



COLLABORATION: Definition and Structure

Claire Scoular, Daniel Duckworth, Jonathan Heard,
and Dara Ramalingam

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The Australian Council for Educational Research Ltd
19 Prospect Hill Road
Camberwell VIC 3124
Phone: (03) 9277 5555
ABN 19 004 398 145

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THE NEED FOR A FRAMEWORK OF COLLABORATION

The definition of any skill or construct is essential prior to the assessment, teaching, or development of pedagogical resources in relation to the skill. The ACER collaboration framework is designed to support researchers and educators with a clear definitional model from which to base their understanding and development of the skill.

This collaboration framework has been developed to address the challenges associated with teaching and assessing collaboration. While there are many definitions of the skill, few provide a means to operationalise collaboration in the classroom. This framework is designed to synthesise and harmonise existing theory and research on collaboration to provide a holistic perspective. It outlines collaboration processes along prescribed strands and aspects that are informed by a sound evidentiary basis. The aspects contained within the framework are designed to provide foci for teaching and the basis of assessment.

The full framework paper, which outlines the literature behind the framework can be accessed at https://research.acer.edu.au/ar_misc/42

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THE IMPORTANCE OF COLLABORATION

There is increasing demand to work well with others and to work globally (O'Neil et al., 2004). Consequently, collaboration skills that allow effective working in groups have been identified as increasingly important for success in school and work environments (Singh-Gupta & Troutt-Ervin, 1996). Collaboration has been shown to enhance students' cognitive development (Webb et al., 1998; Zhang, 1998) and has been demonstrated to have advantages in encouraging students' accountability, ability to ask questions and justify responses, flexibility in problem-solving, and reflective skills (Baghaei et al., 2007; Soller 2001; Webb et al., 1998).

There is research to suggest that students process information differently when they work in groups compared to working independently (King et al., 1997). Social interactions make explicit students' understanding and students can improve their comprehension through discussion with others, elaborating, and negotiating with others to reach shared understanding (Van Boxtel et al., 2000). There is also supporting literature that suggests social interaction is crucial in learning and in developing cognitive and problem-solving abilities (Wittrock, 1989). Collaborative activities such as asking questions, peer mentoring, and providing feedback can help students to solve problems they may have otherwise not been able to solve and therefore allow them to move towards higher levels of proficiency (King et al., 1997). Vygotsky (1986) first highlighted the learning benefits to the individual of interaction with other humans. Social interactions while working through complex tasks can provide additional ideas and shared meaning that an individual would not achieve without communicating with others (OECD, 2013). Social interaction or awareness during cognitive activities such as problem-solving has been considered beneficial for some time. Glaser (1992) suggested placing students in a social context is a core strategy for developing complex cognitive skills such as problem-solving competency. When students work collaboratively to solve problems, they think through the problem and the processes more explicitly during their interaction with others which leads to a greater conceptual understanding and leads them to manage tasks more effectively (Darling-Hammond, 2003).

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ACER'S COLLABORATION FRAMEWORK

The ACER collaboration framework describes collaboration within strands (core elements) that are then further qualified as aspects (sub-elements). Specifically, a *strand* refers to the overarching conceptual category for framing the skills and knowledge addressed by collaboration assessments, while an *aspect* refers to the specific content category within a strand. Specifically, the ACER collaboration framework comprises three strands, with each strand containing three or four aspects (summarised in Figure 1 and described in the following sections). The aspects encompass the set of knowledge, skills and understanding held in common by the range of definitions of collaboration discussed previously.

ACER's definition of collaboration is as follows:

Collaboration refers to the capacity of an individual to contribute effectively in a group. This involves perseverance, contributing to team knowledge, valuing contributions of others and resolving differences. Effective collaboration involves a division of labour with participants who are engaged in active discourse that results in a compilation of their efforts.

Strand 1 Building shared understanding

Strand 1 relies on students building a shared understanding of the goal or problem presented to them. This involves establishing a group dynamic. Students engage with and explore the problem or goal in order to build an understanding of the task. The ability to interact with others and recognise the importance of that interaction will also contribute to their success. Students' understanding and awareness of others is likely to evolve as the collaborative relationship progresses. They will need to pool information from the task space and one another, and identify gaps in their understanding. They will then need to manage resources, send information to each other, request information, and integrate resources to build their mutual understanding and identify what is required to complete their activity or task.

