Supporting the learning of self and peer assessment in group work

Ryszard Raban
Faculty of Engineering and Information Technology, University of Technology, Sydney
richard@it.uts.edu.au

Andrew Litchfield
Faculty of Engineering and Information Technology, University of Technology, Sydney
andrew.litchfield@uts.edu.au

The ability to assess the work of oneself and others are core attributes for professionals. The development of these attributes in our students requires the learning of self and peer evaluation, feedback, reflection and review understandings and skills. This paper discusses issues in the design and learning of self and peer assessment and the impact of a group work online tool – *TeCTra* for *Te*am *C*ontribution *Tra*cking. Since 1998, in a UTS capstone undergraduate subject with large student numbers and large group tasks, different support strategies for self and peer assessment of individual contributions have been implemented. The distribution of the students' marks has markedly widened, and now more reflects the reality of differing team member contributions. This substantial change has occurred since 2004 with the use of *TeCTra* which supports the learning of self and peer evaluation and feedback skills when students assess individual contributions to large group projects. With funds from a 2006 Carrick/ALTC Priority Grant the tool has been further developed, pilot-tested and evaluated for use in various disciplines in different Australian Universities. TeCTra is now ready for dissemination and use in national and international higher education.

Keywords: self and peer assessment, individual marks in group work, online learning support, developing professional attributes

Introduction

The development of the evaluation, feedback and review skills required to self and peer assess complex teamwork processes is often a key learning objective of large project-based subjects. These are skills every professional should possess and be able to use for different purposes. It is also important for the novice professional to experience being on the receiving end of peer reviews and assessment and to learn to review, reflect and benefit from any feedback received.

The online TeCTra – *Te*am *C*ontribution *Tra*cking - tool requires each student to report on project deliverables, and rate and comment on their team members' work on a weekly basis. This task is informed and supported by evidence of the work done and outcomes achieved by each student. This strategy creates a formative, diagnostic, developmental and summative assessment environment in which the students can learn the understandings and skills of self and peer assessing using qualitative comments and holistic quantitative ratings.

TeCTra has been trialed in a software development capstone subject since 2004 in the Faculty of Engineering and Information Technology at the University of Technology Sydney. The tool has been further developed, pilot-tested and evaluated for use in various disciplines in different Australian Universities with funds from a 2006 ALTC Priority Grant.

In contrast with other criterion-based peer assessment tools, *TeCTra* uses a holistic approach for incremental and cumulative performance assessment giving students a progressive status of their standing in the group. The online system for data-collection, presentation and calculation of individual contributions releases academics from the unsustainable amount of work required to process any similar paper-based strategy. Academics can monitor progress and mediate if necessary.

The TeCTra self and peer assessment strategy has delivered greater differentiation of individual student marks in group work than those reported in the literature and experienced by the authors in the period before the introduction of the online tool.

Supporting the learning of self and peer assessment skills

In many disciplines, higher education courses include significant capstone subjects involving projects that require large student teams. When facilitating peer assessment with a holistic approach (Schechtman, 1992; Schechtman & Godfried, 1993), the common assessment strategy for group work of allocating the same or almost the same mark to all team members (Rosen, 1996; Lejk & Wyvill, 2001; Kennedy, 2005) is not adequate as the project tasks are extensive, the teams are large in number (more than 4 members), extend for the whole semester and group work can constitute 100% of the final student assessment. The subject coordinator has limited opportunities to observe and assess the complex group and teamwork dynamics that are taking place (Raban & Litchfield, 2007).

A self and peer assessment strategy is required which is ideally formative, diagnostic, developmental and summative (Goldfinch, 1994; Gatfield, 1999). This ideal has been difficult to achieve and remains as an important and unresolved feedback and assessment issue (Lejk & Wyvill, 2001; Li, 2001).

Peer assessment has been shown to support not only students learning but also improve their understanding of assessment processes themselves (Bloxham & West, 2004). Peer assessment is required to assess individual contributions to group assignments (Johnston & Miles, 2004). The development of the evaluation, feedback and review skills required to self and peer assess these complex group work processes is often a key learning objective for large project-based capstone subjects. These are skills every professional should possess and be able to use for different purposes. It is also important for the novice professional to experience being reviewed by peers and to learn to benefit from their feedback.

Peer assessment for assessing individual contributions to group work is controversial because it can produce ‘unreliable’ results caused by the inexperience of the student assessors and often produces undifferentiated marks (Kennedy, 2005). Also the labour intensive processes that the subject coordinators have to administer are problematic (Clark, Davies, & Skeers, 2005). The TeCTra online tool addresses these concerns and offers a self and peer assessment strategy for the peer identification of individual contributions in large group work based subjects.

