

## Chapter 6

# Collaboration in East Africa: A Contextualised Approach to Defining the Construct



Claire Scoular  and David Alelah Otieno

**Abstract** Collaboration has been highlighted internationally as a key skill for learning, working, and living in the twenty-first century. However, to teach it well, enhance its performance, and measure its growth, it is essential to have a clear and consistent definition of the skill. There are a number of frameworks that describe collaboration in a way that is meaningful to learning and growth. Despite some differences across frameworks, it is clear there is a common core set of contributing subskills. This suggests that collaboration is of global interest, and that there are components that transcend national or cultural specificities. Notwithstanding, definitions and frameworks need to be suitable for the context in which they will be applied, ensuring the approach is integrated and sustainable in education systems. One focus of the ALiVE project was to develop a collaboration framework suitable and relevant for the sub-Saharan African context. The approach included auditing frameworks internationally, curricula regionally, and conducting an ethnographic study. The resulting framework was used in the development of assessment tasks to sample the skill among adolescents in Kenya, Tanzania, and Uganda. The issues highlighted in this chapter reveal the need for further study of collaboration in specific contexts in order to understand local variations and ensure optimal approaches to measurement.

## 6.1 Introduction

For many education systems, there is increasing focus on integrating skills that are deemed to be relevant for learning in the twenty-first century. This increased focus is reflected by many international organisations which emphasise the high demand

---

C. Scoular (✉)

Australian Council for Educational Research, Camberwell, VIC, Australia

e-mail: [claire.scoular@acer.org](mailto:claire.scoular@acer.org)

D. A. Otieno

Zizi Afrique Foundation, Nairobi, Kenya

e-mail: [dotieno@ziziafrique.org](mailto:dotieno@ziziafrique.org)

for such skills in the workforce. For example, the World Bank (2019) issued a call for action for governments to invest in building the skills in demand in the labour market during schooling. One skill that is consistently mentioned across education systems and organisations is collaboration. The need to develop collaborative skills has been voiced by governments in response to the complex, multi-layered challenges that learners and workers are likely to face in the future (UNESCO, 2015). Digitisation, demographic shifts, and globalisation have transformed daily social interactions, schooling, and the workplace, and require individuals to work collaboratively to make decisions and solve problems. The OECD (2019a) has couched this skill as social-emotional, to emphasise the need for individuals to adapt to and engage with their environment and with others. These imperatives require learners to develop the skills to work effectively with their peers to address complex multi-lateral, regional, and historic challenges (OECD, 2019b). The World Bank (2010) has likewise emphasised the importance of developing social skills, including teamwork and adaptability, “to collaborate with and motivate others in a team, manage client relations, exercise leadership, resolve conflicts, and develop social networks” (p. 14). For both OECD and the World Bank, collaboration can be framed as a skill that supports the attainment of social and economic goals across various contexts.

Within classrooms, collaboration has been described by the UNESCO International Bureau of Education (2016) as involving social relationships between learners that foster “positive interdependence, individual accountability, and interpersonal skills” (p. 140). Educators are therefore framed as facilitators who skilfully develop and enhance their learners’ education journeys by using pedagogical strategies and tasks that are challenging, stimulating, and meaningful. Importantly, collaboration is distinct from cooperation; the former is characterised by learners working in a coordinated fashion to solve a problem, while the latter involves the division of work responsibilities between learners (UNESCO International Bureau of Education, 2016).

Assessment of Life Skills and Values in East Africa (ALiVE) is an initiative of the Regional Education and Learning Initiative (RELI), a network of more than 70 civil society organizations in East Africa. ALiVE is a collaboration within itself seeking to *generate evidence* on life skills, including collaboration, and use this evidence to *engage in public policy reforms* as well as *strengthen local capacities* in life skills competencies in Kenya, Tanzania, and Uganda specifically.