Aspect 1.1 Communicates with others

Usually communication serves a specific purpose, for example, to exchange information or to convey attitudes and values. The purpose of collaboration, then, is to reach a common goal through the building of shared understanding (Loxley, 1997). Communication with others reflects the nature of collaboration and the directional flow of communication. Students may ask questions or for clarification, they may also respond to other requests or questions. Proficient communicators will communicate about the related activity and respond efficiently to others (OECD, 2013). They will also initiate communication with others and identify that good communication is necessary to build a shared understanding (Wilczenski et al., 2001). Communication in this sense is not about individual communication but the individual's communication to the group or group members. It is communication within the group for the benefit or goal of collaboration.

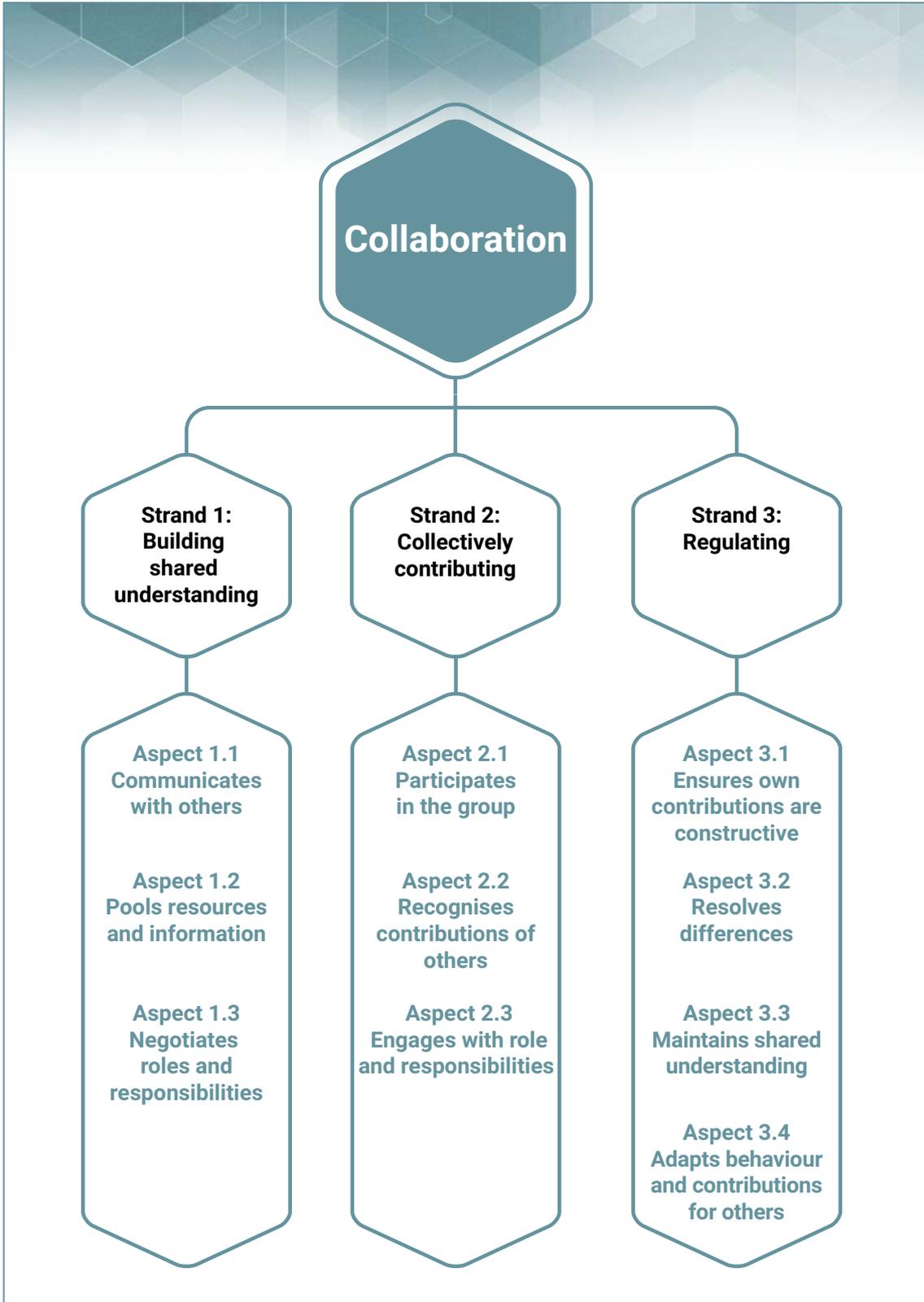


Figure 1 ACER's collaboration framework

Aspect 1.2 Pools resources and information

In collaboration, students need to recognise that they and other group members may not individually have all of the information required and realise the importance of sharing information throughout the task (Avouris et al., 2003). When working in groups, students who are engaged and active understand that interacting with their group will be beneficial. To this end, proficient collaborators pool their resources and information in order to generate a larger repository and build a shared understanding (Larson & Christensen, 1993). Students are able to bring together the different pieces of information and work together on finding ways that will help them achieve their common goal. Pooling resources and information requires identifying which member holds important information or resources.

Aspect 1.3 Negotiates roles and responsibilities

Effective collaboration requires clearly defined roles and the appropriate division of responsibilities (Husting, 1996). Resources and information for a task need to be distributed between students to encourage active participation from each group member. In order to build a shared understanding of the group task, a student must realise that their participation is required and their contribution is essential. The group may negotiate these roles and their associated responsibilities to ensure that there is the best match to the expertise, information, or skills held by the allocated group member. If there was successful pooling of resources (see aspect 2.1), group members can then identify how optimally the pooled resources can be used and make a plan on how to approach the task as a group through defined roles with associated responsibilities (Zagal & Rick., 2006).

