USING KIRKPATRICK'S FOUR-LEVEL-EVALUATION MODEL TO EXPLORE THE EFFECTIVENESS OF COLLABORATIVE ONLINE GROUP WORK

Colin Baskin
Teaching and Learning Development Unit
James Cook University, Australia
Colin.Baskin@jcu.edu.au

Abstract

This paper examines two cohorts of students, each engaged in the same course of study but using different means of engagement. One cohort of 90 students completed a real time learning program integrating group dynamics, action research, team performance and participative decision-making (Tuckman & Jensen, 1977: Belbin, 1981: Dick, 1986: Hopson & Scally, 1982). A second cohort of 171 students completed the same course of study in an online environment. Satisfaction ratings were drawn across the real-time and online cohorts, the data structured and critically mined using a four level evaluation of learning model (Kirkpatrick, 1996) to explore student-learning outcomes related to online group work.

Findings indicate that the real time student sample recorded a significantly higher satisfaction rating in some aspects of their group learning experiences than their online counterparts. Further examination of the learning outcomes of the online cohort of students using level two, level three, and level four evaluation strategies (Kirkpatrick, 1996), suggests that the online group work model successfully supports group learning behaviours, transfer of these behaviours to practice, and improvement in learner behaviours at the enterprise level. Despite some differences in between group learning outcomes, online group work was seen to add value to the group learning experience.

Keywords

online group work, evaluation studies, online pedagogy

Introduction - The Centrality of Group Work

Group work has emerged as a strategic curriculum response among business educators attempting to come to terms with an entrenched industry, enterprise and graduate focus on teamwork. The fact that organisations have continuously moved toward an internal structure based on work teams or groups has not escaped the focus of management educators. This is manifest in a curriculum focus that treats (as routine) aspects of socio-technical work design, quality circles, TQM and their corresponding models of human and intellectual capital. The workplace is no longer the frontier of individual achievement for the 'top gun' graduate, but is painted more as a 'networked' environment peopled by graduates with the skills to work in a team setting (Cordery, 1996; Cohen & Ledford, 1994).

Understanding small group formation, its dynamics, processes and outputs remains a key element in the provision of effective learning environments (Hogan, 1999; Baskin & Greenfield, 1999). Some of the perceived benefits underlying our use of groups as a learning technology point to the benefits of efficiency and productivity. Groups accomplish tasks that cannot be done by

individuals alone. They bring multiple perspectives to bear on a single problem and in doing so they capture the dynamic of real world complexity. Groups provide a vehicle for decision-making and taking, and they impose an efficient means of organisational control over individual behaviours. Groups also form a key element in the broader social system. They are instrumental in the formation of personality, are agents of both socialisation and control, and act as a motivational tool within a continuous cycle of work-based learning.

In an effort to demonstrate an appropriate response to the learning needs of new graduates (and the demands of accrediting bodies), group work has emerged as a common feature of many contemporary management classrooms. The rationale here is as transparent as it is formidable. By exposing students to working within a peer-based team, then by osmosis (or some other 'learning' process), students would likewise inherit a capacity and propensity to handle corresponding group interactions, challenges, conflicts and dynamics. Yet herein lies one compelling reason why group work has long suffered as a result of inadequate epistemology. Merely exposing students to group work has not yet proven to be a guarantee that these same students will evolve into efficient and effective team members. Poorly defined group tasks, a lack of group skills training, and a low level of autonomy for learning teams to remedy learning problems are amongst the reasons cited for group work failure (Hogan, 1999). In part these failures are traceable to larger systemic features, in particular the competitive framing of our higher education system, and the logistical difficulties the 'marker' faces in assessing and reporting on individual performance within a group learning context.