In seeking to respond to economic and societal challenges, curriculum reforms since the 1990s in East African countries (and other sub-Saharan countries) have generally shifted away from educator-centred and content-focused approaches, towards a more learner-centred approach, and emphasising thinking as well as social-emotional skills. While barriers that limit education access and equity, and traditional designs and implementation of curriculum, assessment, and pedagogy, continue to challenge the pace of progress in East African countries (Chisholm & Leyendecker, 2008; Cunningham, 2018), these reforms are resulting in improvements. For example, the process of shifting Kenya’s education sector towards a competency-based curriculum, as well as reforming educator professional development, textbooks, and local school management practices, have resulted in this country becoming a top performer across East Africa (Simon, 2022; World Bank, 2022),

while Tanzania's Free Education Policy for secondary education (Standards 1–4) has shown signs of improvement in learner enrolment rates and increased educator numbers since 2015 (Mashala, 2019). Collaboration as a skill has been identified as essential for learning and life in these countries and was therefore made a priority for defining and measuring as part of the ALiVE initiative.

### 6.1.1 What Is Collaboration?

Social interaction is critical for learning and plays a positive role in developing cognitive ability (Wittrock, 1989). In the context of education, collaboration occurs when learners work together to achieve a common goal in a shared learning environment (Underwood & Underwood, 1999). Generally, the nature of collaboration tends to focus on ability to learn from the interactive situation (O'Neil et al., 2003). Social interactions that occur during collaboration such as discussing, justifying arguments, and negotiating with others can help to improve individual understanding (van Boxtel et al., 2000). Learners process information differently when they work in groups compared to working independently.

A focus of early research on developing social skills focused on teamwork or cooperation, which depend upon symmetry of action with learners working on parallel tasks and eventually bringing the different tasks together (Dillenbourg, 1999). By contrast, collaboration requires interdependent teams or individuals that rely on the actions of others and, in particular, on the need to share responsibility and engage in the active division of labour (von Davier & Halpin, 2013; Hesse et al., 2015; Lai, 2011).

A comprehensive understanding of what constitutes the fundamental building blocks of collaboration, and how it develops and changes over time, will support effective methods of assessing, monitoring, and teaching it. A detailed definitional framework of collaboration can provide the means through which to build reliable and valid assessment tools to measure the skill. *Four conceptual structures* useful for contextualising ALiVE's development of an assessment framework for collaboration are discussed here. These structures demonstrate the commonalities across definitions, while also explaining their differences.

As part of the *Assessment and Teaching of 21st Century Skills* project (Griffin & Care, 2015), Hesse et al. (2015) broke collaboration into three strands: Participation, Perspective Taking and Social Regulation. *Participation* refers to learners' 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. This three-strand structure was built for the 'social' aspect of the two-dimensional notion of collaborative problem solving, the social and the cognitive. Its situating

within this broader context explains the very active nature of each of the strands, with each providing critical input.

A framework that built on the work of Hesse et al. is that of Scoular et al. (2020b)—the *Collaboration Skills Development Framework*—which depicts collaboration as strands and subordinate aspects (Fig. 6.1). The similarity of the strands with those of Hesse et al. (2015) point to the commonality of understandings about the construct. For Scoular et al. (2020b), strands refer to overarching components, while aspects refer to specific content within strands. The aspects relate to specific behaviours that can be observed and monitored in the classroom and in real-world contexts. These are designed to facilitate teaching and guide assessment. For example, educators can write assessment items to measure specific aspects, or integrate teaching of just one aspect into a lesson, rather than the whole skill. This educational perspective accounts for the deconstructed nature of the framework—into actionable aspects.