Assessing individual contributions in group work

Assessing individual contributions is a perennial problem for all group projects and assignments. The difficulty is that the students who have the best insight, although possibly not an accurate one, about the individual efforts contributed by team members when faced with the task of peer assessment often find it is too hard. In capstone subjects with large group work projects, students are often given responsibility to allocate individual marks according to the perceived individual contributions made by each team member. This responsibility has proven difficult for students resulting in an equal distribution of marks irrespective of the actual contributions (Rosen, 1996; Lejk & Wyvill, 2001; Kennedy, 2005; Raban & Litchfield, 2007). As a result, good students are dissatisfied with their summative mark and grade while those students who choose to do little receive undeserved rewards.

Some possible ways of addressing this group work assessment problem are:

- Tracking individual contributions in the final deliverables. The problem with this approach is that it becomes detrimental to teamwork as the team members are more interested in making sure that their parts of the submission look good as opposed to contributing to the overall quality of the group work.

- Testing the students individually to assess their contributions. This approach is based on the questionable assumption that through an assessment of personal knowledge and skills, one can infer how much the individual contributed to the team project.

- Adopting criterion-based peer assessment, as used in SPARK (Freeman & McKenzie, 2002). Students are asked to assess each other using a set of criteria usually on completion of the project or at milestones. The problem here is in making sure that the criteria used gives an indication of individual contributions and in

ensuring that the criteria are consistently used by all students. An additional difficulty is that this kind of assessment covers work done over long periods of time raising an issue whether early efforts are taken into account in the assessment.

The TeCTRa approach is based on the following principles:

- *Group autonomy* meaning that while there is overall supervision by academic staff, the students are responsible for assessment and resolving group work issues. TeCTra is based on self and peer assessment under supervision, but without direct interventions by academics. This acknowledges the fact that students have the best knowledge and appreciation of who did what. The students are given full autonomy and take responsibility for using the system properly. They have to manage processes of collecting time records and ratings, and confront problems of dishonesty and collusion.

- *Just-in-time assessment* which means that the assessment covers only recent work and its value in the context of the status of the project at that particular time. Thus all the effort that goes into the learning processes of the group, possibly by creating unworkable solutions and half-baked ideas, can still be rewarded appropriately. It is unlikely that the work which is not visible in the final outcome would ever get sufficiently recognised in a summative only assessment approach.

- *Incremental and cumulative assessment* means that assessment decisions made in consecutive short periods of time (TeCTra adopts a week) on a regular basis are aggregated into an individual performance indicator for the entire assessment period. Students are asked to perform assessments on small well-understood pieces of work that contribute to formative stages of the project. This incremental assessment creates less pressure on the students as its overall impact on the final mark is not very significant. Incremental assessments that accumulate into aggregated indicators of individual contributions give an on-going picture of how individuals rate against the group.

- *Holistic assessment* which means that instead of asking students to use many assessment criteria, as in SPARK (Freeman & McKenzie, 2002), there is only one criterion that relates to the overall contribution of a team member during the assessment period. This approach captures the types of contributions that could be missed in a criterion-based approach. A holistic approach has proved to be more effective for assessing individual contributions in group work than a criterion-based approach (Lejk & Wyvill, 2001; Lejk & Wyvill, 2002) and was found to be as efficient and effective as peer assessment of team members' contributions to individual tasks (Goldfinch, 1994).

- *An easy to use rating scale* which simplifies distinguishing between different levels of achievement and reduces an element of subjectivity in ratings. This acknowledges the fact that assessment is a difficult task even for experienced academics (Beard & Hartley, 1984; Grainger, Purnell, & Zipf, 2007). Peer assessment is even harder as it is performed by novice markers. As Goldfinch (1994) observed students had difficulty distinguishing between 'above average' and 'average' levels of achievement. In TeCTra there are only four levels of achievement each linked to a simple judgement:
  0 – no contribution when a team member did not do any work,
  1 – below normal contribution when a team member visibly lagged behind the group in his/her efforts,
  2 – normal contribution when a team member contributed on par with the other team members,
  3 – above normal contribution when a team member visibly contributed more than the other group members.

- *Well-informed assessment* which is based on systematic accumulation of evidence of work done by team members. This information is always available when students rate each others' contributions.

- *Fully visible yet anonymous group information* which makes all the records of work done and ratings received by and from team members available to everybody in the group. The only information not available are the identities of the peer assessors who gave a particular quantitative rating or qualitative feedback. Team members need not worry about possible retribution for assessing non-performing members appropriately.

There are two profound impacts of adopting these principles:

- The students are empowered as they can respond to their formative ratings from their peers by taking action to improve their performance. On the completion of the team project TeCTra data supports individual claims for a wide distribution of marks, and

- Each student's self-perception of their individual contribution is confronted with the weekly quantitative and qualitative formative evaluation of the peers. This formative 'reality check' ensures students review and reflect their performance in the context of their peer's expectations.

In these ways, using the TeCTra online tool is a teaching strategy that supports the learning of group evaluation, feedback, review and reflective capacity leading to improved self and peer assessment understandings and skills. The tool scaffolds the conditions needed to support individual formative improvement of performance within group work. At the completion of the project, the TeCTra data enables and empowers individuals to claim a wider distribution of marks than the common strategy of all group members getting the same summative mark.

