

# Chapter 7

## Collaborative Assessment Survey: A Measure of Group Teamwork



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**Abstract** In the twenty-first century, employers require graduates to work in teams. To do this, they need to collaborate as a team on completing certain tasks. Teamwork is an important skill for building interpersonal skills for employability. According to the Malaysia Higher Education Blueprint, there is a mismatch in the supply and demand of graduates, with employers reporting that graduates lack the requisite knowledge, skills, and attitudes. Yet there do not seem to be many tools to effectively assess teamwork. One possibility is to measure factors that influence the success of collaboration among the students. To explore students' collaborative skills, an instrument known as Collaborative Assessment Survey (CAS) was adapted based on a 5-point Likert scale with 29 items divided into six categories of environment, membership, process and structure, communication, purpose, and resources. The assessment was administered upon accomplishment of a collaborative group task using a different type of collaborative tool such as discussion forum and wikis. The findings show that the major factors influencing success of collaboration among the students are communication and process followed by purpose and environment. Membership characteristics and resources seem not to influence group collaboration in this study.

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## Introduction

This chapter is set in the context of assessing student performance in a more holistic way. Its key focus and emphasis are on the changes to traditional, standardized assessment made possible by one of the alternative assessments known as peer assessment. This chapter introduces the importance of peer assessment and explores the context, environment and challenges in which it thrives. Assessment is one of the most critical elements of the teaching and learning process (Spector, 2016). In the context of higher education, however, assessment has traditionally concentrated on information retention where students are assessed by standardized assessment and academic assignments. That means less room for assessing students' generic skills which are important in this twenty-first century with traditional tests. Therefore, alternative assessments such as peer assessment are vital because skills such as critical thinking, reflection, and knowledge construction are core skills necessary for lifelong learning (Ibarra-Sáiz & Rodríguez-Gómez, 2020) and employability.

A wide range of generic skills are required for employability such as adaptability and self-evaluation, collaboration, communication, creativity, critical thinking, information technology, and numeracy (Candy et al., 1994; Leung, 2008). Several researchers have also identified teamwork as one of the generic skills to be developed among learners just as purposefully and precisely as their academic skills (Laal et al., 2012). Teamwork is important in education because learners who work in teams acquire higher levels of thinking and retain information much longer than learners working in isolation (Mizell, 2010; Makokha & Mutisya, 2016). Working in teams is not only for successful completion of assignments. This is because by ensuring shared learning goals, learners can be challenged socially and emotionally, as they need to listen to different perspectives and are required to articulate and defend their ideas (Fransen et al., 2013; Pegrum et al., 2015). By doing so, the learner constructs new knowledge, makes meaning of the knowledge, and practices critical thinking, all skills which can be transferred to the workplace (DeWitt et al., 2014; Liu et al., 2016).

According to the Malaysia Higher Education Blueprint (2015), there seems to be a mismatch in the supply and demand of graduates, with employers reporting that graduates lack the required knowledge, skills, and attitudes. One of the skills required by employers is the ability to work in teams. In order to develop this skill, employees would need to be able to collaborate as a team on their tasks. Teamwork is an important skill for building interpersonal skills for employability (Learning Partnership for Twenty-first Century, 2016). This is because graduates of higher education institutes who come into the workforce may be required to work on projects with people from different disciplines, with differing learning and working styles. Success of the project undertaken may depend on quality teamwork and collaboration in achieving shared goals. Hence, the aim of the Ministry of Higher Education (MOHE) as stated in the Malaysia Education Blueprint is to produce learners who will be effective communicators, emotionally intelligent and able to work across cultures; socially responsible, competitive, resilient, and confident to lead and work in teams.

On the other hand, very few tools which can effectively assess teamwork. One possibility of measurement is the perception of collaboration among the group members (Cristina et al., 2015; So & Brush, 2008). Hence, what is required is a tool which can assess learners' collaborative skills. Collaborative tools are described as an "architecture of participation" because they promote a user-friendly platform, allow immediate learner response and structural levels, and value each participant's opinion (McAfee, 2006). Besides that, collaborative tools are also known as Web 2.0 applications (Biasutti, 2017). The term Web 2.0 refers to Internet technologies that enable and promote Web content development through social and collaborative effort (Oliver, 2010) and allow rich and varied information resources to be accessed promptly and globally (Firat & Koksall, 2017). Collaborative tools include content creation (blogs, wikis, podcast); social networking sites (Facebook, Twitter, YouTube); bookmarking (tagging and RSS feeds) and communication tools (text messaging/chat and discussion forum) that can be integrated into teaching and learning to promote learning through social interaction. According to Mattessich et al. (2004), six (6) factors influence success of student collaboration. They are environmental, member characteristics, communication, purpose, process, and resources. Hence in this study, the Collaborative Assessment Survey (CAS) instrument was developed from the Wilder Collaboration Factors Inventory (Mattessich et al., 2004) to measure students' collaborative skills for teamwork. The next section of this chapter will discuss further on peer assessment and collaborative learning.

