Group self-assessment is desirable and acceptable in collaborative learning

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Abstract

Collaborative learning is considered to be an effective learning method. In principle, it promotes two key conditions for effective learning, namely good (social) control of metacognition and internal regulation of learning behaviour. Both require healthy social interaction in addition to good cognitive engagement. This social interaction and cognitive engagement cannot be imposed on groups, but can be fostered, among other factors, by individual accountability. Group self-assessment can help to achieve this. We have developed a group self-assessment procedure and shown in a previous study that it steers students towards internal regulation of behaviour (autonomous motivation). As we use the procedure in many collaborative projects, the question is whether students accept it and whether it has the intended effect on the group work experience. An acceptance survey was developed for this purpose. Students' responses indicate that they find the self-assessment procedure convenient, that the assessments are fair, that it improves the collaborative experience and strengthens group beliefs.

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Summary

Collaborative learning is considered to be an effective learning method. In principle, it promotes two key conditions for effective learning, namely good (social) control of metacognition and internal regulation of learning behaviour. Both require healthy social interaction in addition to good cognitive engagement. This social interaction and cognitive engagement cannot be imposed on groups, but can be fostered, among other factors, by individual accountability. Group self-assessment can help to achieve this. We have developed a group self-assessment procedure and shown in a previous study that it steers students towards internal regulation of behaviour (autonomous motivation). As we use the procedure in many collaborative projects, the question is whether students accept it and whether it has the intended effect on the group work experience.

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Introduction

This paper describes a study, using an newly developed acceptance survey, of how university students experience group self-assessment in collaborative learning projects. Collaborative learning is considered to be an effective learning method, provided that the group respects appropriate *internal dynamics*(*Johnson, Johnson & Smith, 1998*;*Springer, Stanne & Donavan, 1999*). A number of factors need to be satisfied such as positive interdependence, indvidual accountability, face-to-face promotive interaction, employment of social skills and group processing. By collaborative we refer here to "the use of a self-contained task and the focus on joint activity with the aim of creating shared understanding" (p. 177,*Tolmie, et al., 2010*). Indeed, the strength of collaborative learning lies in engaging in the co-construction of meaning, a process enabled by transactive dialogue, also referred to as shared cognition (Blatchford et al.,*2003*,*2006*;*Garrison & Akyol, 2015*;*Tolmie et al., 2010*;*Van den Bossche et al., 2006*). The term transactive implies a developmentally effective dialogue. In fact, transactive dialogue promotes metacognition, i.e. self-monitoring of learning with the help of others (*Flavell, 1979*;*Garrison & Akyol, 2015*, table 1, p69;*Hadwin & Oshige, 2011*). Of course, the social regulation of learning in groups goes beyond the individual characteristics of self-monitoring activities and implies a dimension of social skills (*Iiskala, et al. 2011*). A lack of social skills, or the failure to use them, hinders the process of transactive dialogue. Without all this, students are better off working alone.

Besides its positive influence on metacognition, collaborative work can also improve the quality of motivation among group members. We're talking here about the sense of autonomy (sense of agency), competence (shared) and relatedness that, according to Self-Determination Theory, are important drivers of high volition engagement in learning tasks (internalized regulation) (chapter 4,*Ryan & Deci, 2017*). We find internalized regulation essential for enjoyable and productive education, as described in our previous studies (*Kramer et al 2017*; *Kramer et al., 2022*).

Three important conditions, among others, for a constructive transactive dialogue are cognitive engagement, psychological safety (*Van den Bossche et al., 2006*) and the feeling that individual contributions are recognized in the collective product (*Johnson, Johnson & Smith, 1998*;*Slavin, 1996*). It is therefore important to allow group members to assess their collaborative engagement, with the possibility of linking this assessment to an individual (project) score. In this way, individual accountability and group processing are encouraged; two factors of the*internal dynamics* mentioned above. In addition, if one of the members does not collaborate despite all precautions, groups can be comforted by a differentiating individual score (installing a sense of fairness).