Successful collaborators will facilitate joint execution of the group plan to reach the common goal. Proficient collaborators should encourage shared responsibility for the task. Good collaboration does not mean taking sole responsibility or leadership for the task – there must be a distribution of responsibility (Scardamalia, 2002). Those responsibilities need to be communicated back to the group as a whole so that joint execution of the plan can be maintained. If students do not adopt shared responsibility and feedback on individual activities, students may disengage from the task, which is likely to impact the group's overall performance.

Strand 2 Collectively contributing

Once a shared understanding of the group, task and roles has been established, each group member needs to contribute their agreed responsibilities to the group, and recognise the contributions of others, for sufficient collaboration to occur.

Aspect 2.1 Participates in the group

Participation in the group relates to the extent to which a student is active during the collaborative activity. Students may participate when asked or in part of the activity. Proficient collaborators will participate throughout the activity, and see it through to the end goal or solution (DiCerbo, 2014). This focuses on the longevity of the participation rather than the specific elements or tasks they participate in (this is reflected in aspect 2.3). The extent to which a student perseveres with the task can indicate their level of participation in the group. Proficient collaborators take multiple attempts at group tasks and try alternative strategies to reach the end goal even during difficult situations or problems (Scoular & Care, 2019).

Aspect 2.2 Recognises contributions of others

Understanding or comprehending another person's understanding of the problem or task is a critical skill in maintaining a shared understanding throughout collaboration. Further, understanding how another person's perspective can contribute to the greater good of the group is important for effective collaboration (Trilling & Fadel, 2009). Proficient collaborators acknowledge that others may have a different perspective, which may be beneficial to the group as a whole. Listening to, acknowledging, understanding, and critiquing the perspective of others can lead to changes in student's behaviour and group dynamics. Recognising others' perspectives can lead to acceptance, rejection or incorporation of suggestions (Horton & Gerrig, 2005).

Aspect 2.3 Engages with role and responsibilities

Effective collaboration requires clearly defined roles and responsibilities and appropriate delegation (as addressed in aspect 1.3). The actions students take during a collaborative task is the foundation of successful collaboration and demonstrates the willingness and readiness to be involved in the group (Jennings & Mamdani, 1992). The extent to which each group member successfully carries out the responsibilities associated with their allocated role will relate to the overall success of the group as a whole. Proficient collaborators take responsibility for the actions determined by their role and understand the role of others in the task. Further, they will stick to the rules of engagement that the group has established and actively engage with them (OECD, 2013).

