Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Department of Management, Technology and Economics
Teaching Innovations Lab

didactica course FS2018

Designing Peer Assessment Exercises

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Monday, 5 March, 13:00-17:00

Peer assessment is a didactic method in which instructors design a structured feedback loop between learners to improve a learner's submitted assignment. The method can support socio-constructivist and connectivist learning processes, online or face-to-face, at all educational levels, in both formal and informal contexts. The idea behind the method is that sharing views and opinions with others by discussing with peers and receiving and providing formative feedback enriches the quality of learning. When linked to developing critical thinking skills, peer assessment can train students in practicing awareness in their reasoning as writers and as reviewers. As a form of asynchronous collaboration, the method lets students learn through discussion, through collaboration, and through production. In this course, you will critically assess the learning benefits of peer assessments and design a peer assessment exercise for your own teaching activities.

Key Themes

- Definitions of peer assessment (peer review, peer feedback)
- How to design and review a peer assessment exercise in a course design
- The importance of communication the learning benefits of peer assessment
- Characteristics of student collaboration in peer assessments

Learning Objectives

After attending the course participants will be able to...

- ... design a peer assessment exercise for their own courses.
- ... assess the learning benefits of different peer assessment exercises

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What is peer assessment?

In the classroom, peer assessment is a didactic method in which instructors design a structured feedback loop between learners to improve a learner's submitted assignment. Reinholz writes, "peer assessment is defined as a set of activities through which individuals make judgements about the work of others" (2016: 301). It is important that in double-blind reviews, learners are ignorant of the status and reputation of their reviewers. In a class-setting, they usually are of equal status.

Some scholars differentiate between **peer feedback** as a "communication process through which learners enter into dialogues related to performance and standards" and relates to "rich detailed comments but without formal grades", whereas **peer assessment** pertains to "students grading the work or performance of their peers using relevant criteria (Falchikov 2001)" and specifically "denotes grading (irrespective of whether comments are also included)" (Liu and Carless 2006: 280).

The term peer assessment is here used synonymous with peer review and peer grading. Peer review is a didactic method that supports socio-constructivist and connectivist learning processes, online or face-to-face, at all educational levels, in both formal and informal contexts. The idea behind the method is that sharing views and opinions with others by discussing with peers and receiving and providing formative feedback enriches the quality of learning (Pozzi et al 2016).

The general assumption is that peer assessment can sustain active and collaborative learning. It can, at the same time, combine "summative assessment (i.e. peers evaluate an individual's work in order to assign a grade) and formative assessment (i.e. peers provide constructive feedback that could help an individual improve his or her work)" (Patchan et al 2017: 1). One of the big promises of peer assessment, that many authors point out, is that "multi-peer assessment can provide more total feedback than a single over-taxed instructor (Cho, Schunn, and Charney 2006; Patchan, Charney, and Schunn 2009; Patchan, Schunn, and Clark 2011)." (Patchan et al 2017: 1-2).

After several decades of (somewhat unsystematic) research[1] on the topic, several studies have found that "students can provide feedback that is just as helpful as an instructor's feedback in helping their peers improve their drafts (Topping 2005), and sometimes they can provide feedback that is more helpful (Cho and MacArthur 2011; Cho and Schunn 2007; Hartberg et al. 2008)."

Diana Laurillard (2012: 190) summarises peer assessment and peer feedback as an aspect of learning through collaboration. To better understand her approach to the didactic design and its effects on teaching and learning, it is helpful to let her summarize the aim of her Conversational Framework:

> *"The aim of the Conversational Framework is to represent, as simply as possible, the different kinds of roles played by teachers and learners in terms of the requirements derived from conceptual learning, experiential learning, social constructivism, constructionism, and collaborative learning, and the corresponding principles for designing teaching and learning activities in the instructional design literature. This is the simplest possible static visual representation that can capture the complexity of the collective ideas in the literature on what it takes to learn, and therefore what it takes to teach." (Laurillard 2012: 93).*

In the Conversational Framework that establishes the triadic figuration of teacher-learner-peers, she combines the peer communication and modeling cycles as follows:

> *"The importance of peer feedback also emerges in a more recent study that shows very clearly how the use of peer review can act as a valuable form of collaboration. Each student has to produce an output (in this case draft pages of an assignment), which is shared with two others for them to comment. The act of creating an output in order to share it plays a role in motivating the student's practice, but being encouraged to engage in peer review of each other's work establishes an iterative cycle of:*
>
> - *seeing an alternative solution in the output of a peer;*
> - *generating feedback for their peer;*
> - *using the feedback from others to modulate their concept; and*
> - *generating a new output as a result, which enables modulation of their practice."*

[1] The NSF-funded research project PeerLogic conducts a systematic study of peer reviews and peer assessments (www.peer **Student Experiences from a Course with Peer Assessment Exercises**
logic.org) and provides services for educational peer-review (peer-assessment) systems (cf. Pramudianto et al 2016).