TeCTra case study in Systems Development Project: subject description

Systems Development Project (SDP) is a capstone subject in the Bachelor of Science in Information Technology at UTS with 350-400 students each year. The degree has three years of course work and a year of industry placement. SDP is taught in the second semester of the second year and aims to prepare the students for industry training in the third year. Before undertaking SDP, the student has completed three semesters of IT education in programming, systems design and development, networking and information systems. During SDP, the students experience working in a large team and learn how to apply their prerequisite knowledge to a practical system development problem. During the project they develop a system from specifications to a working software product.

SDP involves groups of 7-10 students in a major project that takes 50% of their study time (12 credit points) for a full time student for one semester of 15 weeks. Groups have a great degree of autonomy. They are responsible for planning and allocating project tasks and organising work in the groups. Academic tutors, usually project managers from industry, are responsible for overseeing the groups' progress and attending to problems with group dynamics and project work.

There are two milestones in the project, a mid-semester review and a final review, and each produces 50% of the final assessment. These two assessments comprise a peer review by another group (worth 40%) and an academic staff review that assesses written submissions (worth 60%).

Peer assessment in the SDP project

Students are required to undertake a number of peer assessment activities. Firstly, they review another group's work at the two project milestones of the mid-semester review and the end-of-semester final review. Secondly, the groups are asked to assess individual contributions to the project made by each team member. This assessment is done formatively and progressively each week during the semester using TeCTra, and summatively during the mark allocation at the mid-semester and final reviews.

During the peer reviews, each group assesses an oral presentation given by another group. The presentation takes 20 minutes and is followed by 10 minutes of question and answer time. The reviewers make their assessment against a set of given criteria that the designers were to achieve through their solutions. During the presentation, each member of the reviewing team does their own criterion-based assessment of the presented solutions. Then the group discusses their individual assessments and consolidates them into a whole group assessment which is given to the presenters and accounts for 40% of the total mark. There is a requirement that the marks given to the other group are properly justified and both the advantages and disadvantages of the presented designs are assessed.

The project outcomes, as assessed by the peer and staff reviews, produce an overall mark for the group effort. This mark is then multiplied by the number of students in the group and the result becomes a pool of marks that the group members must distribute amongst themselves according to the group's perception of individual contributions to the project. Guided by instructions given to them in the assessment policies and procedures, a meeting of all the team members is convened to discuss the mark allocation. The groups are advised to start the meeting with a round of statements by the team members about their respective contributions to the project. Then through discussion and negotiation, the group arrives at an allocation of the marks that all team members can agree on. The results are presented to their academic tutor for approval. Once the consensus on the mark allocation is confirmed, the individual marks are accepted.

Supporting peer assessment of individual contributions

In the SDP capstone subject, the project groups of 7 to 10 students experience the problem of rewarding individual contributions fairly and equitably. In recognition of this, the students were given an increasing level of support in peer assessment across the 8 years in which the subject has been offered. There are three distinct periods in which peer assessment of individual contributions was assisted in different ways. These are:
Summative assessment of contributions without on-line support (years from 1998 to 2001),
Summative assessment of contributions with time recording (years from 2002 to mid-2004). (This period is omitted from this discussion as while it has produced statistically significant differences in the allocation of individual marks, the overall trend of giving all team members the same mark remained in a majority of the groups, and
Formative and summative assessment of contributions with time recording and weekly qualitative feedback and quantitative ratings supported by the TeCTra online tool (years from mid-2004 to now).

These three periods have shared the same rules for mark allocation to individuals; irrespective of the level of support provided, ultimately the groups themselves were responsible for allocating individual marks. The support given to the groups by using TeCTra was intended to inform decisions about individual marks rather than be a mechanism for calculating them. (The tool however can be used to calculate marks that are mandated from the contribution factors, if that is the preferred summative assessment strategy).

The assessment period is another factor in assessing individual contributions that can make it easier or harder. The longer the period between successive evaluations, the more chance that the peer assessment is based on the last impression, and that all the effort that went into 'stepping stones' on the way to the final outcomes is forgotten and overlooked.

In SDP, the use of TeCTra each week to self and peer evaluate and give feedback makes it easier to recall who contributed what and how. TeCTra makes the self and peer assessment as simple as possible and with a holistic approach encompasses all the different types of contributions to group work. In contrast with a criterion-based approach only those contributions that relate to the criteria are assessed.

In SDP group projects, students learn how to perform project tasks and how to collaborate within the group to produce various outcomes. TeCTra provides a tool for supporting, scaffolding and developing group dynamics through weekly formative and diagnostic assessment. Individual ratings for each week are cumulatively calculated and made available for review, reflection and adaption. As the project progresses each team member is aware of their relative standing in the group and the trends in the assessment of their individual contribution. If the contribution rating falls behind the rest of the group, the student is informed and, with peers and possibly with academic staff, can develop a strategy for adaption and improvement. Alternatively, a student may accept low peer ratings and receive an appropriately lower summative mark without feeling that it is unfair.