## Peer Assessment as a Learning Measurement Tool

Peer assessment, sometimes known as peer evaluation, peer feedback, peer review, or peer critique (Shen et al., 2020) is used as a investigable tool to encourage students to self-appraise their learning performance. Peer assessment could be used in a small group to facilitate class discussions that promote collaborative skills and teamwork (Suen, 2014). Since teamwork is important in education for learners to acquire higher levels of thinking and information retention, peer assessment could be used by instructors to encourage active student participation.

However, in some cases, there are some "sleeping partners" in every team project. Most students have a negative view of team projects that often arise when one or more team members do not contribute the same amount of work. Therefore, instructors could apply peer assessment when they are unable to observe contributions of each member during collaborative learning.

Peer assessment could be implemented into practice in various ways. For example, it can be used as assessment of learning (AOL) and assessment for learning (AFL). Assessment of learning, or AOL, is mostly done at the end of each topic or unit that students have learned as a summative assessment. This will serve as evidence of student understanding and achievement over their own learning (Nielsen, 2014). Besides that, peer assessment could be implemented as assessment for learning (AFL)

by instructors as an investigable tool in order to identify students' current understanding on topics learned, preconceptions and gaps. Since AFL happens during the learning rather than at the end, it shifts from summative to formative assessment. Hence by using peer assessment as a formative tool, students can understand their learning outcomes and expectations of the topic learned. This will help students to take control of their own learning by monitoring their learning progress. Instructors can also give prompt feedback on student learning and suggestions how to improve student work to move forward (Shen et al., 2020; Vlachopoulos & Cowan, 2010; Zainuddin & Attaran, 2015).

## The Nature of Collaborative Learning (CL)

CL occurs through face-to-face or computer-supported settings (Dillenbourg, 1999; Laal & Laal, 2012). In both traditional and online learning modes, CL has been proven to be an effective instructional method (Bernard et al., 2000). CL is a process of teaching and learning, whereby a group of learners work together toward a shared common goal through problem-solving, task accomplishment, or knowledge creation (Dillenbourg, 1999; Kuo et al., 2017; Laal & Laal, 2012).

Besides that, CL also enables acquisition of knowledge, skills, and attitudes which results from group interactions (Johnson & Johnson, 2004). CL takes place when learners in a group discuss a task or resolve a problem with the assigned learning materials, without immediate intervention from the instructor. Mutual engagement occurs among learners who solve the problem together, synchronously through either face-to-face interactions or otherwise (Roschelle & Teasley, 1995). However, CL among group members can also occur asynchronously when technology is integrated, and instructors or peers moderate the discussion.

Six factors influence the success of collaborations formed by students (Mattessich et al., 2004):

- environmental characteristic consists of the geographic location and social context within which a collaborative group exists;
- member characteristics consisting of skills, attitudes, and opinions of the individuals in a collaborative group;
- communication refers to the medium used by students and peers to send and receive information so that will be able to keep each other informed, and convey opinions to influence group actions;
- purpose refers to the reasons for the collaboration and the result the group seeks in accomplishing a specific task;
- process related to the decision-making and operational systems of a collaborative effort whereby group members feel "ownership" of both the way the group works and the end results; and
- resources which can be financial and human "input" to develop and sustain a collaborative group.

Hence, CL is a natural process through social interaction and the establishment of group understanding happens naturally among a community of learners through social interaction and the establishment of group understanding. CL can promote joint construction of knowledge among learners when factors that influence success of CL are being addressed. The next section will discuss the use of Collaborative Assessment Survey (CAS) as a tool for assessing CL.

## Implementation of CAS

This quantitative case study measures collaborative skills among undergraduates in a course using the Collaborative Assessment Survey (CAS). The context is an undergraduate course in Basic ICT skills in the Faculty of Education in a public university in Malaysia. The course participants were the first year and first semester students. The undergraduate course was selected because, in the twenty-first century, teamwork and collaborative skills are essential for preparing students for the future at the freshman level as they were new to life in the university (Learning Partnership for Twenty-first Century, 2016). The 22 participants were selected for this study through convenience sampling as they were willing to participate and were available for the study.