Peer assessment is a complex form of learning and usually touches upon multiple ways of learning within the conversational framework. The conversational framework is both a learning theory and a practical framework for designing educational environments. It outlines 6 different types of learning:

1. ‘learning through acquisition’, where the teacher is communicating concepts and ideas;
2. ‘learning through inquiry (investigation)’, where the learner explores or interrogates the teachers’ concepts;
3. ‘learning through practice’, where the learner puts their concepts into practice to achieve a task goal, and then responds to feedback;
4. ‘learning through discussion’, where the social construction of ideas helps them develop their concepts;
5. ‘learning through collaboration’, where discussing and sharing practice helps them develop both concepts and practice with each other;
6. and ‘learning through production’, where they reflect on and represent what they have learned to communicate it to the teacher.

It connects teacher (left), learner (middle) and peers (right).

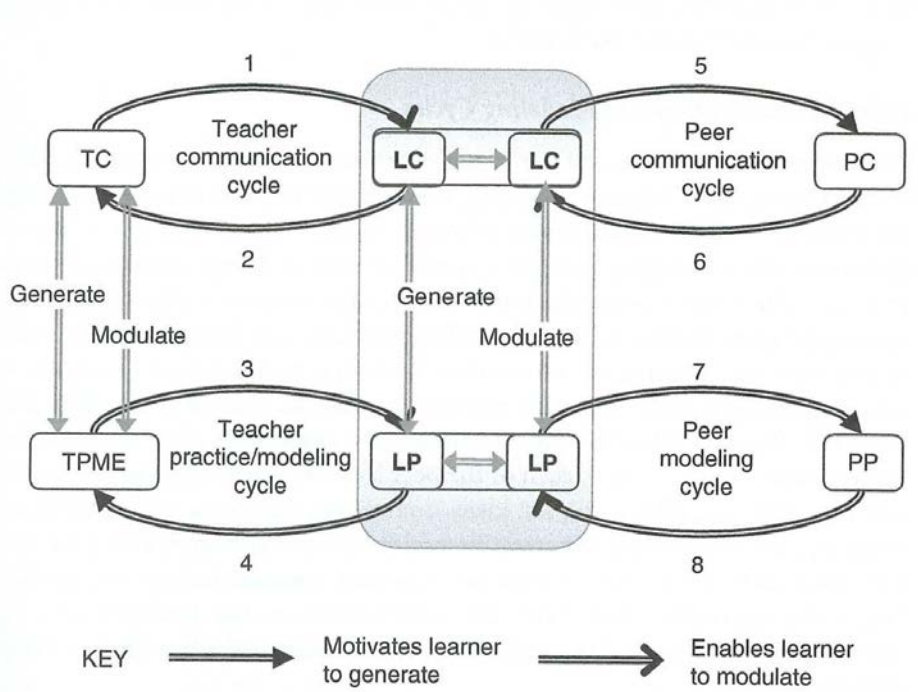


Figure 1: The learner learning through interaction with peers' concepts and practice (PC, PP), exchanging concepts and the outputs of their practice (numbered components are defined later in the text). (Laurillard 2012: 90).

Peer assessment touches upon all aspects of the conversational framework. However, peer assessment has a distinct double-focus on the peer modeling cycle and the peer communication cycle. Peer assessment is a form of “asynchronous collaboration” through which students train specific communicative skills in different roles that will help them to grow collectively.
The feedback from peers can be “confirmatory, suggestive, or corrective” and it “can reduce errors and have positive effects on learning” (Topping 2009: 22). Its learning design lets students give constructive feedback and receive (and acknowledge) their peer’s feedback. And if the assignments and the implementation is thoughtfully designed, the gains can spill out to improvements in thinking skills and self-awareness, writing and communication skills, and in saving instructor’s time spent on grading. Based on several studies, one could summarize that if done right, the reliability and validity of peer assessment is as high and sometimes even higher than instructor-based assessments (Topping 2009: 24, 26).

When linked to developing critical thinking skills, peer assessment can train students in practicing epistemic vigilance in reasoning. As a form of asynchronous collaboration, peer assessment focuses on several ways of learning, primarily learning through discussion, learning through collaboration, and learning through production (Laurillard).

