Online self and peer assessment of team work in accounting education

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Abstract

Purpose – The purpose of this study is to describe and evaluate the implementation of an online self and peer assessment model (SPARK^{PLUS}) to assess team work skills of accounting students.

Design/methodology/approach – This study describes the background and implementation of SPARK^{PLUS} and employs a survey questionnaire administered to students enrolled in an undergraduate company accounting subject before and after the implementation of the model. The survey results and selected qualitative data are used to evaluate students' attitudes to group work and the impact of SPARK^{PLUS}.

Findings – The study suggests that students understand the benefits of group work activities in developing their technical knowledge in company accounting. However, students do not appreciate the value of group work activities in developing generic skills or how SPARK^{PLUS} supports group work activities.

Practical implications – Professional and accreditation bodies require evidence of teaching and learning activities and assessment of team work skills during the students' undergraduate accounting degree. This study demonstrates that students require significant teaching and learning activities in relation to team work skills and the assessment model for successful implementation.

Originality/value – This study makes an original contribution to the accounting education literature pertaining to assessment of team work skills in two respects. First, the study outlines the design, implementation and preliminary evaluation of an online self and peer assessment model in an undergraduate company accounting course. Second, preliminary evidence concerning the impact of this model on group work activities and team work skills is provided.

Keywords Teamwork, Accounting education, Accreditation, Assurance of learning, Generic skills, Peer assessment

Paper type Case study

1. Introduction

Teamwork, also described as the ability to work in groups, is a generic skill demanded by employers but not necessarily acquired by accounting students during their higher education experience. Employers of accounting graduates require more than just technical skills but a range of generic skills such as team skills, leadership,

oral communication, interpersonal skills and business awareness or real life experience (Albrecht and Sack, 2000; Kavanagh and Drennan, 2008; Jackling and De Lange, 2009). In particular, employers have criticised the focus of accounting education on content knowledge and not creative types of learning which foster generic skills including teamwork (Albrecht and Sack, 2000; Ballantine and Mccourt Larres, 2007b; Hancock *et al.*, 2009).

Professional bodies have recognised the importance of generic skills in accounting education by establishing criteria that require universities to include generic skills in the curriculum (ICAA and CPA, 2009; the Association to Advance Collegiate Schools of Business (AACSB), 2011). For example, the CPA/ICAA *Professional Accreditation Guidelines for Higher Education Programs* requires higher education providers "to clearly articulate their objectives and demonstrate that quality assurance systems are in place to ensure that these objectives are achieved" (ICAA and CPA, 2009, para. 1.12). Teaching and learning activities that include generic skills such as interpersonal, leadership and the ability to work effectively in groups are regarded as essential components of the quality assurance framework. Submissions for accreditation must explain how these generic skills are assessed within the curriculum (ICAA and CPA, 2009, para. 1.2.1). Similarly the Association to AACSB, an internationally recognised accreditation for business and accounting programs, requires tertiary institutions to have a quality assurance framework that specifies learning goals for general, management specific and/or discipline-specific knowledge and skills (i.e. generic skills), and how they are achieved in the undergraduate degree program. Assessment, if properly designed, is intended to demonstrate that the learning goals are being met (AACSB, 2011).

It is in this assurance of learning context that an online model was introduced to facilitate the assessment of teamwork skills of accounting students. Online self and peer assessment (SPA) is not a new phenomenon with various models being described and evaluated in the literature (Freeman and McKenzie, 2002; Thompson and McGregor, 2009; Kavanagh *et al.*, 2012). This paper makes an original contribution to the literature by studying various student attitudes to group work before and after the implementation of an online tool known as Self and Peer Assessment Resource Kit (SPARK[PLUS]) in a second year undergraduate company accounting course at an Australian university. The paper also provides initial teacher insight and preliminary evaluation of SPA design and implementation of this online model. We suggest that this may provide valuable lessons for accounting educators faced with the task of assuring external stakeholders of student learning in teamwork skills.

The next section examines the literature on group work assessment with particular attention paid to peer assessment strategies and criteria. Following the literature review, we provide a case study that includes a background to and implementation of SPARK[PLUS], and an evaluation by students (through a brief pre and post study) and teaching staff of its first use in the company accounting course. The paper concludes with a discussion of the limitations and potential for future research into peer assessment strategies and processes.