Where this Paper Began

In 1998 I began to question the 90 students enrolled in a second year management subject about past group work experiences. Most relayed negative, at times frustrating and frequently alienating experiences of 'team work' and vowed to avoid it where possible in the future. Based on this feedback, I revamped the design of the subject to include a focus on 'industry-style' team-building efforts, with a clear competency framework, and demonstrable learning outcomes (Baskin, 1999). The 'target subject' integrated aspects of group dynamics, action research, team performance and participative decision-making (Tuckman & Jensen, 1977; Belbin, 1981; Dick, 1986; Hopson & Scally, 1982). In 1999, this same course 'went online' with a cohort of 171 students, and dealt with the 'prickly problem' of group work in an emerging and new (virtual) context. This paper is an account of this shift in two distinct stages. The first stage addresses the shift from 'real time' to 'online' technologies and presents between group ratings of each group work process. The second stage of the paper examines the online behaviour of students engaging with group work, and analyses the patterns of learning behaviour that characterise group work in a 'virtual environment'. The paper offers four levels of evaluation of group skills learning based on those developed by Kirkpatrick (1996). This classification scheme is offered as an effective framework for evaluating enterprise-learning programs and for determining the effectiveness of this learning, its impact on the institution and the learning behaviours of its students.

Students, Subject and Context

Two cohorts of the same undergraduate subject are discussed here. In the first instance the class consisted of 90 students, and in the second it comprised 171 students. Both classes completed the same assignments, used the same text, materials, participated in peer assessment and had access to the same facilitators. The assessment in the subject was predominantly collaborative, and both cohorts undertook all enquiry tasks in a group context. The second and larger cohort completed all group work and peer assessment online.

Student Perceptions of the Collaborative Learning Process - Level One Satisfaction

Students in both cohorts were asked to respond to six statements related to their understanding of the group work process, and their perception of their peers as markers. Responses were rated on a five point scale ranging from 1 = strongly agree to 5 = strongly disagree. Results of a statistical breakdown of all student responses (cohorts 1 & 2) are shown in Table 1 below.

Factor	Mean	SD
1. I understand the group work process	1.80	.85
2. I believe the group process is a valid way of learning	2.05	.92
3. I am confident in peer assessment processes	2.10	1.05
4. Peer assessment is an equitable form of grading	2.20	1.00
5. My grades reflect my efforts in this subject	2.20	1.05
6. I became more effective as a member of a team	2.30	1.08

Table 1: Student responses to group work and peer assessment (n=261)

Across the total population of students the results of Table One reflect an approximate level of agreement, and a 'narrow' distribution of values (mean SD approaching 1). This is a positive endorsement of group work and peer assessment practices by students. Further analysis of between-groups data (Online Group = 171) and (Real Time Group = 90) reflect that some significant differences in perception do emerge around factors 3, 4, 5 and 6. The data cited in Table 2 (below) indicates a stronger preference by real time group work students (a lower Likert scale rating) for collaborative group work in student perceptions of confidence, equity, return for effort, and effectiveness (t[259] = 3.06, p<.05), (t[259] = 2.80, p<.05), (t[259] = 2.70, p<.05), (t[259] = 3.40, p<.05). Despite these differences, learner perceptions of their understanding of group process theory, and of collaborative learning as a valid learning technology do not differ significantly in online or real time settings.

Factor	Real Time Cohort Mean	Online Cohort Mean	p-value
1. I understand the group work process	1.70	1.85	.178
2. I believe the group process is a valid way of learning	1.96	2.10	.282
3. I am confident in peer assessment processes	1.90	2.30	.003*
4. Peer assessment is an equitable form of grading	1.94	2.30	.006*
5. My grades reflect my efforts in this subject	1.96	2.30	.007*
6. I became more effective as a member of a team	2.01	2.50	.008*

*significant at p<.01

Table 2: Comparison of real time and virtual group work cohorts on group and peer assessment processes

The overall satisfaction level of both cohorts of students (Mean = 1.88) indicates that students in both the real time and online group settings remained highly satisfied with the group work experience, and that the range of variation in response across cohorts was rather narrow (SD = .84). A between group analysis was conducted in order to ascertain which if any differences in between-group perceptions may apply to either online or real time group learning contexts. These results, presented in Table 3 raise some relevant questions about the context of online group learning, pointing to a significant difference in the perceived satisfaction of real time as opposed to online group work participants (t[259] = 2.49, p<.05). The higher perception of satisfaction in this instance belongs to those students who undertook collaborative group work in a real time setting. Level one evaluation of this kind is purely and simply a measure of 'customer satisfaction' (Kirkpatrick, 1996), and not a measure of the 'quality' of the participants' experience. It is nonetheless an important initial measure of participant response, and one that in this case raises the warrant for further examination of why this intergroup difference in perceptions exists.