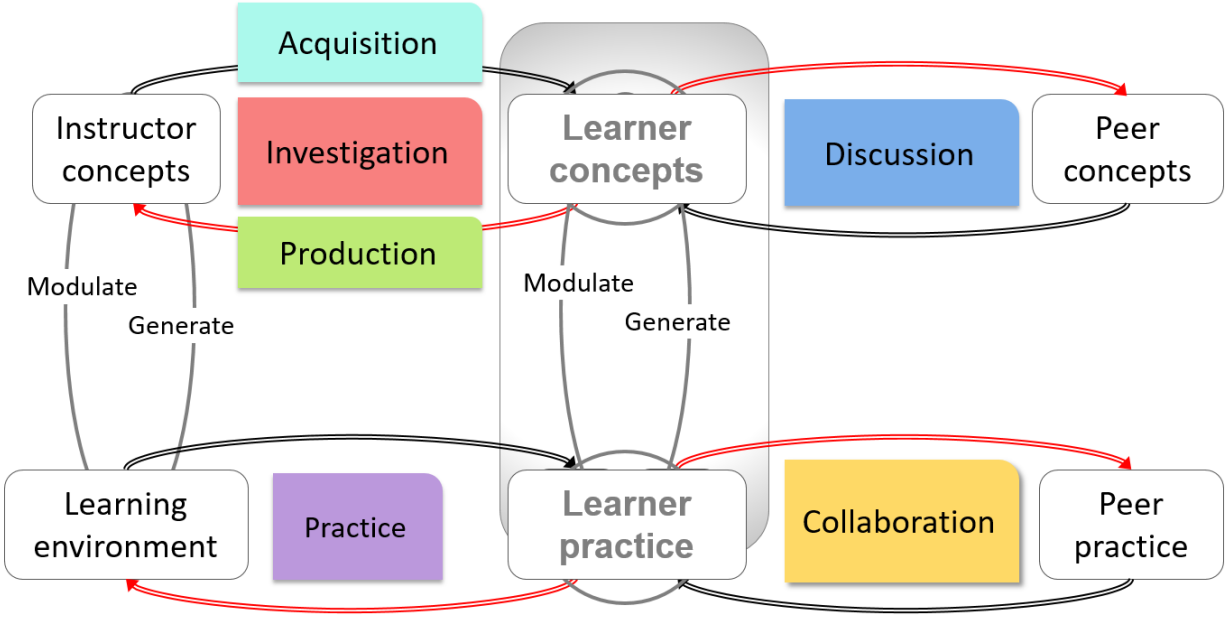


Figure 2: The 6 learner types in the conversational framework (based on Laurillard 2012: 90).

The didactics allows (to a certain degree) that instructors can remain in a coaching role and do not become judges, while students are elevated (and made responsible and held accountable) to co-teach through giving constructive feedback.

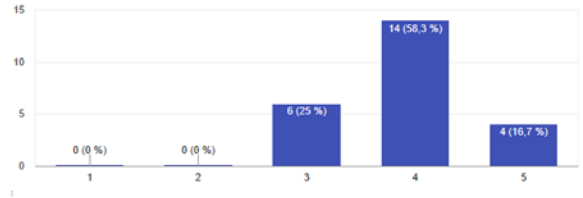
Student Experiences from a Course with Peer Assessment Exercises

- I think it's highly valuable for this class as well as for other classes at ETH
- It is a very time costly exercise, since I wanted to give a constructive feedback to everyone. Maybe next could be less peer reviews, or just for one 6SA, so that there's more will to write a good peer review.
- I think this is a great tool to work with, you get feedback to your work from peers and you see how other people write it and have to think about what was good or not so good. Very good idea, from my point of view!
- As a MAS student, I found in most of the cases the feedback not clear/useful. I understand that younger students are still developing these skills. However, I would suggest to add one "top - peer review" from a teaching assistant to improve the quality of the feedback and learning.
- The feedback I received seemed to be very inconsistent and I note that I did respond quite emotionally to feedback that I perceived to be unfair; this was a lesson in itself.
- Receiving honest feedback is never easy, especially when other people's effort in giving feedback does not match your own. Writing reviews on other students' 6SAs was very useful. However, it would be good to try and increase the quality of reviews received. I am not sure what feedback loop would somehow manage/incentivize all students to put effort when grading others.
- The peer assessment method works really well mostly because we tend to overlook flaws in our own argumentation

Survey Results from a Course with Peer Assessment Exercises at D-MTEC

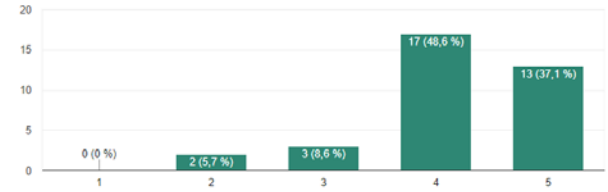
1. Seeing several examples of my peers' work was valuable for my own learning.

24 Antworten



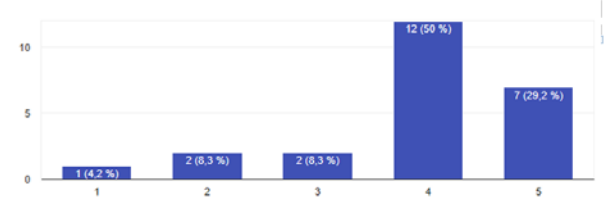
Seeing several 6SA examples of my peers' work was valuable for my own learning.

35 Antworten



2. Applying the assessment criteria to several examples of my peers' work allowed me to better understand the assessment criteria.

24 Antworten



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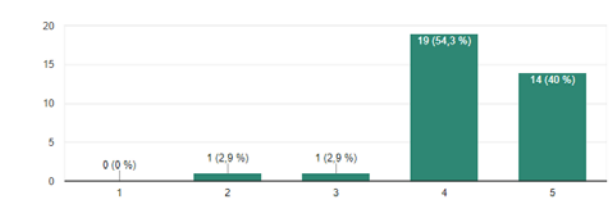
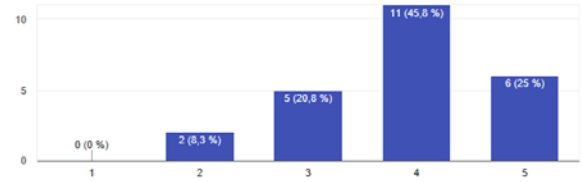


3. After providing feedback to my peers on their assignments/projects/presentations, I am capable of producing better work myself in the future.

24 Antworten



After providing feedback to my peers on their 6SA, I am capable of producing better work myself in the future.