We have developed an online group self-assessment procedure to meet these conditions (*Kramer et al., 2022*). It is in many ways similar to other category-based group assessment procedures described previously (*Brown, 1995*;*Conway, 1993*;*Freeman & McKenzie, 2002* (SPARK);*Ohland et al., 2012* (CATME)) but with an important difference that students set their own ground rules (*Kramer et al., 2022*;*Kramer, 2024*). This approach is based on the arguments that groups should have maximum autonomy (Self-Determination Theory) (*Ryan & Deci, 2000*) and that groups that make forward-looking agreements about how they will work together have been shown to be more focused and motivated to make adjustments in group functioning (*DeChurch & Haas, 2008*). As a third argument, making decisions about the standards of performance and rating the quality of the performance in relation to these standards strengthens learning (*Boud & Falchikov, 2006*). Besides all this, group self-assessment also provides an opportunity, when applied during the collaborative task, for instructor/leader intervention in the event of inappropriate group functioning.

Research question

Assessing one's peers and oneself requires some commitment, and although there are theoretically important learning benefits (*Boud & Falchikov, 2006*), it seems unwise to expose students to this type of activity involuntarily, as this would reduce the usefulness of assessment (*Van der Vleuten, 1996*). The research question is therefore whether students find the process acceptable and whether they see the benefits that experts envisaged. To this end, an acceptance survey was designed to explore whether it was good to be assessed, whether it was fair to be assessed by peers, whether the process (setting up the ground rules and online voting) was easy to carry out, whether it changed group beliefs and whether it influenced group work. The target group consists of higher education students (18-23 years of age) involved in a collaborative learning project of sufficient size and duration (at least two weeks full time).

Methods

Participants Characteristics

University students were at two different levels, first and third year. The first year students (n = 88) were in preparatory classes for entry to life sciences engineering schools (the "Grandes Ecoles") in a French university. They had a mean age of M = 18.98, SD = 0.46 and were 70% female. These students participated in a collaborative science writing blog project (*Kramer & Kusurkar, 2017*). The third year students (n = 83) were predominantly Dutch students in their third year of medical school and participated in a collaborative science writing blog project in a Dutch or French University. They had a mean age of M = 22.1, SD = 0.88 and were 81% female.

The self-assessment procedure

The self-assesment procedure comprises four stages. In the first stage, after a brief introduction, the students define 5 to 7 ground rules for productive collaboration. It was found that they're pretty much experts at it (*Kramer, 2024*), and by letting do it themselves there's minimal interference from teachers (and a high degree of autonomy for the group). About halfway through the project, the groups carry out an initial self-assessment. In the third stage, the teacher discusses the voting results with the groups and offers help in case of conflict. The fourth stage consists of a second group self-assessment, and the result is used to calculate an individual project score (see also*https://groupworking.net/5-setting-the-ground-rules/*). The supervising teacher feeds the group composition and the 5-7 survey questions proposed by the students into a software application. Access to the application on a specific date is controlled by logins and passwords. Students can vote on their smartphones. They vote for other group members and for themselves. The individual score is calculated by dividing individual ground-rule compliance by the average group compliance. The resulting coefficient is then multiplied by the project score. The application also provides information about the coherence of the assessment, i.e. the extent to which one's own view is consistent with that of others. We reasoned that a realistic self-assessment is a good measure of the extent to which someone is aware of his or her functioning in the group (*Kramer et al., 2022*).

Measures

We measured the acceptability of the self-assessment procedure, as well as its impact on group working and group beliefs, using a 22-item "acceptance survey" divided into 5 scales. The scales were "convenience of voting procedure", "principle of group assessment", "fairness of self-assessment (peer assessment)", "impact on group working" and "impact on group beliefs". References that underpin the items of the impact scales are:*DeChurch & Haas, 2008*; *Karau & Williams, 1993*;*Kramer et al., 2022*; *van den Bossche et al., 2006.*

The survey was used at the end of the collaborative projects, during the project closure session in class. Students had online access (Google "Forms") and voted on each item on a Likert scale from 1 - 7. The anchor points were: strongly disagree - disagree - somewhat disagree - neutral - somewhat agree - agree - strongly agree. A number of statements were negative, but have been converted to positive in Figure 2 (to

make the graph more compact). The internal consistency of the scales was sufficient, with the exception of fairness of peer assessment. Not all scales have the same number of participants. A number of items have been changed in the pilot period from which resulted the current survey.