2. Literature review
Teacher assessment of group work
Assessment of group work may be conducted in one or more of the following three ways: the individual student completing the group work activity (self-assessment); the student's

peers in that group (peer assessment); and the teacher. Self-assessment is where the students evaluate their own contribution to the group work activity. This can be contrasted with peer assessment where it is the group members who evaluate the contribution of individual group members to the group. Finally, the teacher may assess the group work utilising either the group only or "mixed-incentive" models (Bryant and Albring, 2006). With the group only model, the teacher assigns a single grade to the entire group. The varying contributions of group members are disregarded, thereby discouraging individual accountability, with the final output assessed and not the teamwork process used to produce the final output. This may lead to grade inflation as "individual weaknesses tend to be covered up by the strengths of other group members" (Habeshaw *et al.*, 1993, p. 93). With the group only model, students may complete the group project but not function as a team.

Under a mixed-incentive model, the individual's final grade is effectively a combination of a group mark and individual mark. To achieve individual accountability, the design and assessment of the group work project must ensure that each group member is held responsible for their contribution (Cottell Jr and Millis, 1992; Johnson *et al.*, 2007). This discourages "free riders" and "workhorses" (Clinton and Kohlmeyer III, 2005, p. 98) and fosters the skills associated with a "team", which can be distinguished from a group (Hackman, 1983).

Clear accountability regimes are necessary to ensure students are motivated to take advantage of opportunities to learn as they contribute to a group project and simultaneously develop, demonstrate, and reflect upon teamwork skills at both individual and collective levels. A more specific assessment structure leverages the range of motivation types across diverse group members. The students who are extrinsically motivated to dominate the group for fear of underachieving desired grades will be less likely to dominate and conflict with other group members, whereas, students who are intrinsically motivated to contribute will be less exploited by social loafers.

Peer assessment of group work
Peer assessment and SPA strategies have been variously recommended (Boud and Falchikov, 2007) and used (Freeman, 1995; Michaelsen *et al.*, 2004) in tertiary education. The assessment criteria may be negotiated between group members or set by the teacher (Habeshaw *et al.*, 1993). A variety of peer assessment strategies have been documented in the literature including:

- Multiplying the group mark by an individual weighting factor derived from the assessment criteria completed by the student's peers (Goldfinch, 1994).
- Multiplying the group mark by the number of students and asking the students to distribute the marks between themselves, with or without set assessment criteria (Lejk *et al.*, 1996). For example, a teacher awards a grade of 60 percent for a group project produced by a group of five students, allocates 300 marks to the group and asks the group based on an assessment criteria to allocate the 300 marks amongst themselves (Habeshaw *et al.*, 1993).
- A group mark plus or minus a mark for contribution using set assessment criteria (Habeshaw *et al.*, 1993; Lejk *et al.*, 1996).
- A combination of a group mark (the final output) and a mark for group work (the process) derived from peer assessment criteria, with the split not necessarily being 50/50 (Lejk *et al.*, 1996).

The most common peer assessment strategy involves some form of adjustment to the group mark for each individual based on an assessment of contribution by their peers. We identified four peer assessment models in the accounting education literature that adjusted individual grades (Johnson and Smith, 1997; McConnell and Sasse, 1999; Mahenthiran and Rouse, 2000; Miglietti, 2002). Whilst their application varied, each peer assessment model was completed in hard copy form, used a point allocation system to distinguish the performance of group members and had "contribution" as one criterion for assessment. With the exception of Johnson and Smith (1997), our initial concern with the peer assessment models is their over emphasis on contribution. Each model appears to be an effective reward/punishment mechanism, which encourages students to engage in group work activities and thereby improve their teamwork skills. We suggest requires more comprehensive and prescriptive criteria for assessing students' teamwork skills for assurance of learning purposes.

The literature on the implementation of peer assessment strategies is divided into two main fields: the benefits to learners and reliability and validity issues (Boud and Falchikov, 2007, p. 132). As SPARK[PLUS] was used as a means of collecting data and assessing teamwork skills for assurance of learning purposes, our focus is on issues of reliability and validity of strategies and methods aimed at assessing and evaluating students' group work skills and performances. Peer assessed grades may cluster around an average and students may feel uncomfortable about criticising their colleagues (Ballantine and Mccourt Larres, 2007a, p. 167). Further, students may be too critical or generous about other group members (Goldfinch, 1994) and gender bias may exist (Falchikov and Magin, 1997). There is also the possibility of grade inflation, that is, the relationships developed in the cooperative learning environment may encourage students to give peers higher evaluations which do not reflect their actual performance (Johnson and Smith, 1997). This can be contrasted with Gibbs' review of the peer assessment literature, which suggests that peer assessment marks are no more or less reliable than teachers' marks, albeit that reliability can be affected by the number of peers (Gibbs, 2009). Race (2007) has also reported that average student assessments against criteria closely resemble the actual marks given by tutors (within 0.5 standard deviation).

