INNOVATIVE PEDAGOGICAL STRATEGIES FOR DEVELOPING STUDENTS' COLLABORATIVE COMPETENCE

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Abstract. *Collaboration, as presented in this framework, is considered in the context of teaching and assessing the skill, and as such requires there to be an end goal, problem to be solved, or decision to be made. This definition of collaboration is situated on the premise that there is purpose and necessity to employing the skill. This skill development 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.*

Keywords: *Collaboration, method, multi-vector approach, education.*

INTRODUCTION

As a teaching and assessment resource, the ACER collaboration skill development framework presented in the subsequent section seeks to describe collaboration both as generally applicable sets of skills, and as it tends to be operationalised in practice. The skill development framework describes collaboration in a general way providing a consistent terminology; however, in order to apply, teach, and assess the skill it needs to be embedded within learning areas. The skill needs to be embedded within the methodologies, conventions and 'ways of knowing' of each of the disciplines to give their application context, to ensure they are relevant, and that they can be sustainably integrated. A benefit of the framework is having consistent terminology in which to describe the skill and its associated aspects across learning areas. The aspects can be used to write or map assessments items, or the aspects can be integrated into lesson plans.

MATERIALS AND METHODS

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 learners' cognitive development (Webb, 1998; Zhang, 1998) and has been demonstrated to have advantages in encouraging learners' 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). Social interaction or awareness during cognitive tasks such as problem-solving has been considered beneficial for some time. Several prominent researchers highlighted the learning benefits to the individual of interaction with other humans, which suggests that placing learners in a social context is a core strategy for developing complex cognitive skills such as problem-solving competency (Glaser, 1992; Vygotsky, 1986; Wittrock,. 1989).

When learners 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 them to manage tasks more effectively (Darling-Hammond, 2003).

RESULTS AND DISCUSSION

Particularly in recent years, collaboration has played a part in theoretical and technological developments in educational research (von Davier & Halpin, 2013). Much of the research in the field of collaboration has focused on collaborative learning, problem-based collaboration, or computer-based collaborative learning.

The definition of collaboration is much more complex than simply working with others. The literature has shifted from a simple definition of working in groups, to defining collaboration as an action where two or more learners pool knowledge, resources and expertise from different sources in order to reach a common goal. The distinction between interdependence and independence provides some insight into the nature of collaboration. The focus of team or group work literature has been on independent teams where learners work in relative isolation. Interdependent teams rely on the actions of others and cannot perform the task independently (von Davier & Halpin, 2013). Collaboration is related to the latter. There is shared responsibility and an active division of labour. For example, a marching band or sports team are highly dependent on the interelated actions and communications of the various members of their group.

Dillenbourg (1999) highlighted that collaboration consists of symmetry of knowledge, symmetry of status and symmetry of goals, but that the roles and tasks for each person in the collaboration may be different. Symmetry of knowledge suggests that all participants have different perspectives but their application of respective knowledge is required. Symmetry of status refers to collaboration between peers as opposed to hierarchical supervision. Symmetry of goals in collaboration refers to participants having common goals rather than differing or opposing goals. Dillenbourg (1999) also highlighted the difference between cooperation and collaboration. Cooperation depends upon symmetry of action with learners working on parallel tasks and eventually bringing both parts together as one. Collaboration requires learners working together on the same task where the division of labour is intertwined and therefore requires interdependent tasks (Lai, 2011).

A framework developed by Hesse et al. (2015) identified three essential components of collaboration specifically within a problem-solving context: participation, perspective taking and social regulation. Participation refers to learner engagement with the task, the extent to which they persevere to solve the problem and how well they interact with others. Perspective taking focuses on the quality of the interaction between learners during collaborative problem-solving, such as how learners respond and adapt to one another. Social regulation refers to how learners navigate the collaborative space and includes negotiating and resolving differences, evaluating their self and their peers and taking responsibility for the solving of the problem.

The OECD's Programme for International Student Assessment (PISA) outlined a framework to support their assessment of an innovative domain: collaborative problem-solving. Three collaborative processes were identified: establishing and maintaining understanding; taking appropriate action to solve a problem; and establishing and maintaining team organisation (OECD, 2013). Establishing and maintaining understanding; refers to a learner's ability to identify the knowledge and perspectives of others and establish a shared understanding of the problem.

Within these strands, learners must have a good understanding of their own and others' capabilities and knowledge so they can work towards mutual understanding. Taking appropriate action to solve a problem refers to a learner's ability to identify the appropriate steps and strategies in order to solve the problem. This includes developing a plan and executing and monitoring the outcomes of the actions. These processes require strong communication skills such as negotiation and explaining complex information in an appropriate way for others.

Although there are different definitions of collaboration presented in the literature, similar components can be identified in each. For example, due to the nature of collaboration, the participation of each learner and their level of engagement with a task directly impacts on the effectiveness of the collaborative group as a whole. Some teamwork models align learner ability to take responsibility with their ability to lead (O'Neil et al., 2004), although collaboration does not require one learner to take sole responsibility or leadership for the task – there must be a distribution of responsibility.

Shared, or collective, responsibility refers to a situation in which the responsibility for the success of the group is distributed among all members, rather than being placed on one individual or leader (Scardamalia, 2002). By definition, collaboration includes the assumption of shared responsibility during collaborative work (Fadel & Trilling, 2009). If learners do not adopt shared responsibility they may disengage from the task, which is likely to impact the overall performance of the group (Hesse et al., 2015).

Initating cognitive responsibility is critical in collaboration. Cognitive responsibility refers to learners taking responsibility for knowing what needs to be known and ensuring that others know what needs to be known (Scardamalia, 2002). Therefore, learners need to take responsibility for understanding the progress of the task and staying cognitively aware of tasks as they happen. Zhang et al. (2009) identified that collaboration results in more collective cognitive responsibility than group work.

This suggests that the distribution of information likely encourages more collective contributions from learners. Jenning's and Mamdani's (1992) findings suggests that for collaborators to take responsibility, there has to be identification of a common problem, recognition of the need for joint action and setting of common goals.

Studies have shown that learners' motivation to share responsibility for a task is impacted by whether:

- their contribution is valued (Willias et al., 1981) their shared task is aligned (Barron,

2000)

- they have access to resources (Avouris et al., 2003) reciprocal feedback is presented (Johnson & Johnson, 2003).

Therefore, learners' willingness to take shared responsibility for the task may depend on how successful the joint planning process was. Committing to shared responsibility can be influenced by learners' beliefs in their ability to achieve the goal, as an individual or as a group (Hollenbeck & Klein, 1987). In order to enhance shared responsibility, some researchers have informed the learners that the task provided to them, based on their ability, is achievable (Huber, 1985). Care et al. (2015) found that in online collaborative tasks, learners who were more collaborative tended to take more responsibility for their group and ensured that the tasks necessary for task success were completed by both themselves and their partner. This was assessed through learners reporting their tasks to others as they progressed through a task. Highly proficient learners reported specific information on their progress and tasks.

This ACER skill development 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 skill development framework for collaboration 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.

In collaboration, learners need to recognise that they and other group members may not individually have all of the resources required and realise the importance of sharing resources throughout the task (Avouris et al., 2003). Resources refer to information, skills, knowledge, expertise, or tangible resources that each learner brings to, or is provided by, the task. When working in groups, learners 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). Learners are able to recognise and bring together different pieces of information and identify how to optimally use their pooled resources.

CONCLUSION

Proficient collaborators understand the importance of maintaining a shared understanding throughout the 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. Learners' contributions to the task requires a commitment to following the rules of engagement, which includes providing important information about progress and prompting others to communicate and perform their own responsibilities.

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