Factor	Real Time Cohort (n=90) Mean	Online Cohort (n=171) Mean	p-value
1. Level of Satisfaction	1.70	1.97	.013*

*significant at p<.01

Table 3: Perceived satisfaction of real time and virtual group work cohorts

Further analysis of the student sample focused on work experience (t[259] = 1.85, p<.05) indicating no significant differences in reported satisfaction as a result of industry background. A final ANOVA was undertaken measuring the degree of satisfaction across four age group categories (<20, 21-25,26-30,>31). The results (F[3,257] = .277, p>.05) again point to no significant differences in reported satisfaction as a result of age related factors or frames.

Level Two Evaluation - What was Learned?

At this point, it was decided to focus on the level two question of 'what was learned' and 'what wasn't learned' in online group work as a means of gaining some background into why online group work was perceived by students as less satisfying than its real time counterpart. A level two evaluation tests participant learning (Kirkpatrick, 1996), and generally takes the shape of an evaluation of 'what was learned'. In this case 136 valid responses were collected from the online cohort. This evaluation process was a replication study (Hogan, 1999) the purpose of which was to capture and bracket student accounts of group learning in an online environment. A summary of results is provided in Table 4 (below).

The tabled results (Table 4) indicate that students endorse online group work as an appropriate forum for learning and assessment, and list a range of learning outcomes. The table indicates a high level of acceptance of responsibility for self-directed learning (89.8%), and self-management (80.9%) respectively. The students also report positively on their learning about aspects of group behaviour (82.4%) and the challenge of group facilitation (75.7%). Emphasis on aspects of member participation indicate an increased awareness of how 'my behaviour effects others' (64.4%), experience with hands on conflict management (55.9%), managing group processes to include 'quiet' people (69.9%), and in dealing with the dominant personality (61.6%). The online environment was clearly able to stimulate a broad range of 'authentic' group and interpersonal challenges for learners.

The formation of 'new learning networks' was also a feature of student responses. Some 80% of respondents made new friends, 78% engaged in cross-age learning groups, and 86% of students reported the opportunity to observe 'different personalities'. Students saw the online method of group work and assessment as somewhat 'unorthodox' (52%), and nearly half informants declared that they felt at risk 'at first' (43%). Yet corresponding attributions of better self-management (81%), and more meaningful engagement with others '*I wouldn't normally be exposed to*' (71%) indicates that students relied on group behavioural theories and models (82%) to build dialogue between theory and practice in a real world setting (79%).

Individual perspective	**Agree**		**Disagree**		**Unsure/DK**	
	No.	**(%)**	**No.**	**(%)**	**No.**	**(%)**
Learnt more about myself	82	[60.3]	21	[15.4]	33	[24.3]
Made new friends	108	[79.5]	15	[11.1]	13	[9.6]
Learnt more about old friends	59	[43.4]	26	[26.4]	41	[30.1]
Felt at risk at first	59	[43.4]	45	[33.1]	30	[22.1]
Learnt to speak up in a group	75	[55.1]	30	[22.1]	30	[22.1]
Can remember experiential exercises more easily	60	[44.1]	15	[11.0]	60	[44.1]
Learnt to further develop trust in other students	82	[60.3]	21	[15.5]	31	[22.8]
Learnt to facilitate a group	103	[75.7]	15	[11.05]	18	[13.2]
I took responsibility for my own learning	122	[89.8]	6	[4.4]	8	[5.9]
Relate organisational behaviour theories to real world	107	[78.7]	14	[10.3]	15	[11.0]
I felt Qualified to give feedback	93	[68.4]	22	[16.1]	21	[15.4]
I felt the feedback received was adequate	93	[68.4]	18	[13.3]	24	[17.6]