Despite its potential hazards, peer assessment was our preferred form of assessing teamwork skills on the basis that "students who have been part of the team process are best positioned to evaluate individual contribution within their own group" (Gammie and Matson, 2007). The alternative to peer assessment of teamwork skills – instructor monitoring – would be resource intensive and simply not feasible in large classes (Thompson and McGregor, 2009). Further, there is no guarantee of instructor objectiveness and their presence may alter student behaviour in a way that negatively affects the group environment.

SPA criteria
Criteria-based SPA is well described in the higher education literature (Michaelsen *et al.*, 2004; Thompson *et al.*, 2008; Taylor *et al.*, 2009). Lejk and Wyvill (2001) confirmed that criterion-based approaches to peer assessment of group contributions are more discriminating than holistic scoring, although they argue that both formative and holistic approaches have merit. Race (2007) recommended the use of self-assessment strategies based upon explicit criteria. Recently, the impetus for using explicit criteria in assessment has been the need to accumulate measures of higher order learning goals

that may be constructively aligned (Biggs and Tang, 2007) with contextualised and specific assessment task criteria for assurance of learning purposes. This recent development has led to a proliferation of recommended generic rubrics (Rhodes, 2010; Oliver, 2011) that are descriptive of student performance across a range of broad outcome categories, including teamwork and group communication. The performance level descriptors for each criterion in the rubric are adaptable to various evaluative purposes, including threshold standards for assurance of learning as well as categorised marking and grading of individual students.

3. Case study: SPARK[PLUS] in company accounting
Background – assurance of learning

Accreditation was the key driver behind the adoption of criterion based SPA of teamwork skills in company accounting. The "ability to work effectively in groups" (teamwork) was a program learning objective (PLO) of the undergraduate accounting degree as part of the AACSB assurance of learning process. The university was required to demonstrate that one or more of the accounting courses included teaching and learning activities and assessment of teamwork (one of many PLOs) for accreditation purposes. A strategic review of the accounting degree (strategic review) entailed the mapping of the accounting curriculum against the PLOs. This curriculum mapping exercise identified a "gap" in the teaching and assessment of teamwork skills. Company accounting, a second year undergraduate accounting course, was selected to develop and implement a formal mandatory group assessment item. Although the course already had a group assignment, it was deficient both in assessment and design from an accreditation perspective. Previously group formation was optional. No peer assessment existed as students self-assessed their group work skills using a rubric, and the group only model of assessment lacked the individual accountability demanded of a cooperative learning environment.

A short survey of the company accounting cohort was also undertaken in the semester prior to the implementation of SPARK[PLUS] to gauge student attitudes towards group work. The survey included three questions that students responded to on a seven point Likert scale ranging from (1) "not at all" to (7) "to a great extent". These questions focussed on the students' attitudes towards group-assessed activities as an aid to learning, their preference for individual assessment and their opinion as to how group work would provide skills useful for their future working life. A summary of the demographic data is provided in Table I. The average student age was just over 24 years. The gender of the sample was weighted to female students, with most students of Australian nationality and had completed year 12 as the highest education level.

The descriptive statistics are included in Tables II and III. The results show that for the first question relating to group work providing assistance to learning, the 93 students surveyed rated the item around the mid-point of the mean (3.95). As shown in Table III, despite the mean (3.95) being around the mid-point, 22.6 percent of students responded by rating 1 and 2 suggesting that they are sceptical that group work would assist their learning. At the other end of the scale 15.1 percent of students rated 6 and 7, and therefore thought group work would be helpful. Question 2 relating to a preference for individual assessment has a mean of 4.98, with 49.5 percent of students rating a 6 and 7 suggesting that students have a preference for individual assessment. Question 3 relates to the benefit of group work in a students working life