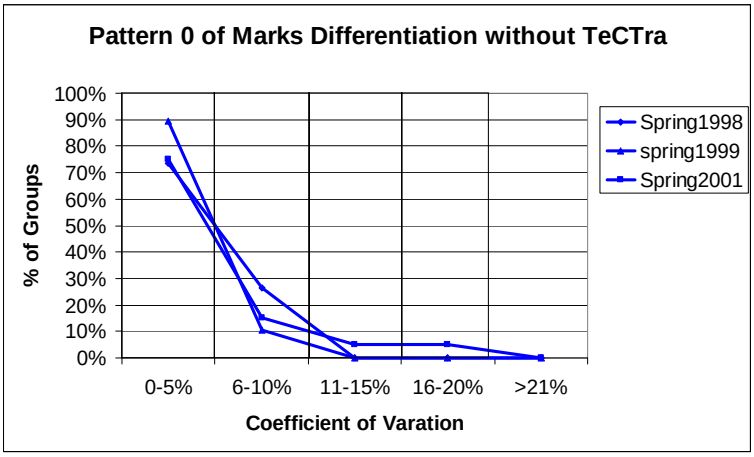
The development of peer assessment strategies and support in SDP was gradual and the results of different approaches closely monitored. The ability to differentiate final marks by the groups was used as a measure of the impact. To make the analysis statistically significant, it was performed only for semesters with 10 or more groups. For each group, a coefficient of standard deviation of the final individual marks was calculated. It was used as an indicator of to what extent the group was able to align marks with individual contributions. For each semester, a graph showing the percentage of groups that differentiated their contributions by 0-5%, 6-10%, 11-15%, 16-20% and 21%+ was plotted.

Summative assessment of contributions without TeCTra support

In the years from 1998 to 2001, the students had to rely on their own records and recollections of individual contributions in allocating individual marks. The only support given to the groups was a set of rules and policies that spelt out a range of good practices for peer assessment. Occasionally, groups were not able to reach a consensus and their academic tutor was asked to break a stalemate in the mark negotiations.
It has to be stressed however that the academic tutors never engaged in the actual assessment of contributions. Instead, the tutor assisted the group in choosing an acceptable method of assessing contributions, and then assumed the role of an impartial facilitator of the method's implementation. As a

result in semesters Spring 1998, Spring 1999 and Spring 2001, the distribution of peer marks were diversified as shown in Figure One.

In Figure One marks differentiation is measured by a coefficient of variation. For each semester, the graph shows what percentage of all groups produced individual marks for the project differentiated within five bands 0-5%, 6-10%, 11-15%, 16-20% and >21%. For example in Spring 1999 around 90% of all groups opted to have marks differentiated within 0-5% and the remaining 10% had marks spread in the 6-10% range.



Pattern 0 Analysis[a,b]

	CoVar
Chi-Square	3.975
df	2
Asymp. Sig.	.137

[a] Kruskal Wallis Test
[b] S1998, S1999, S2001

Figure 1. Pattern 0 of mark differentiation without TeCTra

A Kruskal Wallis test indicates that in this period the distribution of mark diversification in the three semesters studied do not show significant differences (p=.137 > 0.05). This consistent distribution pattern in the period is referred to as Pattern 0. The graph shows that in Pattern 0 between 75% to 90% of all groups opted for an almost equal mark distribution. This is an expected result in line with similar cases reported in the literature (Rosen, 1996; Lejk & Wyvill, 2001; Kennedy, 2005). This nearly equal distribution of marks is hardly plausible as in a groups of 10 students one would expect a wider range of individual contributions.

Formative and summative assessment using TeCTra

In semesters from mid 2004 to 2008, the students were supported by the TeCTra online tool. The tool was based on the principles discussed earlier and provided support for:

Quantitative (time records) and qualitative (project deliverables) self assessment,
Quantitative (contribution ratings) and qualitative (confidential feedback) peer assessment and
A progressive calculation of weighted weekly contribution factors that shows each team member's standing in terms of perceived individual contributions to group work by their peers.

From the beginning of the large project, each team member could check how their peer's rated their contribution. In Figure Two, the bottom line shows the lowest individual contribution factor in the group for each week, and the top line shows the highest individual contribution factor for each week. The middle line plots individual contribution factors of an anonymised student (Shawn Penney). This student consistently contributed in the lower band of the group effort and there is no indication that he made any attempt to improve his position. He appears to have accepted the likelihood of a lower summative mark for his overall contribution to the group.