Strand 3 Regulating

Ongoing regulation of the group dynamic and of an individual's contribution to that group is important for effective collaborative working. Proficient collaborators will ensure their contributions are relevant and helpful to the task, as well as ensuring the shared understanding is maintained throughout. This may require checking in or reporting back to other group members, ensuring differences are resolved, and adapting behaviour and contributions to support others' roles, understanding or perspective for the greater good of the group.

Aspect 3.1 Ensures own contributions are constructive

In collaborative tasks, students should work together by sharing information, knowledge and resources in order to make relevant contributions to group knowledge and outcomes. By ensuring the quality and relevance of their own contributions, students can regulate how well they are contributing to the group, whether that be through monitoring the quality of their communication, actively participating, integrating others' ideas, or engaging with their responsibilities.

To self-evaluate one's own contribution to the group can be a critical element in identifying ones' own strengths and weaknesses in relation to the progress of the group task (Flavell, 1976). Students who are proficient in evaluating themselves and their progress may also be better placed to monitor and regulate the collaborative space (Ohland et al., 2012).

Aspect 3.2 Resolves differences

Effective collaboration is distinguished by the quality of interactions. The interaction between collaborators should influence thinking and test negotiation skills to maintain a common understanding. Discussing differences of opinion or perspective, and negotiating how to use these, may improve learning as it encourages students to explain and justify their understanding, providing more depth to their knowledge and perspective.

The presence or absence of negotiation skills becomes apparent when conflicts arise among group members. When working collaboratively, students need to find effective ways of resolving any differences or conflicts that arise when trying to reach the common goal. Students bringing different opinions to bear need to navigate the collaborative space but with careful consideration of the views of others. Maintaining a shared understanding requires that students negotiate debate and argue their views so that perspective can be transferred, leading to optimal collaboration (OECD, 2013).

Students working collaboratively present with varying expertise, knowledge and resources and students who can regulate differences and conflict can fully exploit the benefits of diversity that their collaborators bring to the task (van Knipperberg et al., 2004). If conflicts do arise, skilled collaborators can address them efficiently by ensuring they are resolved. Students developing this skill may be able to comment on differences but are unable to resolve them. Students who have not yet developed this ability may not be aware of any differences or may choose to ignore them, leading to complications in communication and planning execution.

Aspect 3.3 Maintains shared understanding

Proficient collaborators understand the importance of maintaining a shared understanding throughout the activity or task. By doing so they monitor group progress, request regular updates from group members, and provide updates on their own progress and reflections on the process. Students' contributions to the task involves a commitment to following the rules of engagement which includes providing important information about progress and prompting others to communicate and perform their own tasks.

Effective collaborators monitor group composition and roles and are flexible and adaptable to reorganise or reallocate these if the need arises, or the collaboration could be made more effective by doing so. Roles may need to be renegotiated to adjust for changes in the group dynamic, or individual needs. Given that these environments are complex and dynamic it is reasonable to expect that proficient students need to be adaptable and flexible in their effort to work together (Oser et al., 1999). Students will need flexibility to adapt their approach to enable the group effort to succeed despite unexpected complications (Scardamalia, 2002).

Students' evaluation of their group's performance is vital to building knowledge about themselves, about others and about their group. This knowledge may impact on future performance and approaches to activities.

Aspect 3.4 Adapts behaviour and contributions for others

Students' understanding and appreciation of their fellow group members can facilitate better collaboration. They should be able to identify an appropriate style and level of complexity relevant to their group members and be able to adjust their communication and contributions to suit other group member's needs. For example, students are unlikely to deliver the same information in the same manner to their classmates as they are to their teacher. Receiver awareness, is a valuable skill for coordinating mutual activities (Dehler et al., 2011).

Proficient collaborators tailor one's behaviours and contributions to suit others' understanding. Less proficient students may require feedback from others or explicit requests before they modify their communication style. Students who do not have a good awareness of others may not take into consideration other students' comprehension of the activity or communication style and this could lead to misunderstandings, issues in planning and execution, and may develop conflicts (Scoular & Care, 2019).

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