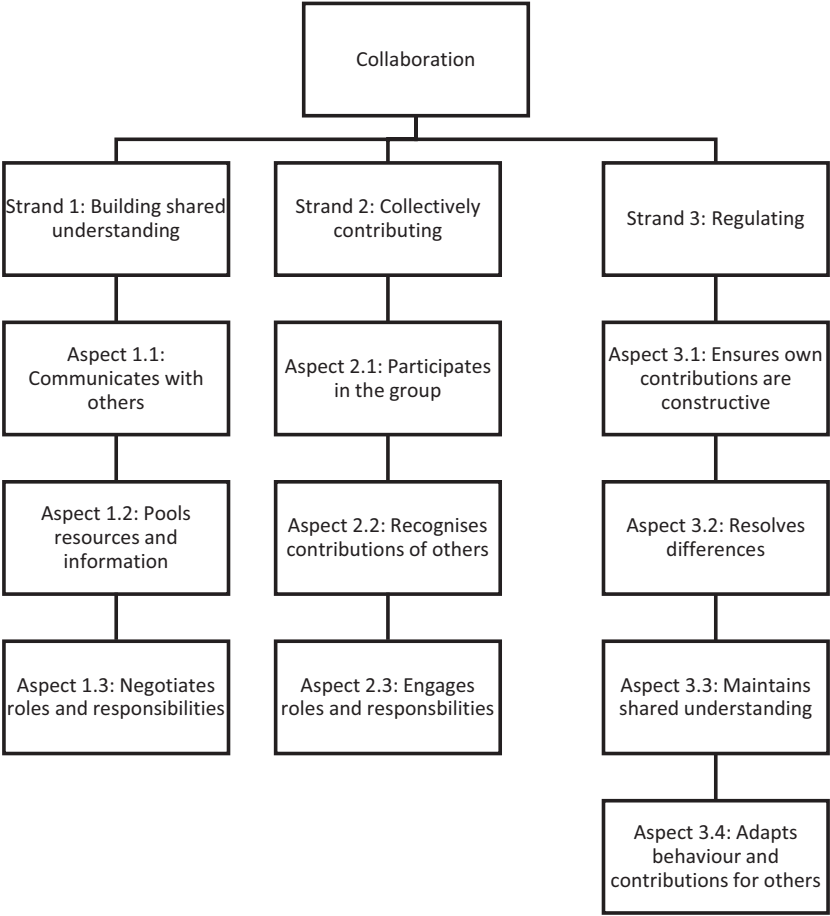


Fig. 6.1 Collaboration skill development framework. (Scoular et al., 2020b)

The *OECD's Assessment Framework* for its Study of Social and Emotional Skills described collaboration as the degree to which individuals can successfully work together while maintaining positive relationships and minimising conflicts (Kankaraš & Suarez-Alvarez, 2019). Inherent within this description is a “concern for the well-being of others” (p. 39), and an emphasis on three subskills:

- Empathy: involves perspective taking and having concern for the well-being of others
- Co-operation: harmonious living with others
- Trust: a general assumption that others have good intentions.

These subskills, while reflecting the perspective taking concept in other frameworks, highlight the social-emotional context of the OECD study. There is less emphasis on action, and more on the quality of interaction.

The *Cambridge Life Competencies Framework* as described by the Cambridge Language Research Team (2020) includes collaboration as a key competency. Within this framework, collaboration is seen to have occurred when “learners work well together in groups through actively taking part in group activities, listening to others, sharing tasks and finding solutions to problems” (p. 3). The skill is composed of four core areas and their corresponding components (Table 6.1). Most strongly aligned with the OECD framework, this framework reflects the community and lifelong dimensions of ‘life competencies.’ It reflects the action of collaboration but in all respects draws attention to ‘the other.’

Within the collaboration frameworks mentioned, the elements that are common include: participation and responsibility, communication, and regulation. Table 6.2 shows a comparison of the frameworks and includes ALiVE’s adopted structure.

## 6.2 Concept of Collaboration in ALiVE

Comparing the four frameworks supported the development of an operating structure for collaboration for use in ALiVE. Three dimensions of collaboration were defined for the ALiVE framework: working together, negotiation, and communication, each including associated subskills. In ALiVE, collaboration was viewed as an end in itself—a domain-general skill necessary for learning and engaging effectively in work and society. The focus is on the nature and quality of the collaborative interactions among group members (Fontana et al., 2022). In exploring collaboration across Kenya, Tanzania, and Uganda, the first step was to conduct a rapid ethnographic study to understand local perspectives. Teachers, parents, community leaders and adolescents were asked to share their views on collaboration in terms of its meaning, and how it could be assessed. From the study, 187 of the participants’ described collaboration as ‘working together’. However, in practice the emphasis is not on *working* together, but on *being* together. Approximately 15% of the participants defined it as ‘teamwork’ or ‘cooperation’.