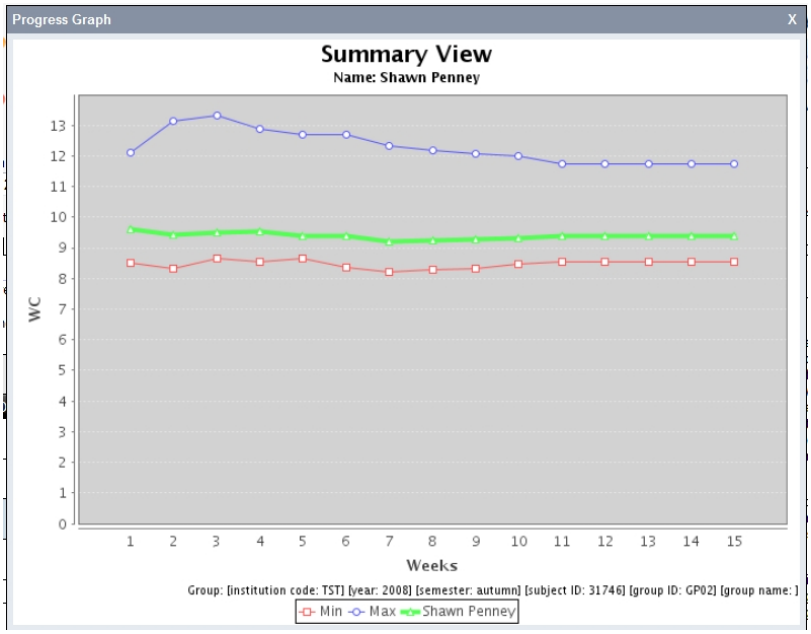
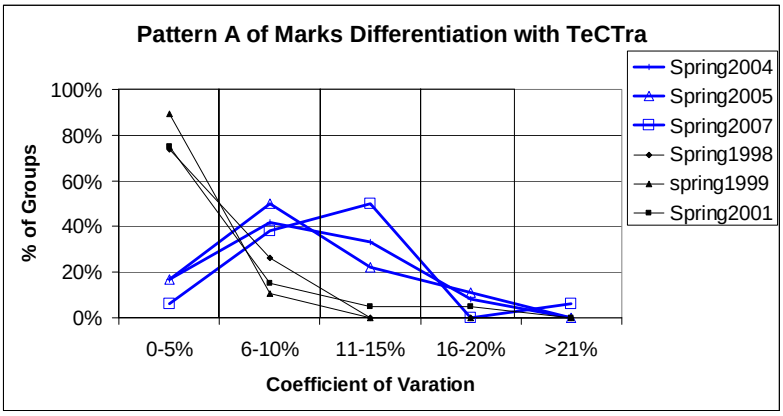


Figure 2. Graphic representation of an individual's standing in the group.

As a result of using TeCTra in semesters from Spring 2004 to Spring 2008, the distribution of peer marks shows a dramatic decrease in the percentage of groups allocating marks almost equally (0-5% coefficient of standard deviation). Through statistical analysis of the mark differentiation distribution in the period when TeCTra was used, there are three distinct mark diversification distribution patterns marked as Pattern A observed in Spring 2004, Spring 2005 and Spring 2007 (Figure Three), Pattern B observed in Autumn 2005, Autumn 2006 and Spring 2008 (Figure Four) and Pattern C (Figure Five) observed in Spring 2006 and Autumn 2007.



Pattern A Test Statistics[a,b]

	CoVar
Chi-Square	4.625
df	2
Asymp. Sig.	**.099**

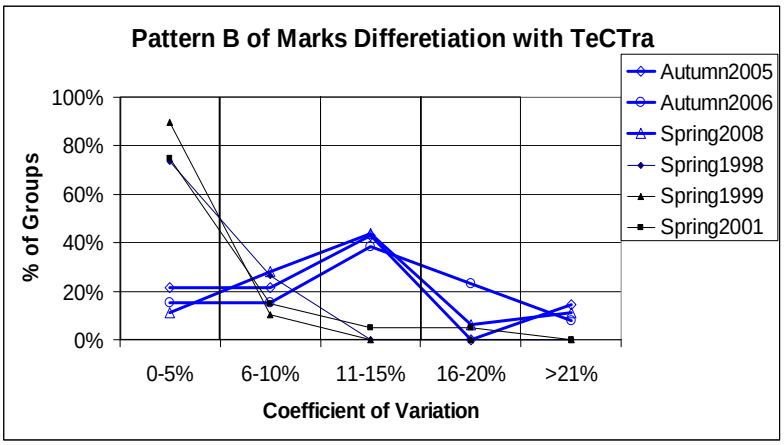
[a] Kruskal Wallis Test
[b] S2004, S2005, S2007

Pattern0 vs Pattern A Test[a]

	CoVar
Mann-Whitney U	393.000
Wilcoxon W	2104.000
Z	-7.119
Asymp. Sig. (2-tailed)	**.000**

[a] Pattern 0, Pattern A

Figure 3. Pattern A of mark differentiation with TeCTra



Pattern B Test Statistics[a,b]

