaching and considerations for instructional design in virtual and hybrid settings. Through the didactic and media design chosen, teachers learn how to use elements of peer feedback in an online environment by conducting peer feedback in an online environment while experiencing the use of peer feedback from the learners' perspective.

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8. Methods of Teaching Informatics 1

Introduction

The course is part of the graduate programme which prepares students to become teachers of informatics in primary and secondary schools. In the course, students attend lectures and do practical work/exercises in schools (real life environment). First, students go to schools and monitor how school teachers conduct their classes. After a round of attendance, students start to give their own classes. During this type of practical exercises, students provide support to each other through peer assessment which is focused on providing constructive and critical feedback to their peers. Students submit their feedback via forum posts which are visible to the whole group. In this manner, students learn from their own classes as well as from classes which were given by other students.

Details of the Case

Metadata Case	
Applications Domain	Informatics in Education
Place in Curriculum (Bachelor, Master, etc.)	Master level
University, Location	Faculty of Organisation and Informatics, University of Zagreb, Varaždin, Croatia
Course Format (which year in degree, # ECTS, length of course, type of course)	Year 1, 6 ECTS, full semester, obligatory for students of the study programme
Delivery (online, face-to-face or blended)	Blended
Cohort and Individual Group size	15, 5
What is being assessed, evaluated or reviewed? (e.g. skills, assignments, exams, design, code or prototype, writing)	• Students have one written exam • Students have one creative project where they need to design a teaching scenario for secondary school teaching

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	• Students need to attend and participate in analysis of practical exercises • Their analysis of the school teacher's teaching is evaluated • Their analysis of peers' teaching is evaluated • One class they give is evaluated from the qualitative perspective
Purpose of peer process	Peer assessment is used because of three main reasons: • students provide support to each other, thus fostering future professional cooperation • students learn to give and receive constructive criticism and feedback related to their work • students learn how to analyse their work (teaching process)
Digital Tools used in Peer Process	Moodle Forum activity
Analogue Tools	N/A

Relevant Learning Outcomes related to Peer Process	
Domain Skills	Improving personal teaching practice based on self-reflection and peer feedback (assessment)
Critical Thinking, Problem Solving	Problem solving elements related to problematic aspects of teaching process and how could they be improved in the future
Metacognitive Skills	Planning, prioritising, defining goals, acting according to the feedback from peers
Reflection, Self Regulation	Self-reflection, peer evaluation and reflection on possible improvements
Judgement	Supporting their opinion with arguments and practical examples, reasoning why something is perceived as a positive or a negative element in the teaching process
Social Skills	Group discussions, acceptance of different perspectives and opinions of the same (teaching) process

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Cultural and Intercultural Skills	Practical exercises are aligned with national curriculum and respect cultural values and attitudes defined on the national level, but also respect regional differences

Design of Peer Process	
Group formation	Self selection
Number of Iterations	Approximately 16 times per student.
Who defines criteria?	Criteria is predefined by the teacher
Qualitative Criteria	Open form assessment based on previous examples and list of elements which should be monitored during the class
Quantitative Criteria	N/A
Trust & Anonymity	All submissions are signed and open. Students learn to provide valid arguments of their perception of a class. Since they want to perform better, they seek valid and quality feedback from their peers
Distribution of Submissions	Students who attend a class need to provide peer assessment. Planning and coordination is done via Google Spreadsheet which is shared with students (because of the complex and dynamic planning of practical exercises).

Evidence of effectiveness	
Effects found (if studied please provide references below)	With open form feedback students focus on what they see, and not what the form asks them to fill (and which they might not perceive). After several iterations students stop worrying about quantitative elements (number of positive and negative elements or number of points they are about to receive) and focus on qualitative elements, with heavy emphasis on how they can improve their teaching.

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Limitations	It takes time for students to open up and provide quality feedback. Students are initially focused on quantitative elements (especially how many positive and negative elements did they identify in a class). Since there are a lot of elements which students need to monitor, they need practice to connect theoretical knowledge with practical application.

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9. Discrete Mathematics with Graph Theory

Introduction

Discrete Mathematics with Graph Theory (DMGT) is taught on a graduate (master) level of the Information Technology (IT) study. Teachers put special effort into constructive alignment and carefully relate learning outcomes with teaching and assessment methods (Divjak, 2015).

To confirm the achievement of two Learning Objectives (LO), students need to create a solution and assess their solutions (self-assessment) and solutions prepared by other teams (peer assessment). LO: “Effective work in a team on problem posing and solving real problems related to graph theory and discrete mathematics” is worth 30% of the final grade and it is prepared as WBL. Students work in teams and in the first phase explore and pose a problem from the real life context. The problems were related to software development, scheduling of work tasks etc. In the second phase, the posed problems are shuffled and another team is assigned to solve the problem posed in the first phase. Finally, the students that posed the problem peer assess the solution according to the analytic rubrics. Teachers also assess the solutions and the assessments of students and teachers are compared and discussed against the criteria from the rubric.