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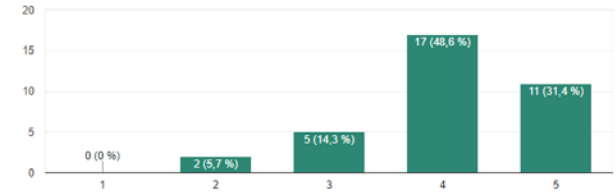
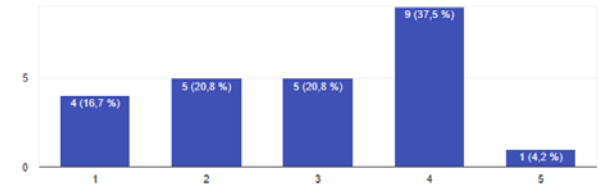


4. The value/usefulness of the feedback that I received matches my investment in providing feedback to my peers.

24 Antworten



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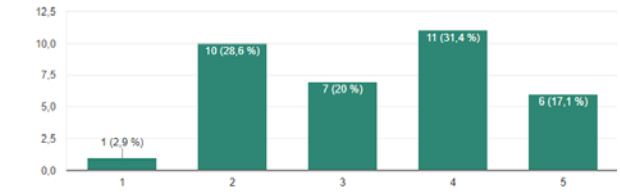


Lessons Learned

- Train students to give feedback and write reviews as "disagreeable givers"
- Address false beliefs that only the instructor has the "authority" to give quality feedback
- Cultivate a peer review culture amongst students
- Support students to emancipate from student role to collaborator/co-coaching role
- Deeper-learning through extended feedback circles (more than assignment + feedback); now: assignment, +reading other assignment and giving feedback + receiving more feedback + giving assessment of quality of feedback

I personally learned most in this phase:

35 Antworten

Lehmann, K.; Söllner, M. & Leimeister, J. M. (2016): Design and Evaluation of an IT-based Peer Assessment to Increase Learner Performance in Large-Scale Lectures. In: International Conference on Information Systems (ICIS), Dublin, Ireland.

Learning Benefits of Peer Assessment (Lehmann et. al 2016)

- Logistically: Lecturers save valuable time if learners give each other feedback and evaluate each other's academic performance (Sadler and Good 2006).
- Pedagogically: The evaluation of responses regarding correctness gives the learner a deeper understanding of the learning contents (Chang et al. 2011). By reading works of others, one can deepen one's own knowledge and develop new ideas and inspiration by evaluating other points of view (Chen 2010; Hovardas et al. 2014; Sadler and Good 2006).
- Metacognitive: Learners will develop awareness for their own strengths and weaknesses (Tahir 2012) and will be able to compare and evaluate their own performance with their peers, at least to a certain extent (Darling-Hammond et al. 1995). Doing so, learners learn to avoid shortcomings (Chang et al. 2012). In addition, learners train their ability to think critically, as well as their evaluation and reflection skills (Jaillet 2009; Leijen et al. 2009; Topping 2005).
- Affectively: Learners perceive qualitative feedback from their peer group as more valuable than a lecturer's grade (Sadler and Good 2006).
- It enhances your students' active engagement with their studies.
- It increases the amount of feedback your students receive, and they get it more quickly than if you do it yourself.
- It augments students' disciplinary understanding since peer feedback invariably requires explanation and justification.
- The process of reviewing the work of others helps students understand what is considered good work and why, thereby increasing their ability to achieve.
- Boud et al 2006: (1) the development of learning outcomes related to collaboration, teamwork, and becoming a member of a learning community; (2) critical enquiry and reflection; (3) communication skills; and (4) learning to learn.

Risks related to peer assessment (Lehmann et al 2016: 4)

- Jaillet et al. (2009) alert the assessment doing by the peers can pose validity and reliability problems which calls for further investigation.
- Some studies emphasize learners' anxieties about the fairness and consistency of peer assessment (Cheng and Warren 1997; Rushton 1993).
- Some authors' investigation indicate that learners with poorer performances might not accept peer feedback as proper (Topping 2005) and might be unwilling to assume any responsibility for assessing their peers, especially in a non-anonymous setting (Falchikov 1995).
- Moreover, learners could feel overstrained as well as frustrated when facing a complex assessment form, e.g., extensive qualitative feedback (Hovardas et al. 2014).
- When learners receive poor quality feedback from their peers, it could frustrate them in their learning (Mintzes et al. 2005).

Keith J. Topping (2009) Peer Assessment, Theory Into Practice, 48:1, 20-27, DOI: 10.1080/00405840802577569; pages 25-26

How to Organize Peer Assessment

Providing effective feedback is a cognitively complex task requiring understanding of the goals of the task and the criteria for success, and the ability to make judgments about the relationship of the product or performance to these goals. Good organization is perhaps the most important quality of implementation integrity, leading to consistent and productive outcomes. Important planning issues evident in the literature (Topping, 2003; Webb & Farivar, 1994) are outlined below.

1. Seek to work with colleagues rather than developing the initiative alone.

2. Clarify purpose, rationale, expectations, and acceptability with all stakeholders. Are you aiming for cognitive, attitudinal, social, or emotional gains? Specify the nature of the products of learning to be assessed. Broach the idea with the students very early and, over time, seek their advice on and approval of the scheme.