Data analysis

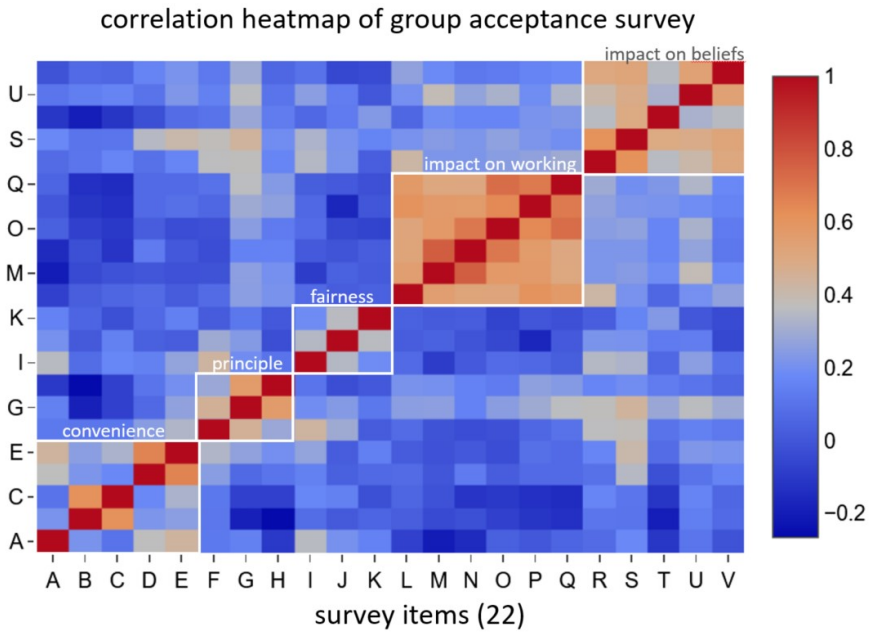
Consistency of the student replies to the different questions within each scale was analysed with the use of the Chronbach alpha reliability coefficient and with the use of a Pearson "r" correlation analysis. Measures were made with the DATAtap online statistics calculator *(DATAtab, 2024)*. The students' responses are presented in a horizontal bar chart to show the distribution of opinions for each question.

Results

Reliability of the survey

The consistency and degree of correlation of the survey scales reveal that all the scales, with the exception of the "fairness of peer assessment", have acceptable to very good consistency (Cronbach values in figure 2). The Pearson correlation heatmap confirms this, with the different scales being easily identifiable; there are clear correlating boxes. Again, fairnes is the exception (figure 2).

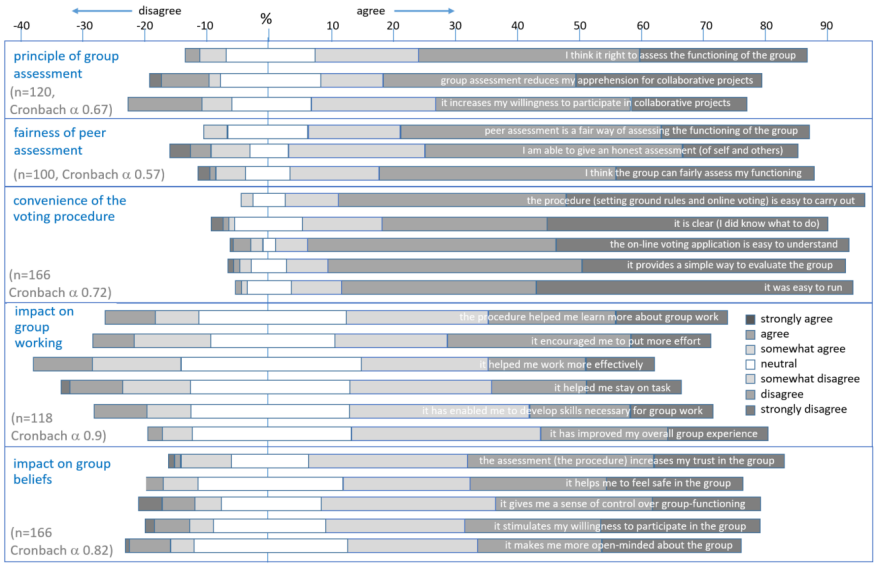
Figure 1. Correlation Heatmap of the Group Acceptance Survey.



An overall agreement on the use of a group self assessment procedure

There is very good agreement among students on the fairness of peer assessment and the convenience of the voting procedure (setting ground rules and online voting) (scales 2 & 3 in Figure 2). Disagreement increases slightly for the principle of group assessment (scale 1). For about 15% of respondents, it does not reduce anxiety or increase willingness to participate. Overall, however, the procedure can be considered acceptable by more than 70% of the population. The effects on group working and group beliefs (scales 4 & 5) have a much higher percentage of disagreement, although a very convincing majority still confirms positive effects. A large majority (70%) reports an improved overall experience.