Details of the Case

Metadata Case	
Applications Domain	IT
Place in Curriculum (Bachelor, Master, etc.)	Master
University, Location	University of Zagreb, Faculty of Organization and Informatics, Varaždin, Croatia

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Course Format (which year in degree, # ECTS, length of course, type of course)	Year 1, 6 ECTS, 60 teaching hours (in 1 semester), project based
Delivery (online, face-to-face or blended)	Blended learning, online during the pandemic
Cohort and Individual Group size	100 – 130 (the whole student group), assessment groups 3 – 4 students
What is being assessed, evaluated or reviewed? (e.g. skills, assignments, exams, design, code or prototype, writing)	Mathematical knowledge and skills (exams), application of mathematics, mathematical modelling and algorithms into code (project)
Purpose of peer process	To confirm the achievement of two LOs, students need to create a solution and assess their solutions (self-assessment) and solutions prepared by other teams (peer assessment)
Digital Tools used in Peer Process	Moodle Workshop, an algorithm for reliability, Wiki for group work
Analogue Tools	N/A

Relevant Learning Outcomes related to Peer Process	
Domain Skills	Apply mathematical knowledge and algorithms to real-world problems
Critical Thinking, Problem Solving	Analyse real-world situations and pose problems Design the solution to a posed problem
Metacognitive Skills	Self-assessment of solutions according to requirements identified in the problem-posing phase
Reflection, Self-Regulation	Peer-assessment of solutions and group or team work
Judgement	Judgement based on criteria (a rubric)

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Social Skills	Team work, giving and receiving feedback, professional communication skills
Cultural and Intercultural Skills	Work in heterogeneous teams (gender, different backgrounds, international students, …)

Design of Peer Process	
Group formation	Students asked to form as heterogeneous groups as possible (students form groups)
Number of Iterations	2 (after problem-posing and after problem-solving)
Who defines criteria?	Given by teachers, but also discussed with students before starting the problem-posing and the problem-solving parts
Qualitative Criteria	Students are asked to provide qualitative feedback in the same format (Moodle Workshop)
Quantitative Criteria	Students assessing according to analytical rubrics
Trust & Anonymity	Non-anonymous
Distribution of Submissions	Automatically by Moodle Workshop

Evidence of effectiveness	
Effects found (if studied please provide references below)	This approach, based on peer-assessment, has proved to be successful in terms of acquisition of LOs, development of metacognitive skills. The use of rubrics was found successful in supporting validity and reliability of assessment. See references below

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Limitations	Students are not used to criteria-based assessment and need to be guided through the process of peer-assessment, but also teachers need to assess students' work as well, in order to ensure fairness

Recommendations and Conclusions

When using peer-assessment, it is important that students are presented with clear instructions and guided through the process. Criteria should be discussed with students before project work, and should be leveled, with each of the levels described. It is important that teachers are also involved in the assessment process, especially if an assessment task is high-stake. Whenever possible, an algorithm should be used to calculate the reliability of peer assessment (Divjak & Maretić, 2015). Grades assigned by students in line with the criteria can be compared to the grades given by teachers or by peers, to ensure reliability, and grades that are not reliable can be excluded from the final grade.

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10. Peer Review and Assessment in an Computer Organization Course

Introduction

The first year of Computer Science and Engineering degree at Delft University of Technology, Delft, The Netherlands has a cohort of 500 students from a diverse international background and is fully taught in English. The course "Computer Organization" taught as part of the degree programme requires each student to work on 7 assignments spread evenly over 10 weeks and submit a report per assignment. Each such assignment is performed in a group of 5 and is an optional component of the course and does not account for final grading a student receives. Grading upto 100 assignment reports every week is an impossible task for a lecturer or a small teaching staff.

Peer review and assessment has been used based on an internally developed digital tool, which handles group formation, random distribution of assignments and deadline management. Students can submit text documents, programming codes and even answer questionnaires in the tool. They get a fixed time duration to provide feedback and are notified when they receive feedback from peers. Since the assignment is based on problem solving, students are exposed to different approaches of problem solving and learn from each other. Besides, the tool is developed on the principles of gamification, where the students earn points when they provide reviews and more points can be earned on providing quality and detailed review.