The study was conducted over three weeks during the course. In the first phase, a collaborative group task for creating content on the topic of cybercrimes was done using wikis and discussion forums. Students were also exposed to the model of e-learning throughout the semester (Salmon, 2000). Upon completion of a collaborative group task at the end of course, all the members in the group were asked to evaluate their members using the CAS.

Data collection was done using the scores of the CAS. The CAS was adapted from the Wilder Collaboration Factors Inventory (Mattessich et al., 2004) and used for peer assessment. The CAS was developed based on a 5-point Likert scale for 29 items under 7 components: member characteristics, process and structure, environment, communication, purpose, process, and resources. The instrument reliability exceeded 0.70 with a total Cronbach alpha of 0.96. All the scores were recorded and analyzed to determine each individual's score and converted into percentages.

## Discussion

The CAS was used to evaluate collaborative skills for teamwork among students. The total scores for each student were converted into percentages to answer the research questions: to what extent does CAS measure collaborative skills among students? In the analysis of the CAS instrument, it showed that students demonstrated collaborative skills. The analysis of the collaborative skills from the CAS showed higher scores for the communication and process (Mean = 3.939; S.D. = 0.550; and

**Table 7.1** Mean and standard deviation of collaborative skills

Component	Mean	Standard division
Member characteristics	3.864	0.6719
Process and structure	3.849	0.795
Environment	3.875	0.654
Communication	3.939	0.550
Purpose	3.909	0.736
Process	3.939	0.717
Resources	3.773	0.681

Mean = 3.939; S.D. = 0.550, respectively as in Table 7.1). The findings are in line with students' remarks such as *"People in this collaboration communicate openly with one another," "I am informed as often as I should be about what goes on in the collaboration," "The people who lead this collaborative group communicate well with the members."* The communication allows the students to work as a team to achieve a common goal in the project since they able to be transparent with each other.

In addition, there were process-related activities in the CL assessment. Students commented that *"each of the people who participate in decisions in this collaborative group can speak for the entire organisation they represent, not just a part", "There is a lot of flexibility when decisions are made; people are open to discussing different options," "People in our collaborative group are open to different approaches to how we can do our work"* and *"They are willing to consider different ways of working."* These remarks reveal that CL has allowed students to voice out their opinions and brainstorm options for decision-making when working on the project. Further analysis of the individual items showed that the students scored lowest on the resources (Mean = 3.773; S.D. = 0.681) as they lack an adequate fund or team members to develop and sustain a collaborative group.

The findings show that CAS is able to measure students' collaborative skills in different components. CL has a positive impact on learning. First, CL promotes knowledge construction as students create meaning for themselves rather than just receiving information (Hannafin et al., 2009; Jowallah, 2014; Kim & Song, 2005; Suthers, 2006). CL is also a meaning-making process as students integrate others' perspectives, synthesize, and make sense of ideas (Koschmann, 2002; Nastasi & Clements, 1992; Roschelle & Teasley, 1995). Knowledge construction and competencies can be developed when CL is applied to ill-structured, complex tasks in an authentic context (Jonassen, 1991, 1994; Keen, 1992). Therefore, by creating shared goals, shared exploration, and shared meaning-making process, learners can achieve deeper level of knowledge- generation (Palloff & Pratt, 2001).

Further, CL promotes and improves student memory, produces fewer errors, and motivates learners and assists them in retaining information rather than working individually (Bligh, 2000). In the same vein, DeWitt et al. (2017) agree that working together with peers or instructors has a positive influence on learning. Hence, CL

promotes knowledge construction in a meaningful learning environment. So, this mean that the CAS instruments can be used to measure collaborative leaning and teamwork for this purpose.

The ability to work effectively with others has become a critically important skill for career and life success. Employers are seeking graduates who demonstrate high levels of collaboration skills by considering the views of others, ability to coordinate ideas and problem-solving processes in teams, to forge consensus, and to use negotiation strategies for conflict resolution (Learning Partnership for Twenty-first Century, 2016). In particular, graduates who demonstrate collaborative and teamwork skills in their tasks show higher performance in team settings, earning higher performance ratings on the job, and receive better remuneration and benefits (Learning Partnership for Twenty-first Century, 2016). This is in line with the Ministry's call for higher education instructors to enhance students' generic skills such as communication skills, teamwork skills and ICT skills among others since it will enable the graduates to function effectively in a wide range of social and professional contexts.

CAS also serves as peer assessment in providing formative feedback to learners on the collaborative task they have been doing. Collaborative assessment also can be used as self-assessment when students reflect on their individual performance after taking into consideration peer comments. Through this assessment, the strengths and weaknesses of the group's overall performance will be determined. In addition, the collaborative assessment is simple and easily understood and executed by the learner. It also saves time. In the context of this study, using CAS as peer assessment encourages student involvement and responsibility.