Demographic characteristic	Total sample ($n = 93$)
Age	
Mean	24.47 years
Minimum	18 years
Maximum	53 years
Gender	
Female	64
Male	29
Nationality	
Australian	53
Chinese	11
Korean	5
Other	24
Education level	
Year 12	51
TAFE	34
Other	8
Degree	
Accounting	67
Finance	1
Economics	1
Double major	23
Undecided	1

Table I.
Demographic data
of the sample

Variable	Actual range	Mean	SD
To what extent have you experienced group assessed activities as an *aid to learning*	1-7	3.95	1.49
In 2103AFE I would prefer to be *assessed individually* rather than in a group scenario	1-7	4.98	1.81
To what extent will working in a group provide you with *skills* that can be used in your *future working life*?	2-7	4.87	1.31

Notes: $n = 93$; scale: "1" – not at all, "7" – to a great extent

Table II.
Descriptive statistics for
variables in the
background study

Variable	Frequency percentage						
	1	2	3	4	5	6	7
To what extent have you experienced group assessed activities as an *aid to learning*	3.2	19.4	11.8	30.1	20.4	10.8	4.3
In 2103AFE I would prefer to be *assessed individually* rather than in a group scenario	5.4	6.5	8.6	19.4	10.8	23.7	25.8
To what extent will working in a group provide you with *skills* that can be used in your *future working life*?	0	5.4	9.7	21.5	29.0	24.7	9.7

Notes: $n = 93$; scale: "1" – not at all, "7" – to a great extent

Table III.
Frequency of responses
to variables in the
background study

with a mean of 4.87 comprising 34.4 percent of students recording a rating of 6 and 7 and 15.1 percent recording a rating of 1 and 2. This suggests that most students appear to recognise the benefits of group work to their future working life.

The results suggest that students were sceptical that group work would assist their learning and that they preferred individual assessment. However, students did acknowledge that group work would benefit them in their future working life.

These findings confirmed our understanding of students' attitudes to group work identified during the strategic review. It appears that although students understand that group work will equip students with the skills required in future work life, they are not convinced that this will assist them in their university studies. SPARK[PLUS] was implemented in company accounting in the following semester as an appropriate model for facilitating SPA and collecting data on teamwork skills for assurance of learning.

SPARK[PLUS]

In previous offerings of the company accounting course, students who elected to form groups self-assessed their teamwork skills using a paper-based rubric. The rubric described standards of performance on a five-point scale from "excellent" to "unsatisfactory" for the following five criterion: working cooperatively; conflict resolution; leveraging group member skills; time management and equity. Student completion of the rubric was a condition of submitting their assignment, but student grades were not adjusted on account of their self-assessment. Paper-based instruments generate administrative challenges, especially in contexts where there are large student numbers such as the company accounting cohort (Thompson and McGregor, 2009).

With consideration to this scale, the necessity of technology solutions to support peer ratings procedures was apparent (Willey and Freeman, 2006; Robinson and Walker, 2008; Kavanagh *et al.*, 2012). The use of an online system for recording perceived performances of self and peers reinforces to students that in contemporary workplaces, work can be progressed virtually as well as face-to-face. This supports the development of teamwork skills both in-class as well as out-of-the-classroom environment. One such solution is the peer evaluation form published in Kavanagh *et al.* (2012) relating to student team virtuality. Students completing a virtual group project conducted peer and self-assessment using an electronic peer evaluation form, which included criterion on teamwork skills as well as quantity and quality of the students' work, in order to provide "individualised grading for teamwork" (Kavanagh *et al.*, 2012, p. 48). Following a review of the peer evaluation forms, the teacher awarded a mark representing up to 20 percent of the overall assignment mark.

SPARK is a widely used online SPA application, which has been described and evaluated in the literature (Freeman and McKenzie, 2002; Thompson and McGregor, 2009). Thompson and McGregor (2009) not only describe the implementation of SPARK in their business and design courses and evaluate its benefits but also assess student results generated by SPARK. Since these studies, a new and improved SPARK system has been developed known as SPARK[PLUS] (Freeman *et al.*, 2011). This paper makes an original contribution to the existing literature by: describing the implementation of SPARK[PLUS] in the context of an assurance of learning process; providing a preliminary study of student attitudes towards group work before and after the implementation of SPARK[PLUS]; and revealing the issues, both from a teacher and student perspective, concerning its implementation.