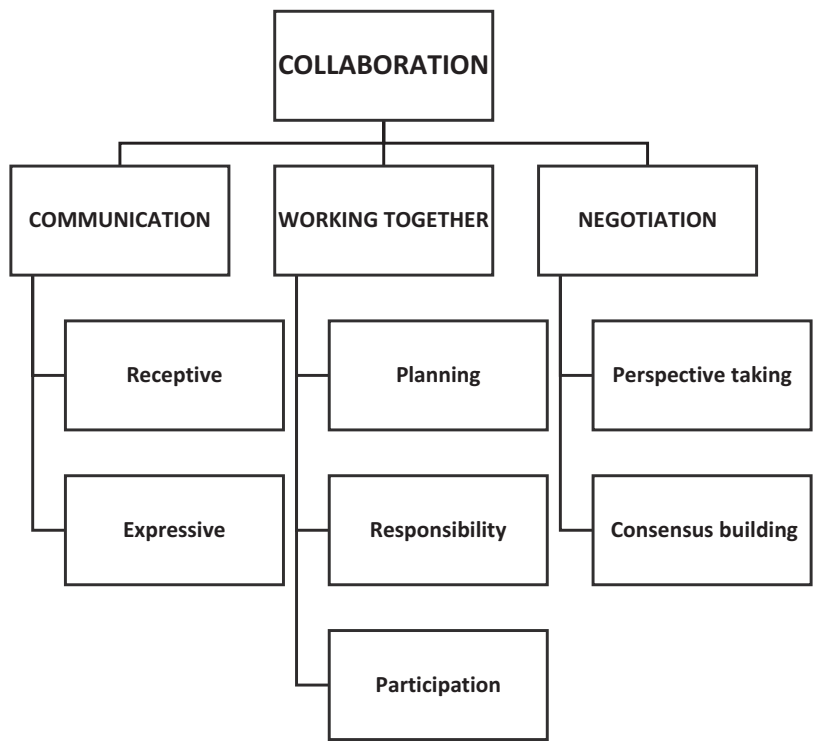
**Table 6.1** Cambridge life competency framework for collaboration

Core area	Core area component
Taking personal responsibility for own contribution to a group task. Refers to active participation in group activities and roles, the sharing of ideas, and a willingness to explain their contributions.	Actively contributing to a task Taking on different roles
Encouraging effective group interaction. References the ability to listen to and acknowledge others' aligned views/conflicting views; utilise goal-orientated strategies within the group (e.g., taking turns, constructive feedback, and provide potential solutions); and establish positive and supportive group relationships.	Listening and responding respectfully Establishing ways of working together Engaging and supporting others
Managing the sharing of tasks in a group activity. Refers to the ability to identify tasks that need to be completed by the group and appropriately managing the distribution of task responsibilities between group members.	Agreeing what needs to be done Managing the distribution of tasks
Working towards task completion. Ensure that progress is being made to achieve the group's task goals. This could include engaging in evaluation processes, identifying the most appropriate solution to complete the task, and engaging in conflict resolution.	Ensuring progress towards a goal Identifying issues and challenges Resolving issues

**Table 6.2** Identification of common elements across frameworks

Frameworks	Participating and responsibility	Communication	Regulation
ATC21S (Hesse et al., 2015)	Participation	Interaction	Social regulation; perspective taking
Scoular et al. (2020b)	Collective contribution	Build shared understanding	Regulation
OECD (2019a, b)	Co-operation	Empathy	Trust
Cambridge Language Research Team (2020)	Responsibility; toward task completion	Group interaction	Sharing of tasks
ALiVE (Fontana et al., 2022)	Working together	Communication	Negotiation

From the ethnographic study, very few participants said that collaboration meant achieving a common goal, which element was a key feature in all of the frameworks reviewed here. Several of the participants elaborated that achieving a shared goal is not necessarily what drives collaboration, but rather it is the element of doing something together. The terms *sharing*, *unity*, and *love* were frequently used by the participants to define collaboration. Further, a crucial component of collaboration identified by participants is *belonging to the community*.