Some challenges however surfaced when using CAS as peer assessment. First, different students have different attitudes, beliefs, and approaches to doing a certain task; therefore, using CAS as peer assessment can be very subjective. Some students may feel ill equipped to rate their peers. As these aspects are likely to relate to the student's previous experience and educational level (Huisman et al., 2019), students need to be trained to use CAS in addition to having instructors provide additional feedback to students. Instructors need to ensure enough time is given and ensure a briefing is done to familiarize students with the assessment tool.

Second, peer pressure has the tendency to affect the score given by the students. Students tend to award high or same marks to peers due to friendship, and at the same time, they also may cheat or go against any group member. Some studies show that students' judgment toward their peers was influenced by friendship where they were too generous while scoring their peers (Di et al., 2019; Ibarra-Sáiz & Rodríguez-Gómez, 2020; Kaya & Özkan, 2019). Hence, there is a risk that students' judgements will be perceived as unequal and demotivating by peers. To ensure fairness, instructors may request students to submit their assessments independent of the group. Despite the challenges faced, the experience of using peer assessment suggests that this form of alternative assessment seems to develop students into more critical thinkers who take responsibility and control of their own learning.

Several possible pitfalls must be identified and overcome before implementing peer assessment. First, peer assessment may be more time-consuming because

instructors still need to provide their own judgment, score, or grades. It is also considered incompatible with exam-based courses where teacher assessment is given more priority (Kaya & Özkan, 2019; Shen et al., 2020). Second, peers' assessments may differ from the teacher's assessment and judgment. This could lead to conflict and lack of trust in peer recommendations and feedback. Because of this, students may feel less confident engaging in the assessment process (Ibarra-Sáiz & Rodríguez-Gómez, 2020; Shen et al., 2020). Third, insufficient language proficiency among students may thwart them from carrying out effective peer assessment. Since in peer assessment, feedback is controlled by the students solely and not the instructor, they should be able to provide high-quality feedback (Biesma et al., 2019).

For a more effective peer assessment process, instructors should take into consideration factors such as learning design. Quality of student learning is enhanced when students are engaged in peer discussion when the learning activities are designed to promote peer interaction. Hence, assessment tasks should allow students to engage in developing complex tasks as well as to receive constructive feedback from peers. Next is peer assessment training to improve the quality of student evaluative skills. Since some students are facing great challenges in understanding the assessment criteria, it is important that instructors provide adequate support in the form of training to alleviate students' discomfort and fear regarding peer assessment. A much more effective approach is for instructors to model their way of assessing students. It is also proposed that instructors need to continue to guide and support peer assessment when students are seeking help to respond to peer suggestions as well as settling any conflict among them. In order to ensure suitability in using peer assessment, prior training must be adequately provided to the students to improve the feedback quality, students' attitudes and evaluative skills. The Collaborative Assessment Survey was designed to evaluate team collaboration in a general context and is not limited to any specific field of study. Therefore, instructors are able to use the collaborative survey for any content and with different collaborative tools, not only with the discussion forum and wikis mentioned earlier.

## Conclusion

This study shows that there are important practical implications in understanding the importance of peer assessment and thus provide insight for future research. As a practical implication, instructors now could use CAS to measure students' perception of the peer assessment implementation. The CAS was designed to evaluate team collaboration in a general context and is not limited to any specific field of study. Therefore, instructors are able to use the collaborative survey for any content specific and with different collaborative tools. CAS also promotes a culture of innovation among instructors to design a learning task with elements of collaboration. As a part of future improvement, the instructors need to ensure mutual trust exists among students when learning in a collaborative environment. Instructors need to educate students



on peer assessment so that they are able to evaluate their peers with confidence and provide their own unbiased judgment.

For the students, CAS also serves as peer assessment in providing formative feedback to the learners on the collaborative task they have been doing. Collaborative assessment also can be used as self-assessment when students reflect on their individual performance after taking into consideration peer comments. Through this assessment, the strengths and weaknesses of the group's overall performance will be determined. In addition, the collaborative assessment is simple and easy to be understood by the learner as well as efficient in execution without occupying much time. Using CAS as peer assessment encourages student involvement and responsibility. With CAS, students also learn to make decisions about the peers' work and vice versa. Further studies are necessary to go deeper to investigate how students' competence could be developed through peer assessment for quality assessment interaction. Besides that, since the current study focuses on a smaller group of students, future research should focus on implementing peer assessment in the context of large-size classes.

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