	CoVar
Chi-Square	.358
df	2
Asymp. Sig.	.836

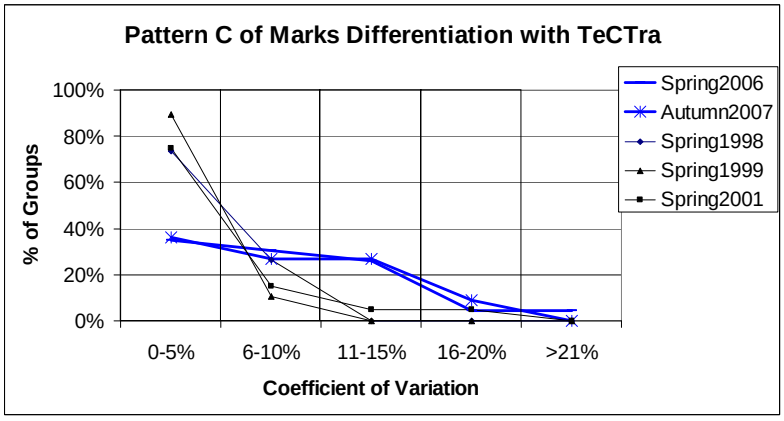
[a] Kruskal Wallis Test
[b] A2005, A2006,S2008

Pattern0 vs Pattern B Test [a]

	CoVar
Mann-Whitney U	260.000
Wilcoxon W	1971.000
Z	-6.953
Asymp. Sig. (2-tailed)	.000

[a] Pattern 0, Pattern B

Figure 4. Pattern B of mark differentiation with TeCTra



Pattern C Test Statistics[a,b]

	CoVar
Mann-Whitney U	123.000
Wilcoxon W	399.000
Z	-.129
Asymp. Sig. (2-tailed)	.897
Exact Sig. [2*(1-tailed Sig.)]	.913(a)

[a] Not corrected for ties.
[b] S2006, A2007

Pattern0 vs Pattern C Test [a]

	CoVar
Mann-Whitney U	421.500
Wilcoxon W	2132.500
Z	-4.569
Asymp. Sig. (2-tailed)	.000

[a] Pattern 0, Pattern C

Figure 5. Pattern C of mark differentiation with TeCTra

It is not known what caused the differences, however it is clear that each pattern is significantly different to the pre-TeCTra Pattern 0 (as indicated by p=.000 > 0.05 in statistical tests). There is evidence that using TeCTra has radically altered student attitudes and capacity to peer assess individual contributions in group work.

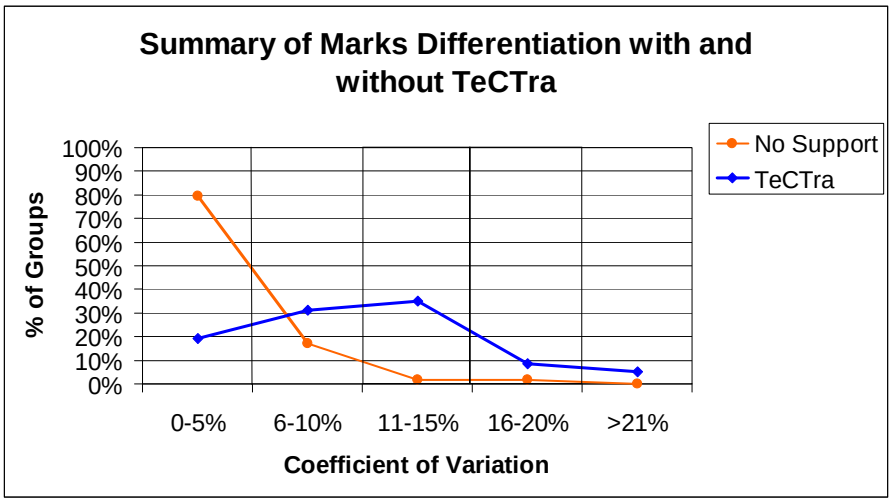


Figure 6. Overview of the changes in the distribution of peer marks due to changes in peer assessment strategies from 1998 to 2008.

Figure Six combines the graphs of the distribution of peer marks for the two peer assessment approaches discussed in the paper. The results demonstrate that without TeCTra's online support the students were not capable of reflecting individual contributions in the marks allocated to team-members and an equal distribution of marks was given to 75-90% of their peers.

The introduction of the TeCTra online tool for supporting self and peer evaluation, feedback, review and adaption processes has brought a significant change in peer assessment mark distribution. An equal distribution of peer marks now happens in less than 20% of groups and, in the rest of the groups, the distribution has become significantly wider better reflecting the variety of individual contributions expected in large group work outcomes.

Conclusion

The use of the TeCTra online tool facilitates the visibility of individual efforts and outcomes. TeCTra collects time records and also records deliverables produced. While rating their team members, the students are presented with all the individual contributions produced in the week being assessed. It ensures that the rating process is evidence-based.

The online tool supports peer evaluation and feedback - both a quantitative rating and qualitative comment - throughout the duration of the project and thus formatively and developmentally influences individual contributions and behaviours within the team. This improved capacity for self review and adaption facilitates diagnostic attributes and can significantly influence the overall project management process.