Design of assessment criteria
In assessing group work there is a need to award marks separately for both achievement of intended cognitive outcomes of a group project (by the group as a whole), as well as to identify varying individual contributions to group outcomes and the achievement of teamwork skills (by distinct individual members). SPARK[PLUS] provides a sophisticated scoring of this combined achievement, by individualizing the teamwork skill achievement component (SPA factor), which is used to modify overall cognitive group project marks, thereby recognizing the overall achievement of individual and group with a more reliable measure which can be used both formatively and summatively.

Table IV sets out the criteria and the associated descriptors for SPARK[PLUS]. The SPARK[PLUS] assessment framework was developed following a review of the paper-based rubric by the university curriculum consultant who had extensive experience with implementing teamwork skills assessment criteria in business courses. There were five SPARK ratings for each descriptor: "well above average"; "above average"; "average"; "below average" and "well below average" placed progressively at 20 point intervals on a continuous 100 point scale and weighted equally. Students do not have the opportunity to modify or add descriptors as assurance of learning dictates that the criteria for assessing team work skills is consistent. The descriptors provide, in our opinion, a more detailed assessment of teamwork skills than previous peer assessment models referred to in the accounting education literature (Johnson and Smith, 1997; McConnell and Sasse, 1999; Mahenthiran and Rouse, 2000; Miglietti, 2002). Our design of the SPA criteria also differs from what could be described as a traditional rubric model adopted in previous studies including Kavanagh *et al.* (2012) where standards of performance are described for each criterion ("Kavanagh assessment"). Like the Kavanagh assessment, teamwork skills represent the criteria being assessed. Unlike the Kavanagh assessment, our model provides multiple descriptors attached to each criterion, with students self and peer assessing each descriptor. Further, the notion of "contribution" is contextualised. For example, the descriptor "makes contribution according to agreed group schedule" is attached to the teamwork skill "work cooperatively

Criterion	Descriptors
Work cooperatively and time management	1. Able to listen
	2. Shares information
	3. Provided leadership
	4. Organised and efficient
	5. Makes contribution according to agreed group schedule
Conflict resolution	1. Manages conflict effectively and constructively
	2. Works towards positive resolutions to group issues
Leveraging group member skills	1. Respects each group member's skills and strengths
	2. Balances own skills and strengths with overall group to achieve best possible group outcomes
Values and equity	1. Respectful of diversity of group member values, knowledge and experience
	2. Made a fair contribution to the overall workload

Table IV.
SPARK criteria and
descriptors

and time management". We contend that contextualising contribution improves the assessment model from an assurance of learning perspective as students better appreciate the connection between quantity and quality of the output and specific teamwork skills. It is important that students recognise that the grading model is seeking to support the development of teamwork skills as its main objective as well as providing a measure of accountability for the students' contribution to the group project.

Implementation of SPARK[PLUS]

Prior to the implementation of SPARK[PLUS] a one-hour orientation session was delivered by the Curriculum Consultant as part of the weekly lecture. The formal part of this presentation took approximately 15 minutes with the remaining time used in addressing students concerns. The rationale for using SPA was discussed, and students had a chance to express their views on group assessment. Students were then briefed on the criteria and what they should be looking for in their own and peers' performances. Then the procedures for logging on to the system and completing the ratings were demonstrated. The computations of the SPA ratings and their impact on the individual's final mark were explained. All this information was also made available via pages on the course learning management system web site.

In addition, students were asked to do a "formative" rating shortly after their groups were formed. The purpose of the formative rating was introductory, procedural and pedagogical. The introductory and procedural purposes were to ensure that students could access the system via correct account details, and to check that all students' group membership details were correct. Pedagogically this first rating experience was used to form students' awareness that through summative mandatory ratings, group work was an inescapable requirement with a transparent and equitable outcome showing a relationship between individual contributions and recognition in terms of marks. Formative feedback to support development of teamwork skills and summative assessment of the achievement of teamwork ability is provided in the first rating, which was labeled "formative". Although data from this first iteration of self and peer ratings is not applied to any formal marks, it is a reflective opportunity for students to see how their contributions are being noted and perceived by other group members. It helps them to realise before it is too late that there is accountability at the individual level. It also provides data at a point in time where the teaching team still has the opportunity to intervene for a team that is either idle or dysfunctional.

Students completed their summative SPARK[PLUS] ratings after their group assignment was completed. The SPARK[PLUS] system generated a SPA factor, the normalised average across all criteria of all self and peer ratings, which was used to redistribute the marks achieved at the group level to the individuals (see Figure 1, excerpted from student support materials).