Figure 2. Bar plot presentation of student replies to the "acceptance survey".



Discussion

The self-assessment procedure is acceptable

We show that for 1st and 3rd year undergraduate students in life sciences and medicine, the self-assessment procedure is fully acceptable and has positive effects on group working and group beliefs for a large majority (70%) of participants. Given the previously reported positive effect on the quality of motivation in secondary-school collaborative projects, with a shift towards more internalised regulation (autonomous motivation) (*Kramer et al., 2022*), and the overall acceptability reported here, we conclude that group self-assessment is desirable and acceptable in collaborative projects of sufficient size and duration. The procedure would improve the working experience of the group, enhance appropriate group*internal dynamics* (Johnson, Johnson & Smith, 1998), and remove the fear that members who do not deliver on their part of the project will still receive the full project score (*Karau & Williams, 1993*).

Heterogeneity of replies

The range of responses, with more contrasting negative and positive responses, increases with questions about the possible influence of group self-assessment on group work and group beliefs. This may reflect different underlying attitudes among students. Those who have a high level of self-regulation coupled with internal causality can fully engage in the collaborative project based on their interest and do not need rules or assessment to feel safe or more committed to a collaborative project. Those who have had negative experiences in the past, often due to bullying, "social loafing" (*Harkins & Jackson, 1985*) or "free riding" (*Strong & Anderson, 1990*), may feel much relieved and be more generous with ratings of impacts on their experience or beliefs. Conversely, regular good experiences with group work will lower the perceived impact (good functioning seems natural). The way in which pedagogical interventions are experienced is always sensitive to the wide range of motivational states of students (*Vallerand et al., 1993*), and quite conflicting opinions are the rule. However, negative responses here do not imply a rejection of the procedure, but simply that certain effects of the procedure, as might be inferred from the literature on group work (*DeChurch & Haas, 2008*; *Karau & Williams, 1993*;*van den Bossche et al., 2006*), are not validated by all students.

Improvement of the scale of fairness

The 'fairness' scale of the procedure has low consistency, even though the questions appear to be valid by definition, i.e. they appear to be highly relevant at face value. Different versions and combinations have been tested, but somehow never achieved satisfactory consistency. The problem may lie in the distinction between self-assessment and assessment of others. The survey responses show that some feel unable to assess themselves fairly but can assess others correctly, while others feel inhibited about assessing others. However, this is really about perception, because in reality, as the results of the analysis of many groups have shown, there is generally good agreement between the self-assessments and the assessments by other members at the end of the collaborative project (as shown by the "average group coherence" of the evaluation report) (see figure 1b,*Kramer et al., 2022*).

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Prof Dr Hermelijn Smith and Dr Bart Everts, University of Leiden Medical School, the Netherlands, are acknowledged for employing the group self-assessment procedure in a science-writing blog project of a Master course and sharing the acceptance survey outcomes.

Conflict of Interest statement

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Ethics Statement

In accordance with *APA ethical compliance guidelines* this study does not require written consent from students because it involves normal educational practices with respect for confidentiality. Information is treated and published anonymously so that disclosing responses would not expose participants to criminal or civil liability or harm their financial standing, employability or reputation.

References

Blatchford, P., Baines, E., Rubie-Davies, C., Bassett, P., & Chowne A. (2006). The effect of a new approach to group work on pupil-pupil and teacher-pupil interactions. *Journal of Educational Psychology* , 98(4), 750-765.*https://doi.org/10.1037/0022-0663.98.4.750*

Blatchford, P., Kutnick, P., Baines, E., & Galton, M. (2003). Toward a social pedagogy of classroom group work. *International Journal of Educational Research,* 39(1/2), 153-172.*https://doi.org/10.1016/S0883-0355(03)00078-8*

Brown, R.W. (1995, November 1-4). *Autorating: Getting individual marks from team marks and enhancing teamwork* . Proceedings Frontiers in Education, 25th Annual Conference, Atlanta, GA, USA.

https://doi.org/10.1109/FIE.1995.483140

Boud, D. & Falchikov, N. (2006). Aligning assessment with long-term learning. *Assessment and Evaluation in Higher Education* , 31, 4, 399-413.*https://doi.org/10.1080/02602930600679050*