Group perspective						
Learnt about people I wouldn't normally be exposed to	97	[71.3]	12	[8.8]	27	[19.9]
Learnt about group behaviour	112	[82.4]	7	[5.2]	17	[12.5]
Mixed with students from different cultures	78	[57.3]	36	[26.4]	22	[16.2]
Showed up immature students	50	[36.8]	26	[26.4]	49	[36.0]
Watched power struggles	58	[42.7]	33	[31.6]	35	[25.7]
Saw how my behaviour affects others	88	[64.7]	16	[11.7]	31	[22.8]
Mixed with students of different age groups	106	[77.9]	13	[9.6]	16	[11.8]
Confront people exhibiting dysfunctional behaviour	34	[25.0]	52	[38.2]	50	[36.8]
Fun	88	[64.7]	22	[16.2]	26	[19.1]
Chance to observe different personalities	117	[86.0]	7	[5.2]	12	[8.8]
Gave me experience in conflict	76	[55.9]	25	[18.4]	34	[25.0]
Deal with people with dominating personalities	85	[62.5]	26	[19.1]	25	[18.4]
Others took responsibility for their own learning	96	[70.6]	13	[9.5]	27	[19.9]
Learnt to include quiet people	93	[68.4]	12	[8.8]	30	[22.1]
The project						
Unorthodox/unusual way of learning	71	[52.2]	33	[24.2]	31	[22.8]
Learnt to be task orientated	102	[75.0]	8	[5.8]	26	[19.1]
Learnt to manage myself	110	[80.9]	13	[9.6]	13	[9.6]
Learnt to manage ourselves	93	[68.4]	18	[13.3]	25	[18.4]
Gave me experience in planning	106	[78.0]	10	[7.3]	20	[14.7]
Gave me experience in time management	106	[78.0]	10	[7.3]	20	[14.7]

Table 4: Summary statistics – Student perspectives online learning

Results captured in Table 4 tend to suggest that online learning groups and peer-assessment processes provide a translational learning model that is able to situate students within contemporary organisational learning processes. Online group work is shown to enhance curriculum planning, by providing an effective frame for the teaching of group development theories (Tuckman & Jensen, 1977), team-roles (Belbin, 1981), conflict resolution skills (Dick, 1986) and the processing of feedback (Hopson & Scally, 1982). This continuous group learning cycle provided a climate of exchange, promoted learning to learn through materials, activities, modelling of behaviour, self-reflection and assessment (Baskin & Greenfield, 1999). On the surface level two data (Kirkpatrick, 1996) seems to endorse the learning outcomes of the subject. What was being learned in online group work was the product of a deliberate and active pedagogy.

Level Three Evaluation: Was the Learning Being Used?

Level three evaluation functions as a check to see if the skills base underlying the pedagogy of online group work is actually being accessed and used by students (Kirkpatrick, 1996). Analysis of the online learning behaviours identified in Table 4 reveals a high level of uptake and implementation in online group work episodes. In the tertiary setting, learning outcomes must initially engage existing student frameworks but at the same time remain relevant to the goal of acquiring new knowledge and skills. In this light feedback identifies online group work as a multi-directional process that occurs within and across groups of learners. It involves risk-taking, decision-making, planning and reflection. Online group work was shown in student responses to be capable of transforming both the learner and the learning experience, and of reflecting how learner needs for time, process and group skills management change as one of the many dynamics of group work.