Figure 1.
Illustration of the calculation of adjusted group mark

Student	Firstname	Lastname	SPA	Raw Group	Adjusted Group Mark
s2345671	Barry	McKenzie	1.11	0.80	0.89
s1234567	Molly	Hatchett	0.8	0.80	0.64
s3456712	Lois	Lane	0.99	0.80	0.79
s4567123	Fleur	Lau	1.2	0.80	0.96
s5671234	Kendra	Ramos	0.8	0.80	0.64

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By normalising the average around the threshold of 1.0, SPA factors above 1.0 represent an above average performance relative to other group members, while factors below 1.0 represent performance at less than average. Note that the self-rating carries equal weight with peer ratings, however the software also provides a measure whereby the self-rating can be compared with the peer ratings, allowing the teaching team to identify cases where the individual may be trying to game the system if he/she expects poor peer ratings or where a student has an inflated view of their own and others' contributions. In these cases, the system allows for the recalculation of the SPA factor excluding the self-rating. If there are at least three students in a group, the marks are anonymous. With two student groups, there is no real anonymity possible.

For assurance of learning purposes, the data were then examined and aggregated at the criterion level, with categorisation into each of the four criteria groupings based on the original paper-based rubric. The data were then presented to the course and program teams in chart form, for discussion and reporting in the "closing the loop" stage of the assurance of learning process.

Student evaluation
A separate pre and post-rating instrument to the standard university student evaluation of teaching and student evaluation of course instrument was completed by company accounting students in the first semester in which SPARK^{PLUS} was implemented. Students were asked to provide their student number or name as an identifier for matching purposes for each of the pre- and post-surveys. This identifier was deleted once matching of surveys using the SPSS statistical computer program was completed. The instrument was designed to collect information about "what was taught and what was learned, the value of that learning, and the effects of learning upon student learning" (Pratt, 1997, p. 35). Two questions were included in the pre- and post-rating instrument that focussed on the students' attitude to group assessment and the fairness of group work.

In terms of demographics, 32 students (20.4 percent) have used SPARK^{PLUS} when completing group work in another course, while 126 students (80.3 percent) have been involved in group work in a prior course. This would indicate that while the majority of students have experience in teamwork most have not used SPARK^{PLUS}. It is noted however that although the majority of students have not used SPARK^{PLUS} for SPA they may have used other manual or computer based forms of peer assessment or SPA. Student ratings may therefore have been influenced by such other previous experiences.

Students responded on a seven-point Likert scale ranging from (1) "very negative/poor" to (7) "very positive/excellent". The post-rating questions in the instrument focussed on the impact of SPARK^{PLUS} on a range of attitudes related to group work and consistent with the SPARK criteria used (Table IV). Paired samples *t*-tests were conducted on the matched responses to assess any changes in their opinions. The results are provided in Table V. A significant difference was found on the question in regard to attitude to group work ($t = -1.771$; $p = 0.079$) suggesting students perceived that there were benefits from engaging in the SPARK program.
The final survey resulted in 157 useable responses. Table VI includes the descriptive statistics resulting from the post-rating section of the survey instrument. These results show that for all questions, students rated the items in each category around the midpoint to the mean. Notably the responses to the use of SPARK^{PLUS} show that

students rated their enjoyment in using this program as below the midpoint to the mean. This may be explained by the fact that students may feel uncomfortable about criticising their peers (Ballantine and Mccourt Larres, 2007b) or a lack of understanding about the operation and benefits of SPARK[PLUS]. This is illustrated through the demographic data relating to the SPARK[PLUS] implementation that shows that although 80.3 percent of students had previous experience in group work, only 20.3 percent had previous experience in using SPARK[PLUS].

By comparing the mean points of the survey results collated in the strategic review prior to the introduction of SPARK[PLUS] (as presented in Table II) (the pre-SPARK instrument) with the results after the implementation of SPARK[PLUS] (the post-SPARK instrument) presented in Table VII, a number of observations can be made. First in relation to group work as an aid to learning, the pre-SPARK instrument showed a mean below the mid-point (mean = 3.95) compared with the post-SPARK instrument (mean = 4.80). Second, in relation to student's preference for completing the assignment individually, the mean has declined from the pre-SPARK instrument (mean = 4.98) to the post-SPARK instrument implementation survey (mean = 4.51). These results suggest that by formalising the group work process and assessing teamwork skills, students see a benefit to their learning and are more willing to undertake group work. Finally, in comparing the mean scores for the use of group work in the development of employability skills, there was a decrease noted in the mean scores from the pre-SPARK instrument (mean = 4.87) to the post-SPARK instrument (mean = 4.47). This small change in mean score may indicate that the development of group work skills was not emphasised in terms of providing the link between the process being undertaken and "real life" at the time of assignment submission.