**Fig. 6.2** The ALiVE collaboration framework

This participant feedback was used to refine the definition, while also drawing on existing frameworks and literature, and on the national education curricula in the three countries. Collaboration between countries on this step was not only in the spirit of the ALiVE endeavour but was integral to ensure a framework relevant within each country. The ALiVE framework depicts collaboration across three dimensions and their subskills (Fig. 6.2).

**6.2.1 Dimension 1: Communication**

Communication is the act of transferring information from one person to another, whether vocally, visually, or non-verbally. Communication is the essential channel used by collaborative partners to send and receive information, keep one another informed, and convey opinions to influence group actions (Mattessich et al., 2001). Collaborators must explicitly communicate their ideas, knowledge, and opinions when working on a task in their groups, as it is through this communication that they can guide the direction and process when working on a task (Driskell et al., 2018).

This dimension targets an individual's ability to listen (receptive) and speak (expressive). Receptive communication is the ability to listen and understand words and language. Much of this type of language is receiving and interpreting communication from our environment, experiences, and of course others. Expressive communication on the other hand is the ability to speak or create narrative. It involves the use of words, sentences, gestures, and writing to create a message or convey meaning. Both receptive and expressive communication is essential for effective collaboration (Lai, 2011). When participants explain their ideas to others their understanding and thinking becomes explicit and self-awareness and understanding is likely to increase (Scoular & Care, 2019). Providing clear explanations enhances collaborative interactions. This is critical to the act of working towards a common goal.

### ***6.2.2 Dimension 2: Working Together***

Collaboration goes beyond coordinating and cooperating; it requires some interdependency between participants. Collaboration involves participants working together on the same task, rather than a division of labour working in parallel on separate elements of a task (Lai, 2011). This interdependency should commence from the planning stage of a joint initiative. In collaboration, setting goals is a prerequisite to driving plans into execution. Goal specificity improves a group's performance (Weldon & Weingart, 1993) and goals need to be appropriate to the task to be efficient (Stevens & Campion, 1994). PISA's CPS framework identifies goal setting as a collaborative process and specifies that students should be able to identify and describe the tasks that need to be completed, which specifically includes creating team goals (OECD, 2013).

Planning requires taking responsibility to solve a problem. Proficient collaborative problem solvers should encourage shared responsibility for the task. Some teamwork models align learner ability to take responsibility with their ability to lead (O'Neil et al., 2003), although collaboration does not require one individual to take sole responsibility or leadership for the task—there must be a distribution of responsibility. Hesse et al. (2015) suggest that if learners do not adopt shared responsibility, group members may disengage from a task. The group needs to negotiate their responsibilities to ensure that there is the best match to the expertise, information, or skills held by any given group member (Scoular, 2019).

Finally, proficient collaborators will participate throughout the activity and see it through to the end goal or solution (DiCerbo, 2014). Proficient collaborators will make multiple attempts at group tasks and try alternative strategies to reach the end goal even during difficult situations or problems (Scoular & Care, 2019).

### **6.2.3 *Dimension 3: Negotiation***

When working collaboratively, learners need to find effective ways of resolving any conflicts that arise when trying to reach the common goal. Learners may bring different opinions but these must be with careful consideration of the views of others (Scoular, 2019). Negotiation skills are the result of rational thinking based on informed choices and interacting such that ideas are both shared and accepted across the collaborators.

Perspective taking is essential to negotiating in collaborative teams. Understanding the perspective of others can change interactions and how individuals respond and adapt to one another (Dehler et al., 2007). For example, the ATC21S project assessed students' audience awareness during online collaborative tasks and observed that students with higher proficiency demonstrated fewer activities before stopping and waiting for their partner to provide their perspective (Care et al., 2015). The ability to adapt one's interaction style for others is based upon individual awareness of others' ability, style and needs (Hesse et al., 2015). Proficient collaborators acknowledge that others may have a different perspective, which may be beneficial to the group. Listening to, acknowledging, understanding, and critiquing the perspective of others can lead to changes in a person's behaviour and group dynamics.