3. Involve participants in developing and clarifying assessment criteria. Students need to be involved in developing the criteria for assessment in order to feel a sense of ownership and decrease any anxiety, even if they come up with something similar to what the teacher would have given them anyway. Small group discussion of teacher-proposed draft criteria should lead to a modest amount of suggested change.

4. Match participants and arrange contact. Generally aim for same-ability peer matching. If the peer partners are from the same class, roughly list them in order of ability in the subject of assessment, and pair the first two, the second two, and so on down the list (or the first three or four for peer response groups). Pairs or groups of students at the bottom of the list may be operating at the lowest level, but with some teacher support they may gain more than expected, as they will be involved in the same processes but at a simpler level.

5. Provide training, examples, and practice. Quality training will make a great deal of difference. Talk to students about what is expected of them, including the roles and behaviors expected of assessor and assessee. Then show them how to do it, perhaps by using a role play between two adults. Have the students practice peer assessment on a very short task selected for the purpose. While they practice, circulate to monitor their performance. Give feedback and coaching where needed.

6. Provide guidelines, checklists, or other tangible scaffolding. Some kind of written and/ab or pictorial reminders or clues to the process to be followed will help, e.g., a simple sheet with not more than eight reminders of what to do and how to do it.

7. Specify activities and timescale. Make clear what needs to be done, within what time-scale, and what records (if any) need to be kept. What of those who finish early—should extra peer assessment work be available or can they switch to some other kind of work? What of those who finish late—how can they be given timescales and reminders to keep them up to speed?

8. Monitor and coach. Whenever students are involved in peer assessment, keep a low profile and circulate among them, giving feedback and coaching as necessary.

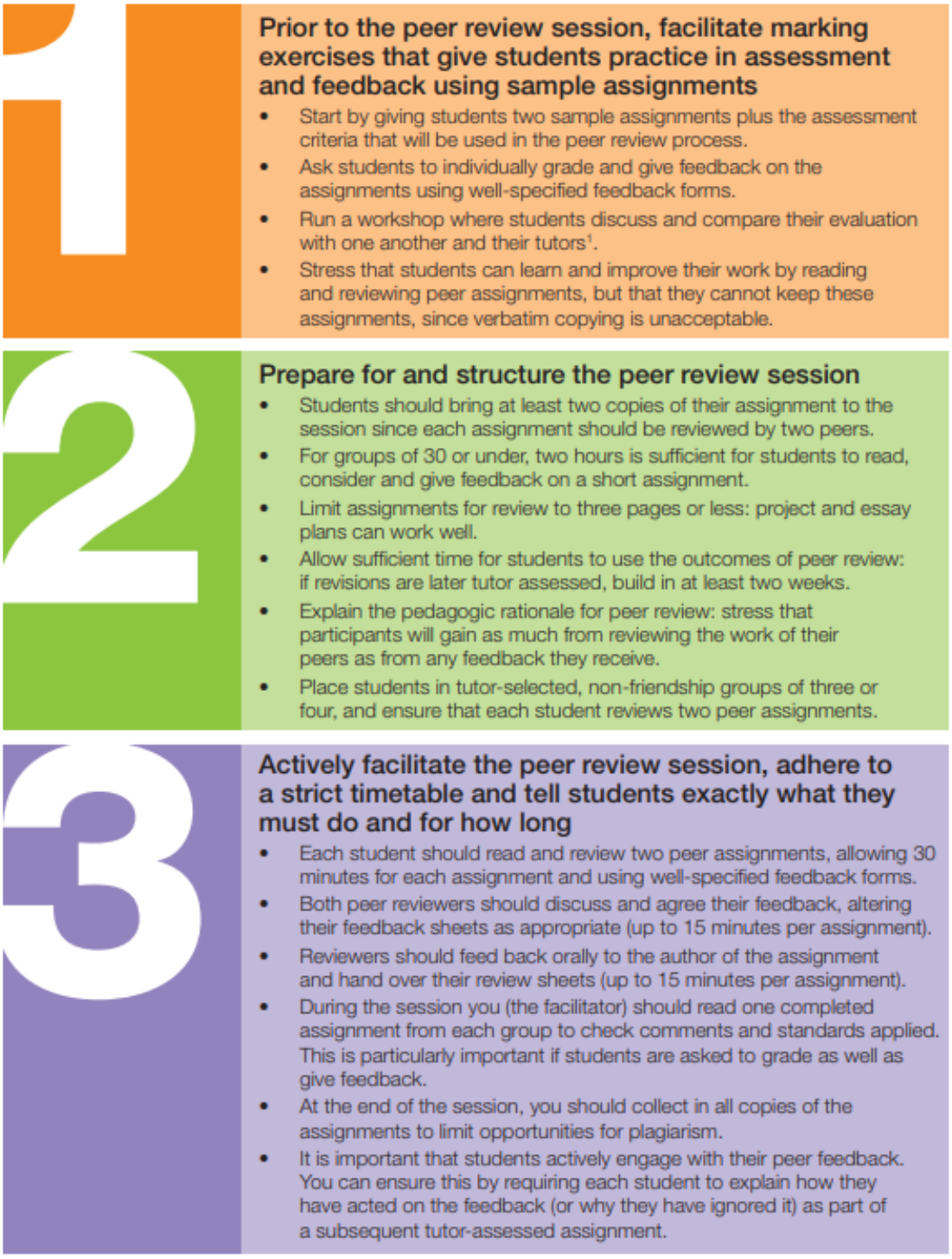
9. Examine the quality of peer feedback. Particularly in the early days, check at least a portion of the peer assessments against your own assessments of the work. Choose a high, middle, and low ability student for this. Do not be surprised if the feedback is different from your own. The more feedback there is, the more chance it will be diverse. If it is very different, discuss this with the partners involved.