Data presented in Table Four places online group work as a dynamically negotiated learning process, rather than a one-way dynamic located within in the individual learner. Students relay evidence of 'authentic' interactions between learners and learning events that work to transform both. Kolb's (1984) experiential cycle is a useful referent here, conferring that the important discourse in learning is not always 'declarative and direct'. The experiential cycle supports those who enter the 'learning' of the group for the first time by providing access to the distributed knowledge of its members. Students benefit from exposure to learning opportunities that enable them to observe how others authentically behave, act and perform in a group learning context. These practices seem closer to the more familiar organisational practices of mentoring, modelling

and process management. Learners no longer behave like students but as practitioners within the context of their own complex learning environment.

Level Four Evaluation - Value-adding and Student Learning

A level four evaluation measures the bottom line result of enterprise learning, and tries to ascertain whether the learning has had a positive effect on the institution (Kirkpatrick, 1996). Field (1995) identifies the four key components of the new interactive learning paradigm as being an emphasis on communication, a focus on knowledge, the need for an adjustment process to embrace and implement new values, and the flexible assembly of work-ready skills and competencies. It is around these competencies that this final discussion will focus, relaying evidence of how online group work might be adding value to existing learning practices.

Further analysis of the data presented in Table 4 identifies gender specific differences in how students report on learning outcomes relating to online group work. A Chi-square (X^2) test was used to examine whether gender had any impact on satisfaction and reporting of learning outcomes in an online group work context. For female students several significant factors emerged to indicate a change in existing learning behaviours. Female students report that they have learned more about their old friends through the online learning process ($X^2 = 14.80$, $p < .05$), and developed a deeper sense of trust in their online group members as the subject progressed ($X^2 = 12.99$, $p < .05$). They also report feeling more able to speak up in group in an online environment ($X^2 = 12.90$, $p < .05$), despite having felt 'at risk' in an online context at the early stages of group work ($X^2 = 9.49$, $p < .05$). Female students also thought that the online environment was a useful one for highlighting the immature behaviour of some group members and students ($X^2 = 10.72$, $p < .05$), whilst also enabling them to mediate and participate in power struggles within the group itself ($X^2 = 39.69$, $p < .05$).

A common theme in the response of female students is that the online environment creates a more transparent framework for the processing of group work issues. It was considered easier to identify and deal with dysfunctional behaviours online ($X^2 = 13.14$, $p < .05$), to have some fun in a safe learn by doing context ($X^2 = 11.92$, $p < .05$), and to manage group conflict ($X^2 = 17.17$, $p < .05$). In short, female students were able to report an increased capacity to take responsibility for their own learning in an online group work context ($X^2 = 16.97$, $p < .05$), despite acknowledging that this was truly an unorthodox learning environment ($X^2 = 29.85$, $p < .05$).

Male students report a similar, but slightly different pattern of response. Again male students indicate that online group work has helped them to learn more about their old friends ($X^2 = 12.90$, $p < .05$), to speak up in groups ($X^2 = 14.80$, $p < .05$), to develop trust in their peer group ($X^2 = 13.13$, $p < .05$), and to handle and process immature students ($X^2 = 10.72$, $p < .05$). Male students also report a perceived improvement in handling dysfunctional behaviour ($X^2 = 13.14$, $p < .05$), managing conflict ($X^2 = 17.66$, $p < .05$), and in participating and dealing with power struggles within the group ($X^2 = 39.69$, $p < .05$). Learning in online groups is also likely to be fun ($X^2 = 11.91$, $p < .05$), but is also considered by male students to be an unorthodox method of learning ($X^2 = 29.85$, $p < .05$). Online group work also supported male students with planning to complete group learning tasks ($X^2 = 15.26$, $p < .05$). Table 5 summarises the gender specific differences that emerge from the level four evaluation.

Factor	Female X^2	Male X^2	p-value
1. Responsible for own Learning	16.97		.002
2. Feeling at risk as first	9.49		.050
3. Planning Experience		15.26	.021

*significant at p<.05

Table 5: Differences in male and female user patterns

While some gender specific differences do exist, these are not extreme, but do touch upon some

interesting themes in relation to the epistemology of group work. There is a clear indication in the data that students are forming groups, and working in teams that enable them to develop group facilitation skills and processes. Students are actively engaged in balancing and managing the resource opportunities fellow team members provide, whilst developing strategies to deal with issues of dependability and coordination. The level four evaluation of online group work shows that online communications can both darken the waters of group work (risk factors), but can also provide access to value-adding practices for male and female students that actually improve process management outcomes for all (conflict, dysfunction, power relations, control etc.).