The above results were supported by comments made by students as part of the post-SPARK instrument. Students appeared to understand the use of group work and the implementation of the SPARK[PLUS] to facilitate teamwork skills with comments including:

I think the SPARK system is a great way to get the group working as a team, as it assists them as to how to work in a group and really helpful tool to assist the performance of group work.

Opinion questions	t-value	Two-tailed sig.
Attitude to group assessment	−1.771	0.079[*]
Fairness of group work	−1.430	0.155

Notes: Significant at: [*]$p = 0.10$; $n = 157$; scale: "1" – not at all, "7" – to a great extent

Table V.
Student perceptions of group work (pre versus post survey)

Demographic characteristic	Total sample ($n = 157$)	Percentage of total sample (%)
Previous experience in group work		
Yes	126	80.3
No	31	19.7
Previous experience in using SPARK		
Yes	32	20.3
No	125	79.7

Table VI.
Demographic data of the SPARK implementation sample

Variable	Actual range	Mean	SD
Post-rating			
In your opinion did the use of SPARK assist in the conduct of group work overall?	1-7	4.20	1.91
In your opinion did group work and the accompanying assessment assist in the development of skills for employability?	1-7	4.47	1.56
In your opinion did group work and the accompanying assessment benefit your learning in company accounting?	1-7	4.80	1.60
In company accounting I would have preferred to complete the assignment by myself	1-7	4.51	2.07
In company accounting I enjoyed using SPARK as part of the group work assessment process	1-7	3.99	1.83
Notes: $n = 157$; scale: "1" – poor, "7" – to a great excellent			

Table VII.
Descriptive statistics for
the variables in the study

SPARK[PLUS] was also recognised as a means to minimise the free rider problem supported by the comment: "it's a good way to punish those guys who are not really engaged in the assessment". However, in assessing the survey responses directly related to SPARK[PLUS] for each question, 22 students (14 percent) recorded a response of 1 "poor" to each question. Student comments supported this negative sentiment, including: "Don't like SPARK. Wasted my time having to evaluate people and in my opinion, SPARK wasn't needed".

This negative sentiment was not all related to the SPARK instrument but attributable to a variety of factors including a lack of student understanding about the importance of teamwork skills in the "real world" and/or an aversion to group work in general. 12 respondents noted "poor" to the item relating to development of skills for employability in the post-SPARK instrument. In the qualitative study students noted that:

Group assignments create more hassles than learning accomplishments and group work should be replaced it's not fair. Despite intentions to mimic "the real world", our personal marks and own money are on the line.

These comments support the evidence from the post-SPARK instrument where students were above the mean on all items relating to group work and SPARK[PLUS]. It should be noted that this includes a preference to complete an individual assignment. It would appear that students understand the importance of group-assessed activities in developing teamwork skills that will assist them in their future careers but would prefer not to engage in teamwork for a variety of reasons.

Initial teacher perspectives

From a teacher perspective we devoted considerable time and resources to the implementation of a group work rubric, SPARK[PLUS] and to ensure that this process was successful. Whilst there was no systematic data collection of teacher perspectives, general discussions amongst those involved revealed that teaching team members were disappointed with the survey results. They considered that SPARK[PLUS] would capture a students' perception of their contribution and experience, relative to their team, moderate and convert it to an objective performance measure that would be used

for grading. It appears that this was not communicated clearly enough to students in the implementation process. Future semesters will include additional resources devoted to improving teamwork through use of formative SPARK^{PLUS} ratings as well as other teamwork skill resources such as review of minutes and observation; introducing students to SPARK^{PLUS} and the use of the technology, and feedback to students relating to the teamwork process following assignment submission. Despite the disappointing research findings, teaching team members considered the experience with SPARK^{PLUS} from an assurance of learning perspective was generally positive. Within a large class setting, the system appeared to be an efficient and effective means of generating documentary evidence for accreditation bodies that accounting students had engaged in learning activities and assessment of teamwork skills.