### **6.2.4 *Measuring and Monitoring Collaboration***

Each of the frameworks discussed in this chapter adopts the assumption that collaboration skills can grow, can be improved through teaching and intervention, and can be measured and monitored. This view is signified by the developmental framework of each with levels of proficiency outlined from early to more advanced application. A key feature of these levels is that they are not linked to specific years of schooling. Learners of the same age can be at very different points in their skill development. Assessment of functioning levels are an alternative to judging success only in terms of year-level or curriculum-based achievement standards. This approach is akin to that adopted in ALiVE.

Developmental frameworks not only identify increasing levels of proficiency but may also link these with maturational features from infancy to adulthood. For example, the OECD's collaboration framework provides initial evidence that might be used to support the development of a skills progression (Kankaraš & Suarez-Alvarez, 2019). In this framework, collaboration has been framed using the sub-skills empathy, co-operation, and trust, with the presence, absence, and development of these subskills having the potential to indicate levels of collaboration. The presence of empathy during childhood, for example, has been associated with 6 and 9 year old children displaying social justice values (e.g., fair treatment and equality) later in life at age 12, while the absence or lack of empathy during early childhood

has been associated with adverse outcomes during the adolescent years. Observable behaviours regarding empathy might include whether a child consoles another or sympathises with the poor, while a lack of empathy might be exemplified by a tendency to misinterpret, ignore, or disregard what a person feels. Cooperation has also been observed to trend in predictable ways. Cooperation or cooperative behaviours typically decline during later childhood (e.g., between 6 and 10 years old) and increase again as adolescents approach their twenties; suggesting that some aspects of cooperation can be shaped by developmental, epistemological, or environmental factors. Children who are capable of cooperating easily make friends and respect group decisions, while those who are less capable may be more prone to arguments and conflicts or be unable to compromise (Kankaraš & Suarez-Alvarez, 2019). Finally, individuals who are more trusting are more likely to lend their belongings and avoid conflict, while those who are less trusting are prone to arguments with others and being unable to compromise.

In the case of the ALiVE collaboration framework, this was developed specific to understandings of likely skills demonstrations by adolescents. Hence identification of functioning levels in Table 6.3 represents a relatively narrow ‘developmental’ range for the skill. Notwithstanding, the range as described can be used as a skeleton upon which more flesh can grow as the framework is used to develop assessment tasks targeted at a wider age range.

**Table 6.3** Qualitative descriptors of collaboration levels of proficiency

	Level 1	Level 2	Level 3	Level 4
Collaboration overall	Does not engage either by being attentive to discussion, speaking, or through action	Is attentive to the discussion and may query the views of others, but does not contribute in word or action	Collaborates through speaking and being attentive in discussions, and engaging actively in performance tasks	Collaborates through taking positions and contributing ideas, prompting others, and being attentive to others’ inputs
Communication	Does not appear to be attentive to the activity	Appears to listen to the discussion	Communicates by listening and speaking	Engages with others through listening, speaking, and prompting others to contribute
Working together	Does not engage in the activity or with others	Engages slightly in the activity as a follower	Contributes to the task actively	Engages in the activity oneself as well as involving others
Negotiation	Does not appear to be attentive to the activity	Participates through querying the inputs of others	Contributes through questioning others and providing own perspective	Engages through questioning and responding to others and contributing own ideas

The assessment of collaboration in ALiVE was based on performance-based tasks. The situations presented to adolescents were based on real life contexts—making use of day-to-day situations that would be familiar to respondents. Participants were presented with a task followed by a series of questions that required the adolescents to focus on how they would work together towards a common goal. The tasks were designed to target a range of sub-skills in the collaboration framework. The observable behaviours of the adolescents can be interpreted within the proficiency levels outlined in Table 6.3. The levels indicate progressive sophistication and complexity over the levels.