10. Moderate reliability and validity of feedback. Over time, keep consistent checks on the match between peer assessments (if more than one peer assesses the same piece of work), and on the relationship between peer and teacher assessments. Do not assume the teacher's are any more reliable than the peers! You might want to match yours against the average of several peer assessments.

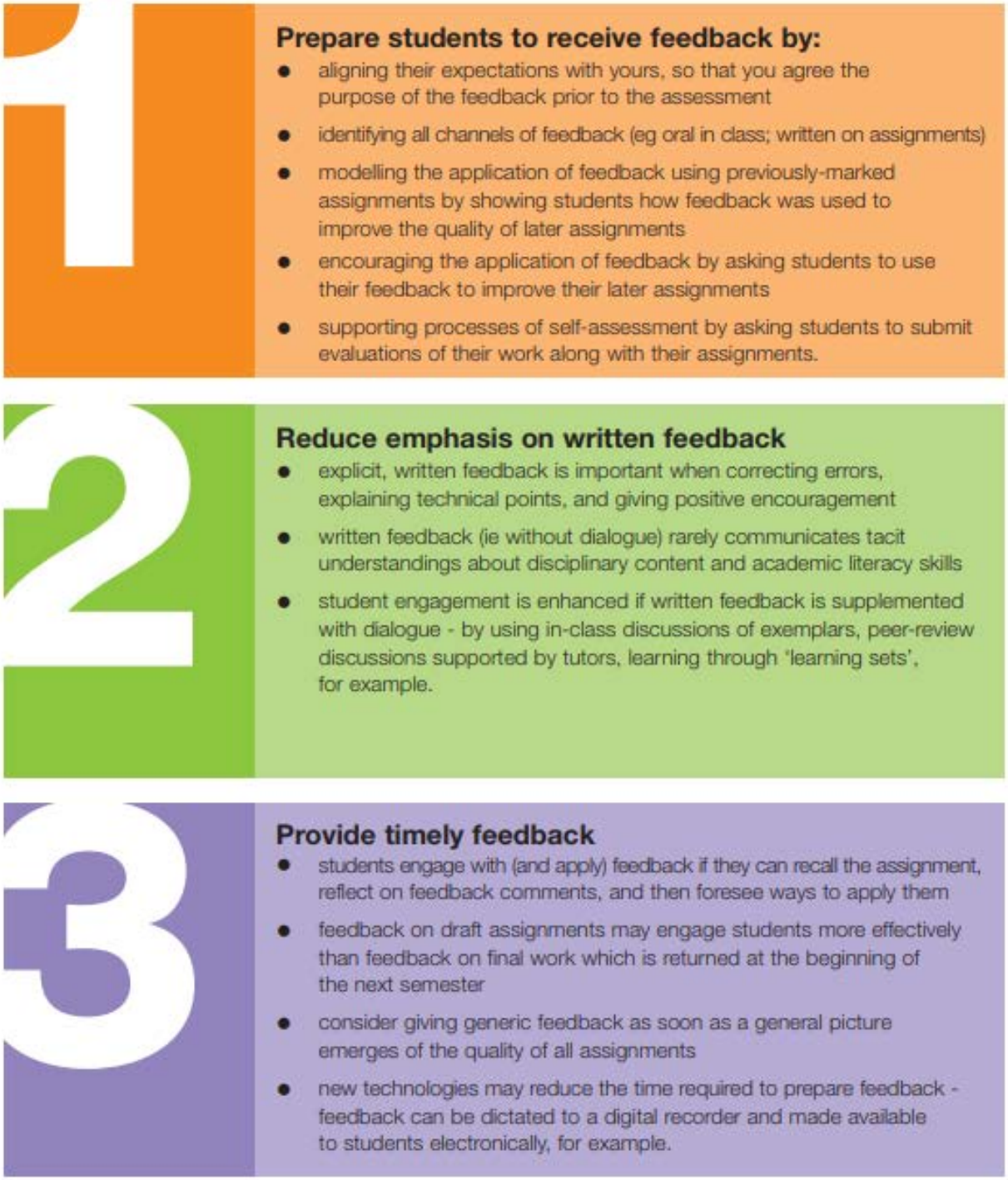
11. Evaluate and give feedback. Give the students information about your observations of their performance as peer assessors and your check on the reliability of their assessments. Unless they have this information, their ability to provide useful feedback will not change for the better.