4. Limitations and future research

A significant limitation of this study, and a valuable lesson for accounting educators, lies with the peer assessment model itself as a means of assessing and assuring the learning of team work skills. There is no absolute external standard for teamwork against which student achievement can be assessed. Assurance of learning data in this study are collected using a relative standard where achievement is gauged against the standard within the team. It would be useful in future research to develop a more robust approach to assess and assure student achievement of teamwork skills. As a further limitation attached to peer assessment, students may not have the experience to assess their own teamwork skills and those of their peers. In other words, student perceptions may not reflect the objective reality of their teamwork skills. Despite the majority of students having engaged in teamwork in prior subjects it cannot be determined what that experience was or what was learned in terms of teamwork processes. In future research, students should be provided with formalised teamwork exercises to ensure they are better informed and therefore better equipped to apply teamwork standards when forming their judgements.

The findings of this study should also be viewed in light of the short time horizon and preliminary nature of the analysis, response biases and group effects. The survey instrument concerning students' attitudes to online SPA was conducted in one semester that enabled the authors to make preliminary observations. The results of the paired samples *t*-tests were based on matched responses in pre- and post-surveys. In any future surveys where matching of samples is to be performed it is essential that the scales used and the phraseology of questions/statements is consistent to ensure there is no effect on respondents interpretations. The study should (and will) be conducted over several semester offerings of company accounting for three reasons: to address any immediate issues; to ensure the study's objectives are met; and that the results are empirically valid and generalizable. A further limitation may lie in the method of implementation of the SPARK^{PLUS} technology and its presentation to students for use in teamwork. Further development of these areas is required for improved implementation in future semesters.

Further research may entail various dimensions of group work previously documented in the accounting education literature, but which can be applied to the online SPA model. Studies may include the effect of group size and formation on SPA results, the effect of online assessment on group dynamics and whether a cooperative learning environment with SPA improves academic performance to a greater or lesser

extent than the same environment without this form of assessment. Researchers may also wish to follow the progress of accounting students after graduation and study their employers as a means of comparing the graduates' teamwork skills with those graduates of the employer who did not encounter comprehensive SPA during their undergraduate studies.

Researchers may also wish to conduct research into the use of SPARK in facilitating the group work process. Based on the experience from this exploratory and preliminary study, further development of the use of the formative SPARK rating process may provide students with the opportunity to give/receive feedback and hence uncover and develop relative team skills thereby encouraging their development during the semester. This may be done using such methods as structured in-class briefings, discussion of team minutes and/or individual work logs, and observations of the group at work. Summative assessment of the achievement of teamwork ability should also be provided to students and their group at the conclusion of the assignment to communicate with them how they achieved as a group and assist them in continued development of their team skills.

5. Conclusion

This preliminary study advances our understanding of the implementation and impact of an online model to assess the teamwork skills of intermediate level accounting students. This study was motivated by the call of professional and accreditation bodies for universities to recognise the importance of generic skills in accounting education and implement a quality assurance framework that demonstrates teaching and learning activities and assessment of teamwork skills, especially in the context of large class sizes. The introduction of SPARK^{PLUS} facilitated the collection of necessary data on teamwork skills for assurance of learning purposes and was a means to formally grade students on their teamwork skills by adjusting the group assignment mark for each student.

The post-SPARK instrument results and qualitative data suggest that students understand the benefits of group work activities in developing their technical knowledge of company accounting. This exploratory study points to the need to understand the introduction and evaluation of such pedagogical approaches developmentally over time, both for the teachers and the learners concerned. We note in this case that students do not yet understand the connection between group work and generic skills development or how the SPARK^{PLUS} assessment tool supports group work activities. As such, the findings of this study present course convenors with a number of challenges. It would appear that students require additional group work and SPARK^{PLUS} training during their degree, in particular: the importance of developing teamwork skills in the "real world" of accounting; the benefits of SPA; the descriptors used to assess teamwork skills; and how and why SPARK^{PLUS} adjusts the individual student mark for the group assignment. Similarly in succeeding implementations, course convenors will be advantaged by improved expectations of students concerning the assessment of group work, as well as having the opportunity to build in more reflective activities that are possible when students come into a course with a more mature expectation of group work. Nevertheless, the current study provides a foundation for improving the design and assessment of group work activities to achieve the generic skills outcomes required by both professional and accreditation bodies.

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