Conway, R., Kember, D., & Wu, A.S & M. (1993). Peer assessment of an individual's contribution to a group project. *Assessment & Evaluation in Higher Education* , 18(1), 45-56.*https://doi.org/10.1080/0260293930180104*

DATAtab Team (2024). DATAtab: Online Statistics Calculator. DATAtab e.U. Graz, Austria. URL*https://datatab.net*

DeChurch, L.A. & Haas, C.D. (2008). Examining team planning through an episodic lens effects of deliberate, contingency, and reactive planning on team effectiveness. *Small Group Research* , *39* , 542–568.*https://doi.org/10.1177/1046496408320048*

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive developmental inquiry. *American Psychologist* , 34, 906–911.*https://doi.org/10.1037/0003-066X.34.10.906*

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: 551-569.*https://doi.org/10.1111/1467-8535.00291*

Garrison, D.R. & Akyol, Z. (2015). Toward the development of a metacognition construct for communities of inquiry. *Internet and Higher Education* , 24, 66-71. https://doi.org/10.1016/j.iheduc.2014.10.001

Hadwin, A., & Oshige, M. (2011). Self-Regulation, Co-regulation, and Socially Shared Regulation: Exploring Perspectives of Social in Self-Regulated Learning Theory. *Teachers College Record* ,*113* (2), 240-264.*https://doi.org/10.1177/016146811111300204*

Harkins, S. G., & Jackson, J. M. (1985). The Role of Evaluation in Eliminating Social Loafing. *Personality and Social Psychology Bulletin* , *11* (4), 457-465.*https://doi.org/10.1177/0146167285114011*

Iiskala, T., Vauras, M., Lehtinen E., & Salonen, P. (2011). Socially shared metacognition of dyads of pupils in collaborative mathematical problem-solving processes. *Learning and Instruction* , 21(3), 379-393.*https://doi.org/10.1016/j.learninstruc.2010.05.002*

Johnson, D.W., Johnson, R.T., & Smith, K.A. (1998). Cooperative learning returns to college: what evidence is there that it works?*Change: The Magazine of Higher Learning* , 30(4), 27-35.*https://doi.org/10.1080/00091389809602629*

Karau, S. J., & Williams, K. D. (1993). Social loafing: A meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology, 65* (4), 681–706.*https://doi.org/10.1037/0022-3514.65.4.681*

Kramer, I., Franc, N., Maricourt, F., Cohen, M., Fau, T., Nogues, X., Van der Velden, W. & Kusurkar, R. (2022). Group Self-Evaluation Primes for Autonomous Motivation in Collaborative Learning. *Advance. Preprint .https://doi.org/10.31124/advance.17105573.v1*

Kramer, I.M., & Kusurkar, R.A. (2017). Science-writing in the blogosphere as a tool to promote autonomous motivation in education.*The Internet and Higher Education,* 35, 48-62.*https://doi.org/10.1016/j.iheduc.2017.08.001*

Kramer, I.M. (2024). Collaborative learning: students' insights into the criteria that define effective collaboration match those of experts.*Advance. Preprint .https://doi.org/10.31124/advance.24799494.v1*

Ohland, M.W., Loughry, M.L., Woehr, D.J., Bullard, L.G., Felder, R.M., Finelli, C.J., Layton, R.A., Pomeranz, H.R., & Schmucker, D.G. (2012). The comprehensive assessment of team member effectiveness: development of a behaviorally anchored rating scale for self-and peer evaluation.*Academy of Management Learning & Education* , 11(4), 609-630.*http://dx.doi.org/10.5465/amle.2010.0177*

Ryan R.M. & Deci E.L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist,* 55, 68-78.*https://psycnet.apa.org/buy/2000-13324-007*

Ryan, R.M., & Deci, E.L. (2017). *Self-determination theory: basic psychological needs in motivation, development, and wellness* . The Guilford Press. ISBN 9781 4625 2876 9.

https://doi.org/10.1521/978.14625/28806

Slavin, R.E. (1996). Research on cooperative learning and achievement: What we know, what we need to know. *Contemporary Educational Psychology* , 21, 43-69.*https://doi.org/10.1006/ceps.1996.0004*

Springer, L., Stanne, M. E., & Donovan, S. S. (1999). Effects of Small-Group Learning on Undergraduates in Science, Mathematics, Engineering, and Technology: A Meta-Analysis. *Review of Educational Research* , *69* (1), 21-51.*https://doi.org/10.3102/00346543069001021*

Strong, J. T., & Anderson, R. E. (1990). Free-riding in group projects: Control mechanisms and preliminary data. *Journal of marketing education* , *12* (2), 61-67.