Two Guidelines from
ASKe (Assessment Standards Knowledge exchange) is a Centre for Excellence in Teaching and Learning (CETL) based in the Business School at Oxford Brookes University

Making peer feedback work in three easy steps!
https://www.brookes.ac.uk/WorkArea/DownloadAsset.aspx?id=2147552652



How to make your feedback work in three easy steps!
https://radar.brookes.ac.uk/radar/file/b07e70a4-89bc-6c32-554e-33dd6862df41/2/MakeFeedbackWork.pdf



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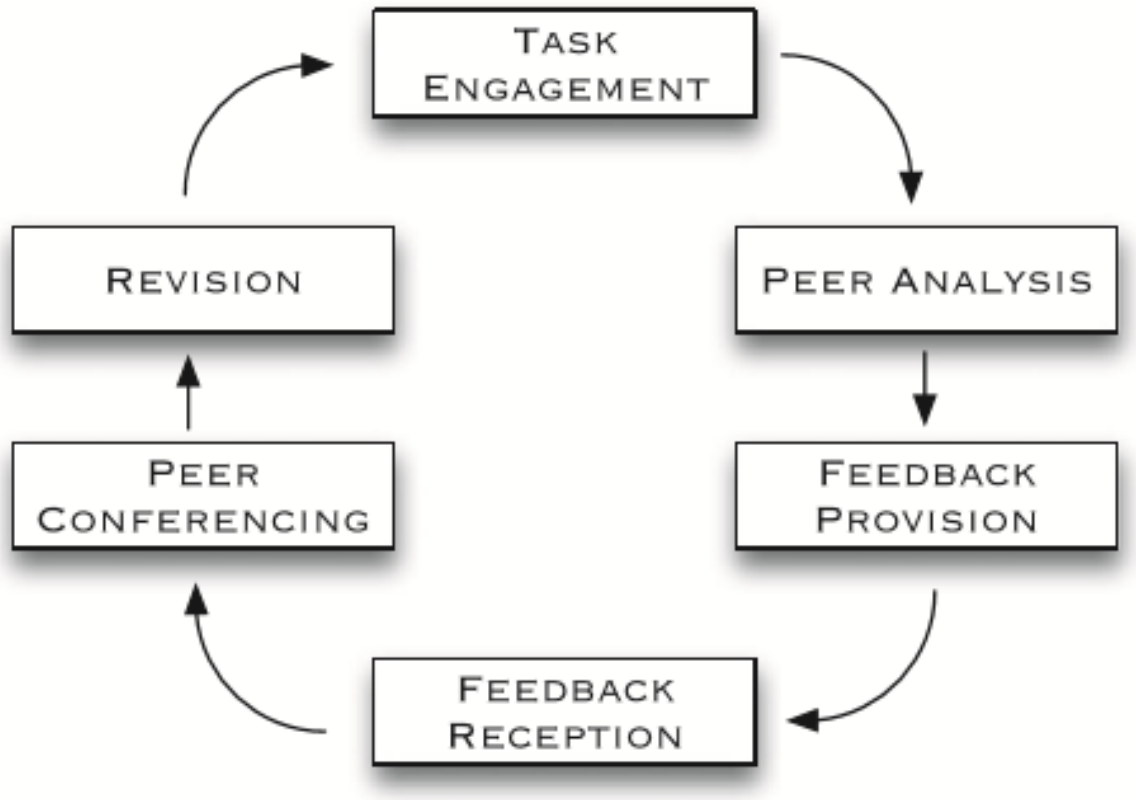

Table 1. Key aspects of peer assessment.

Component	Examples of how it supports self-assessment
Task engagement	*Performance awareness*: students explain their ideas *Gap closure*: revisions during engagement/problem solving
Peer analysis	*Goal awareness*: experience analysing a variety of examples
Feedback provision	*Performance awareness:* explaining ideas and receiving feedback on explanations *Gap closure*: developing constructive feedback to improve work, not just critique it
Feedback reception	*Performance awareness*: students are able to view their own work from another's perspective
Peer conferencing	Opportunities to discuss analyses and feedback can increase the impact of peer analysis, feedback provision and feedback reception
Revision	*Gap closure*: students use analyses and feedback to improve their work

Figure 2 The assessment cycle (in Reinholz 2016: 305) and key aspects of peer assessment (in Reinholz 2016: 308).

Lehmann, K.; Söllner, M. & Leimeister, J. M. (2016): Design and Evaluation of an IT-based Peer Assessment to Increase Learner Performance in Large-Scale Lectures. In: International Conference on Information Systems (ICIS), Dublin, Ireland.

Benefits of using a software solution for peer assessments (Lehmann et al 2016: 5-6)

Table 1. IT Potentials in Peer Assessment. Own Source Based on Davenport (1993).