Using the TeCTra online tool supports and scaffolds the development in students of the capacity:

- to evaluate and give feedback to their peers in group work,
- to self review, reflect and adapt their individual performance in group work,
- to make professional judgments,
- to articulate well-justified decisions, and
- to communicate in a non-confrontational manner to their peers.

These are core skills and attributes for novice professionals. Knowledgeable yet inexperienced individuals are supported to act professionally and take responsibility for and accept the consequences of their own actions and resulting contributions to large group work projects.

The tool is relatively simple for students and academics to use and avoids complexities and additional work that is present in other online tools (Clark et al., 2005). The tool's user-friendliness is important as increasing academic workloads leave minimal time for the administration of elaborate self and peer assessment methods and tools (Fisher, 1999).

There is still a question about whether TeCTra produces marks that do reflect the true individual contribution of each team-member. In the SDP subject, the students are not obliged or mandated to use TeCTra contribution factors for individual mark allocation. In the study period, the majority of groups chose not to directly use the TeCTra contribution factors in calculating summative marks. However, there has been no return to the previous practice of allocating equal marks. Also, there is emerging evidence that the marks given by students show a high degree of correlation with the TeCTra generated individual contribution factors.

It can be concluded that the TeCTra online tool did make the difference in the students' perception of individual contributions and the individual marks allocated to team members. There must have been underlying changes in group dynamics leading to the changes in summative assessment outcomes though the exact mechanisms behind this phenomenon is not clear and is the focus of future research.

References

Beard, R., & Hartley, J. (1984). *Teaching and Learning in Higher Education,* (4th ed.). London: Paul Chapman.

Beasley, R.E., & Vila, J.A. (1992). The identification of navigation patterns in a multimedia environment: A case study. *Journal of Educational Multimedia and Hypermedia, 1* (2), 209-222.

Bloxham, S., & West, A. (2004). Understanding the Rules of the game: making peer assessment as a medium for developing students' conceptions of assessment. *Assessment & Evaluation in Higher Education, 29* (6), 721-733.

Clark, N., Davies, P., & Skeers, R. (2005). Self and peer assessment in software engineering projects. **In *Proceedings of the 7th Australasian conference on Computing Education*.** Newcastle, NSW.

Fisher, R. (1999). Academic Workloads and Assessment. Retrieved from http://www.tedi.uq.edu.au/conferences/teach_conference99/papers/fisher.html.

Freeman, M., & McKenzie, J. (2002). SPARK a confidential web-based template for self and peer assessment of student teamwork: benefits of evaluating across different subjects. *British Journal of Educational Technology, 33* (5), 551-569.

Gatfield, T. (1999). Examining student satisfaction with Group Projects and Peer Assessment. *Assessment & Evaluation in Higher Education, 24* (4), 365-377.

Goldfinch, J. (1994). Further developments on peer assessment of group projects. *Assessment and Evaluation in Higher Education, 19* (1), 29-35.

Grainger, P., Purnell, K., & Zipf, R. (2007). Judging quality through substantive converstions between markers. *Assessment & Evaluation in Higher Education, 33* (2), 133-142.

Johnston, L., & Miles, L. (2004). Assessing contributions to group assignments. *Assessment & Evaluation in Higher Education, 29* (6), 751-768.

Kearsley, G. (2004). Explorations in Learning & Instruction: The Theory Into Practice Database. Retrieved June 14, 2004, from http://www.gwu.edu/~tip/.

Kennedy, G.J. (2005). Peer-assessment in Group Projects: Is it worth it? *The Australasian Computing Education Conference.* Newcastle, Australia.

Li, L. (2001). Some Refinements on Peer assessment of Group Projects. *Assessment and Evaluation in Higher Education, 26* (1), 5-18.

Lejk, M., & Wyvill, M. (2001). Peer assessment of Contributions to a Group Project: a comparison of holistic and category-based approaches. *Assessment and Evaluation in Higher Education, 26* (1), 19-39.

Lejk, M., & Wyvill, M. (2002). Peer assessment of Contributions to a Group Project: student attitudes to holistic and category-based approaches. *Assessment & Evaluation in Higher Education, 27* (6), 569-577.

O'Shea, T., & Self, J.A. (1983). *Learning and teaching with computers*. Englewood Cliffs, NJ: Prentice-Hall Inc.

Raban, R., & Litchfield, A. (2007). Supporting peer assessment of individual contributions in group work. *Australasian Journal of Educational Technology, 23* (1), 34-47. Retrieved from http://www.ascilite.org.au/ajet/ajet23/raban.html.

Rosen, C.C.H. (1996). Individual assessment of group projects in software engineering: A facililitated peer assessment approach. *Proceedings of the 9th Conference on Software Engineering Education* (pp. 68-77). Daytona Beach, Florida. IEEE.

Schechtman, Z. (1992). A revised group assessment procedure administered in several academic settings. *Journal of Personal Evaluation in Education, 6*, 31-39.

Schechtman, Z., & Godfried, L. (1993). Assessing the performance and personal traits of teacher education students by group assessment procedure: a study of concurrent and construct validity. *Journal of Teacher Education, 44* (2), 130-138.