Details of the Case

Metadata Case	
Applications Domain	Computer Science and Engineering
Place in Curriculum (Bachelor, Master, etc.)	Bachelor
University, Location	Delft University of Technology, Delft, The Netherlands
Course Format (which year in degree, # ECTS, length of course, type of course)	Year 1. The course “Computer Organization”runs for 10 weeks and a student obtains 5 ECTS on successful completion
Delivery (online, face-to-face or blended)	Blended learning and online during the pandemic
Cohort and Individual Group size	500 students in the course and each group has 5 students
What is being assessed, evaluated or reviewed? (e.g. skills, assignments, exams, design, code or prototype, writing)	Reports on assignments containing 5 to 20 questions, which can be solved either using pen and paper or as a programming problem using a computer
Purpose of peer process	To inculcate self-reflection and critical thinking of the course content and motivate the students
Digital Tools used in Peer Process	Peer review and assessment tool developed internally at the University
Analogue Tools	N/A

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Relevant Learning Outcomes related to Peer Process	
Domain Skills	Fundamentals of computer science, assembly programming, computer organisation and internal architecture of the computer
Critical Thinking, Problem Solving	Problem solving, debugging computer code and reading computer code of peers
Metacognitive Skills	N/A
Reflection, Self-Regulation	Peer-assessment of solutions and reflection of own performance
Judgement	Understand the process of peer review and effectively use it as there are checks in place to ensure it is done with understanding
Social Skills	Written communication
Cultural and Intercultural Skills	Work in international teams

Design of Peer Process	
Group formation	Students choose teammates themselves
Number of Iterations	7 (There are 7 assignments and peer review is performed on each assignment)
Who defines criteria?	Defined by the lecturers
Qualitative Criteria	The 7 assignments are optional and are gamified, where students can earn points for providing feedback. This

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	motivates the students to work on the assignments, provide feedback and learn from it
Quantitative Criteria	Reviewing questions can earn students points
Trust & Anonymity	Double blind process
Distribution of Submissions	Randomly distributed. Each student who submits assignment receives 2 peer assignments to review

Evidence of effectiveness	
Effects found (if studied please provide references below)	This approach of peer review and assessment is a great tool to help teachers to grade student submissions when the student participation number is large. Using a gamification process enhances student learning, increases enjoyment in learning and motivates them to work on optional, yet helpful assignments. Students can rely on the feedback as it comes from 2 other students
Limitations	1. The process is used only for optional assignments 2. Teaching Assistants cannot overview all the assignments to ensure all feedback received is based on the rubric

Recommendations and Conclusions

This particular format works as the peer review system is in place for optional assignments only. If the peer process was mandatory more oversight would be needed to ensure all peer review was of sufficient quality and to ensure the transparency of the process. This would require more staff effort in that case and extra care must be taken to avoid any identification of both the submitting and the reviewing students to maintain academic integrity. Because the peer review process is set up as double blind for the students (but not for the staff), there is little risk of inappropriate behaviour such as favouritism or discrimination as students know that comments could be traced back to them. However, due to the large numbers, oversight is not always possible. The inherent risk of the lack of oversight is that some feedback may not be of use to the student receiving the feedback as it is not based on the rubric or may not be constructively worded, but then again dealing with unhelpful feedback is also part of receiving feedback.

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CONCLUSION

As can be seen from the 10 cases presented, there is an enormous variety in how Peer Assessment can be implemented in a digital environment, ranging from dedicated tools to using Discussion Fora in VLEs. It is therefore a simple tool to aid any lecturer with assessment across any domain.

What remains paramount when choosing to implement a form of Peer Assessment in courses, is that lecturers select a type that is fitting for the learning outcomes they are assessing and thea will work in the context of the course, the digital tools available to the lecturer, the digital literacy of and/or availability of digital support to the lecturer and the academic culture within an institution. As with all educational innovations, they can never be transferred one-on-one from one course to the next or from one institution to another. Context matters and must be taken into account when selecting Peer Assessment.

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APPENDIX

A1. TEMPLATE FOR CASE STUDIES PEER ASSESSMENT

Details of the Case

Metadata Case	
Applications Domain	
Place in Curriculum (Bachelor, Master, etc.)	
University, Location	
Course Format (which year in degree, # ECTS, length of course, type of course)	
Delivery (online, face-to-face or blended)	
Cohort and Individual Group size	
What is being assessed, evaluated or reviewed? (e.g. skills, assignments, exams, design, code or prototype, writing)	
Purpose of peer process	
Digital Tools used in Peer Process	
Analogue Tools	

Relevant Learning Outcomes related to Peer Process	
Domain Skills	

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Critical Thinking, Problem Solving	
Metacognitive Skills	
Reflection, Self-Regulation	
Judgement	
Social Skills	
Cultural and Intercultural Skills	

Design of Peer Process	
Group formation	
Number of Iterations	
Who defines criteria?	
Qualitative Criteria	
Quantitative Criteria	
Trust & Anonymity	
Distribution of Submissions	

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Evidence of effectiveness	
Effects found (if studied please provide references below)	
Limitations	

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