Tolmie, A.K., Topping, K.J., Christie, D., Donaldson, C., Howe, C., Jessiman, E., Livingston, K., & Thurston, A. (2010). Social effects of collaborative learning in primary schools. *Learning and Instruction* , 20(3), 177-191.*https://doi.org/10.1016/j.learninstruc.2009.01.005*

Vallerand, R. J., Pelletier, L. G., Blais, M. R., Briere, N. M., Senecal, C., & Vallieres, E. F. (1993). On the Assessment of Intrinsic, Extrinsic, and Amotivation in Education: Evidence on the Concurrent and Construct Validity of the Academic Motivation Scale. *Educational and Psychological Measurement* , *53* (1), 159-172.*https://doi.org/10.1177/0013164493053001018*

Van den Bossche, P., Gijselaers, W.H., Segers, M., & Kirschner P.A. (2006). Social and cognitive factors driving teamwork in collaborative learning environments. Team learning beliefs & behaviors. *Small Group Research,* 37(5), 490-521.*https://doi.org/10.1177/1046496406292938*

Van der Vleuten, C.P.M. (1996) CPM. The assessment of professional competence: Developments, research and practical implications.*Advances in Health Science Education* 1996;1:41–67.*https://doi.org/10.1007/BF00596229*

Supplemental material

Group self-assessment survey

Anchor points: 1) strongly disagree – 2) disagree – 3) somewhat disagree – 4) neutral – 5) somewhat agree – 6) agree – 7) strongly agree

Scale: Convenience of procedure and on-line application **(Cronbach's Alpha 0.72)**

disagree ———> agree

A- The procedure (setting ground rules and online voting) is easy to carry out. 1 2 3 4 5 6 7

B- The procedure is unclear (I did not know what to do). (R) 1 2 3 4 5 6 7

C- The on-line voting application is difficult to understand. (R) 1 2 3 4 5 6 7

D- The on-line voting application provides an easy way to evaluate the group. 1 2 3 4 5 6 7

E- The on-line voting application was easy to run. 1 2 3 4 5 6 7

Scale: Principle of group evaluation **(Cronbach's Alpha 0.67)**

disagree ———> agree

F- I think it right to evaluate the functioning of the group. 1 2 3 4 5 6 7

G- Group evaluation reduces my apprehension for collaborative projects. 1 2 3 4 5 6 7

H- Group evaluation increases my willingness to participate in a collaborative project.
1 2 3 4 5 6 7

***Scale: Fairness of self-assessment*(Cronbach's Alpha 0.57)**

disagree ———> agree

I- Evaluation (by members) is a fair way of assessing the functioning
of group members. 1 2 3 4 5 6 7

J- I am able to give an honest assessment (of self and others). 1 2 3 4 5 6 7

K- I think the group can fairly assess my functioning 1 2 3 4 5 6 7

***Scale: Group working* (Cronbach's Alpha 0.9)**

disagree ———> agree

L-The evaluation helped me learn more about group work. 1 2 3 4 5 6 7

M-The evaluation encouraged me to put in more effort. 1 2 3 4 5 6 7

N-The evaluation helped me work more effectively. 1 2 3 4 5 6 7

O-The evaluation helped me to stay on task. 1 2 3 4 5 6 7

P-The evaluation has enabled me to develop skills necessary for group work 1 2 3 4 5 6 7

Q-The evaluation has improved my overall group experience. 1 2 3 4 5 6 7

***Scale: Group beliefs* (Cronbach's Alpha 0.82) disagree ———> agree**

R- The evaluation (of group functioning) increases my trust in the group. 1 2 3 4 5 6 7

S- The evaluation helps me to feel safe in the group. 1 2 3 4 5 6 7

T- The evaluation gives me a sense of control over group-functioning. 1 2 3 4 5 6 7

U- The evaluation stimulates my willingness to participate in the group. 1 2 3 4 5 6 7

V- The evaluation makes me more open-minded about the group. 1 2 3 4 5 6 7