IT Capability (Davenport 1993)	Description	Transfer on Peer Assessment
Automation	IT allows replacing or reducing human labor.	Automatic distribution of learner assignments and peers' assessments which saves time and costs (Babik and Ford 2014) and allows for anonymity (Quinn et al. 2009).
Informational	IT provides additional information.	The system provides e.g., the assessment form with feedback criteria and updates (e.g., for incoming deadlines) (Honeychurch et al. 2013).
Sequential	IT enables changes in processing steps.	It is possible to extend deadlines (e.g., for learners' submission) or to set more feedback loops (Babik and Ford 2014).
Tracking	IT enables detailed tracking of processing steps.	The lecturer may monitor submissions and remind learners of missing submissions. Moreover, they can control assignment or feedback quality and take countermeasures if necessary (Honeychurch et al. 2013).
Analytical	IT allows complex analytical methods for additional findings.	Diverse data evaluation is possible, e.g., comparison to best practice after peer assessment (Quinn et al. 2009) as well as effects on objective learning outcome (Jaillet 2009).
Geographical	IT enables information transfer regardless of geography.	Learners can participate in peer assessment regardless of time and space. Use of peer assessment in e-learning scenarios, e.g., MOOCs (massive open online courses) is possible as well (Kulkarni et al. 2013).
Integrative	IT mergers processes or tasks.	Using IT in peer assessment enables document management for sharing, storage as well as upload-/downloading (Brutus and Donia 2010). Moreover, providing feedback on peers' assignments can be done directly in the system without the need for uploading documents (Anson and Goodman 2014).
Intellectual	IT gathers and provides information.	Creating a knowledge base with frequently asked questions or a forum to discuss the assessment form (Sitthiworachart and Joy 2004).
Disintermediating	Intermediaries are not useful any longer.	IT simplifies the peer assessment process regarding document sharing and handling of the information flow where it reduces complexity (Brutus and Donia 2010). Printed versions of the peer assignments or assessments are not necessary any longer.

Feature Comparison Moodle-PeerGrade
The comparison of both digital peer assessment tools is based on the experiences made in the courses at MTEC that either use the moodle workshop activity or have participated in the peergrade pilot.

Technical Feature Overview

Item	Moodle	Peergrade
Create assessment rubrics	✓	✓
Copy assessment rubrics across courses and assignments		✓
Group Submissions		✓
See students' time investments reviewing		✓
Automatic e-mail-reminders to students		✓
Example Submission (prior to review so that student can train applying the grading criteria)	✓	✖
Grading Strategy Accumulative grading – Comments and a grade are given regarding specified aspects Comments – Comments are given regarding specified aspects but no grade can be given Number of errors – Comments and a yes/no assessment are given regarding specified assertions Rubric – A level assessment is given regarding specified criteria	✓	✓
Different Algorithms to Calculate Grades	✓	✓
Allowing late submissions	✓	✓
Automatic integration of late submissions		✓
Submissions with text and file attachements	✓	✓
Allowing self-assessments (after peer reviewing)	✓	✓
Allowing instruction assessment	✓	✓ As additional review
Overall Feedback to assignment	✓	✓
Instructor's Conclusion to Assessment Cycle	✓	Via mail
Automatic Switching to next Assessment Phase	✓	✓
Live Sessions (in-class assessments via online tool)	(with plugin)	✓
Restricted access to groups within course	✓	**(✓)**
Categorized Assignments (e.g. language groups etc.)		✓
Link with moodle "competencies"	✓	
Grade for Submission	✓	✓
Grade for Assessment	✓	✓
Combination to Feedback Score	✓	✓
React to received feedback from peers		✓
Moderate "Flags" raised by students about feedback		✓
Export Data Analytics	(workarounds)	✓
Export Student Hand-ins and Reviews	(workarounds)	✓

References

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- Is peer feedback the most effective way to teach? https://medium.com/peergrade-io/is-peer-feedback-the-most-effective-way-to-teach-36233c679d01
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Appendix: How to write feedback (for students)

Model Sentence Starters:

Positive Feedback Sentence Starters

This is quality work because...
Your thinking shows...
Two things you really did well are...
When explaining you...
Thank you for…
Your thinking shows...
I like the way you ….
You chose great words here ….
You have no problem at all with …
You made a strong argument here…

Constructive/Critical Feedback Sentence Starters

I appreciate _____, the next step might be ...
I noticed _____, but I wish....
Your writing tells me...
One thing to improve on...
Your need more...
You need less...
Your next steps might be...
You might try…
One point that was not clear to me was...
The argument would be stronger if …
Another way to do it would be …
What if you said it like this …

Alternative Strategies to TRY

TAG!

T: Tell something you liked. (ex: I could connect with…)
A: Ask the writer a question. (ex: Did you consider…?)
G: Give the writer a positive suggestion. (ex: You might want to change…)

QUACK BACK

Q: Question (One question I have is…)
U: Understand (Help me understand…)
A: Agree/Disagree (I agree/disagree because…)
C: Compliment (I think you…)
K: Know More (I would like to know more about…)

Growth Mindset Sentence Stems

Rather than praising students for “being smart” or completing a task quickly, appreciate effort and persistence. The sentence stems below encourage students to take on new challenges, rather than to fear failure.

- I like that you took on that challenging project!
- It will take a lot of work, but you’re going to learn a lot of great things.
- I’m really excited you are stretching yourself and working to learn challenging things.
- I really admire the way you concentrated and finished that.
- That picture has so many beautiful colors. Tell me about them.
- You put so much thought into this.
- The passion you put into that gives me a real feeling of joy. How do you feel about it?
- Whoops. I guess that was too easy. Sorry for wasting your time. Let’s do something you can really learn from.
- I can see you are working hard. You must feel proud.
- I can see you put a lot of effort into that.
- I liked the effort you put in, but let’s work together some more and figure out what it is you don’t understand.
- It may take more time for you to catch onto this and be comfortable with this material, but if you keep at it like this you will.
- Everyone learns in a different way. Let’s keep trying to find the way that works for you.
- I’m proud that you’ve stuck to it and kept learning.