The 'fun' students identify lies in the opportunity online group work creates in allowing group members access to the distributed learning resources of the team, without compelling them to 'buy into' the emotional baggage of group relationships established in short (at times inauthentic) learning contexts. The learning resources for online group work thus become the unique combination of member knowledge and skills. The outcome of such group development is a broad range of experience, personality differences, attitudes and perceptions. The online group environment enables students to isolate aspects of experience, personality, attitude, perception and indeed values, and to deal with these in a way that illuminates both practice and theory. The fact that female students feel more at risk than male students entering online group work, perhaps underlies their determination to take more responsibility for their learning in an online context. This is a tension reduction strategy, that sees female students articulating a need, and then peddling harder to establish themselves in an environment that all students acknowledge as unorthodox. The fact that male students see online group work as particularly useful in addressing their planning strategies is also evidence of the capacity of the online environment to channel a more direct focus on learning and teaching issues, rather than issues of personality and style. This is also evidence that suggests the online group environment provides opportunity for corrective action within the group, thus directing the forming of 'behavioural norms' around aspects of group practice, rather than personality or attitude.

Conclusion: So Why is Online Group Work Less Satisfying than Real Time Groups?

This paper began by examining two cohorts of students, each engaged in the same course of study but using different terms of engagement. Findings conclude that the real time student sample recorded a significantly higher satisfaction rating in some aspects of their group work learning experiences than their online counterparts. Using level two, level three and level four evaluation strategies (Kirkpatrick, 1996) the online group work model was found to be very successful in support group learning behaviours, transfer of these behaviours to practice, and improvement in learner behaviours at the enterprise level. So why was it considered comparatively less satisfying for students?

Online group work is also shown to provide a clinical and experiential learning environment. Its culture promotes an increased sense of responsibility for learning, and for self- and time-management for the learner. Interpersonal issues are still part of the online environment, and it is still punctuated by conflict, member dysfunction, dominant personalities, quiet lurkers, power struggles and accountability issues. Analysis presented here suggests that these behaviours are readily processed online. The online environment is well placed to 'model' group processes as 'something useful in learning'. So why was it considered comparatively less satisfying for students?

This question still remains to be answered, if indeed it can be in the context of this analysis. Perhaps it is the 'joy' of pheromones, or perhaps it is a byproduct of variant sample sizes? Reflecting on the high levels of student feedback and satisfaction, and exploring these through the hindsight and luxury of reflection and research, I remain very positive about the role and potential of strictly online and remote group learning. I have in my mind a compelling picture of Olympic games commentator Bruce McAveny in his call of Kathy Freeman's 400-metre triumph, when he beamed at the camera, and simply said "*How good was that*!" A positive group learning experience

is simply that, and comparing one to the other seems like questionable science.

Yet, as Windschitl (1998, p.28) notes, research into the use of online learning environments lacks 'disciplined scholarly articles'. The vast majority of articles published in online learning relate to technology implementation, or serve as reflections of what one or other set of practitioners have done in a range of given contexts. This presents a particular caveat for practitioners of online teaching. The promise of online learning technologies to perform has been largely derived either from observing how others have used them, or through published acts of persuasion. While persuasion is a short-term solution unless accompanied by confirmation, the real benefits from online group work (that is the benefits of group effort and how to work in teams in contemporary organisational settings) will gravitate to the existing pattern of experience unless actively and continuously updated, extended and challenged. The issue here is not really about 'which' is better, but about how group work epistemology can be enhanced through the adaptation and integration of new learning technologies. Results presented here suggest that online group work can make a significant contribution to group learning outcomes.

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