Assessment in Different Dimensions

A conference on teaching and learning in tertiary education

19—20 November 2009 at RMIT University, Melbourne

Conference Papers

RMIT UNIVERSITY

AUSTRALIAN TECHNOLOGY NETWORK OF UNIVERSITIES

ATN Assessment Conference 2009

ATN Assessment Conference 2009: Assessment in Different Dimensions

Conference Proceedings

ISBN 978-0-646-52421-4

Editors: John Milton, Cathy Hall, Josephine Lang, Garry Allan and Milton Nomikoudis

Published by: Learning and Teaching Unit, RMIT University

November 2009

The ATN Assessment Conference 2009 is a conference on assessment in tertiary education hosted by RMIT University for the Australian Technology Network of universities with the support of the Australian Learning and Teaching Council. The conference is being held at Storey Hall, RMIT University, Melbourne on 19th and 20th November 2009.

Information about this publication: http://emedia.rmit.edu.au/atnassessment09/

The theme - Assessment in Different Dimensions – encompasses:

- Assessing with technologies (AwT)
- Assessing authentically (AA)
- Feedback, moderation and quality (FMQ)
- Assessing in the disciplines (AiD)

Refereed Papers

Acknowledgements

Conference Convenor

John Milton, Senior Advisor, Policy and Program
Learning and Teaching Unit
RMIT University

Conference Committee

John Milton, Conference Convenor
Sarah Lausberg, Project Manager
Margaret Blackburn
Cathy Hall
Sally Jones
Josephine Lang
Amgad Louka
Gregory Plumb
Felicity Prentice
Diana Quinn

Other key roles

Shiralee Saul
Darren Smith
Josie Ryan
Andrew Buntine
Garry Allan
Milton Nomikoudis

Other contributors

Jody Fenn
Cassy Roberts
Anne Lennox
Jacinth Nolan
Louise Handran
Lara Morcombe
Kate Ebbott

ATN Teaching and Learning Group

Beverley Oliver, Curtin University
Margaret Hicks, University of South Australia
Amgad Louka, RMIT University
Jo McKenzie, University of Technology Sydney
Deborah Southwell, Queensland University of Technology

Special thanks:

Dr Diana Quinn, University of South Australia
A conference of this kind cannot be a success without drawing on others' excellent practices and experiences. The Conference Committee particularly acknowledges the generosity and expertise of Dr Diana Quinn of the University of South Australia and Convenor of the 2008 ATN Assessment Conference. Dr Quinn and her ATNA08 Conference Committee are acknowledged for their permission to customise and use materials developed for the 2008 ATN Assessment Conference including guidelines for authors and reviewers.

Associate Professor Peter Hutchings and ALTC
For their kind support both actively with the organisation of particular aspects of the conference and for ALTC sponsorship our international keynote.

The review process

Full papers accepted for publishing in the Conference Proceedings have undergone a double-blind peer review process, with de-identified feedback and suggestions for revisions provided to authors. The Conference Committee gratefully acknowledges the generous work of the reviewers, who all provided constructive and invaluable feedback to ensure the high standard of published papers.

Reviewers

Lynne Badger
Lynne Barnes
Stephanie Beames
Lorraine Bennett
David Birbeck
Julian Bondy
Natalie Brown
Ric Canale
Helen Carter
Andrea Chester
Catherine Clarke
Moira Cordiner
Caroline Cottman
Keith Cowlishaw
Brenton Dansie
Anne Darroch
Melissa Davis
Martin Dick
Peter Donnan
Eveline Fallshaw
Heather Fehring
Sonia Ferns
Helen Flavell
Melanie Fleming
Anne Gardner
Philippa Gerbic
Sara Hammer
Andrew Higgins
Simon Housego
Katie Hughes
Henk Huijser
Kerry Hunter
Sandra Jones
Sue Jones
Martyn Jones
Peter Kandlbinder
Megan Kek
Lila Kemlo
Sharron King
Gloria Latham
Romy Lawson
Linda Leach
Betty Leask
Theresa Lyford
Judith Lyons
Alasdair McAndrew
Coralie McCormack
Julie Mills
Karen Nelson
Matthew Oates
Beverley Oliver
Phoebe Palmieri
Kate Patrick
Deborah Peach
Amanda Pearce
Rob Phillips
Felicity Prentice
Malcolm Pumpa
Marilyn Richardson-Tench
Gayani Samarawickrema
Michael Sankey
Geoff Shacklock
Helen Smith
Heather Sparrow
Gordon Suddaby
Darrall Thompson
Hans Tilstra
Anne Venables
Dale Wache
Alexandra Wake
Kate Westberg
Keith Willey
Denise Wood
Carolyn Woodley
Jon Yorke
Nick Zepke

Disclaimer

The papers published in these Proceedings have been reviewed, edited and proof-read to the best of our ability within the timelines permitted. We acknowledge that there may be outstanding proofing errors.

19th - 20th November 2009