### 6.2.5 Assessment Considerations

Collaboration is a complex skill, with many subskills and layers. Design of assessments to capture collaborative proficiency is complex but requires simplicity in the actual approach. A task must be sufficiently ‘dimensional’ that it requires varied inputs from several individuals, and sufficiently simple to enable the capture of those individuals’ contributions. The form of tasks and mode of assessment delivery is therefore seminal to useful assessment. In the case of ALiVE, the mode of assessment delivery was at household level. In other words, adolescents from the community would be assessed in their home environments, and these adolescents would be assessed doing familiar tasks that would not require additional information inputs. All of these elements combined to guide the process of task development. Three such elements are outlined below, and how these elements were managed is described through discussion of one task developed for the ALiVE large scale assessment program.

The *multi-dimensional* nature of a complex skill like collaboration requires analytical decomposition of the skill in order to ensure that what is being measured is true to the construct. In this case, the assessment tasks must be designed to require collaboration, rather than teamwork or cooperation, and to elicit behaviours from which we can judge the capacity to collaborate. Each of these characteristics has implications for design of the tasks. One such consideration is the distribution of resources. The nature of collaboration relies upon *asymmetry of resources between individuals*, representing a real-world view of diversity of expertise, knowledge, and information (Care et al., 2016). Collaboration requires informational or competence diversity to ensure there is a purpose in working together, rather than working alone (Scoular & Care, 2019; De Wit & Greer, 2008). Therefore, assessments in which individuals each possess unique resources that are required for task completion, provides for more authentic coverage of the construct. If assessment tasks are presented that require individuals to work together, and if there is a mutual benefit from working together, then they are more likely to stay engaged in the task and see the benefit of contributions from others for themselves. At most basic therefore, tasks must be designed such that individual contributions to the goal can be observed.

The measurement of a complex skill such as collaboration is not a matter of identifying success or failure. Interest in measurement of life skills tends to centre on degree of skill rather than presence or absence. Assessing for degrees of difference in proficiency is a challenging endeavour requiring innovative approaches. At most basic, tasks must provide the facility to stimulate *varying levels of proficiency* from adolescents, providing responses that can be evaluated using standardised guidelines.

Another consideration is *group composition*. The issue of how groups should be formed is an important one, since individuals may perform differently depending on the group to which they are assigned, with factors such as differences in ability (Wildman et al., 2012), personality characteristics (McGivney et al., 2008), and gender (Bear & Wooley, 2011) all potentially influencing how individuals within a group might collaborate. Decisions about group composition for any assessment of collaboration should be made with the purpose and the nature of the evidence it aims to collect firmly in mind, with the knowledge that such decisions may influence what aspects of the skill can be elicited by the assessment.

## 6.2.6 A Collaborative Task

The design of tasks to capture adolescents' collaborative proficiencies responded to the practicalities of ALiVE's large scale household-based assessment program. How the considerations identified above were factored into the task design is described with reference to one of the tasks used—the making of a ball. The initial instructions given to each group of four adolescents were: “As a group, discuss and agree on available materials that can be used in making a ball, and then make a ball.” Additional prompts were given at each of three stages in task completion: (1) discussion of possible materials to use; (2) agreement on the materials; and (3) the making of the ball. The stepped instructions were necessary in order to partition the different activities in such a way that the subskills (or dimensions) of collaboration could be observed. The initial discussion provided data for the observing Test Administrators to rate communication; the agreement process provided data for rating of negotiation skills; and the final activity provided data on how the adolescents worked together. Without this explicit partitioning, it would not have been possible for the Test Administrators to capture the behaviours and evaluate these against the rubrics designed to rate them.

In turn, each activity stage and its related subskill provide the opportunity for young people to demonstrate their varied proficiencies. Scoring rubrics are shown in the context of each of the subskills in Table 6.4. As can be seen, each of the criteria across levels 0 to 3 captures higher levels of competency than the one prior. These criteria capture relatively broad levels of proficiency, aligned with the simplicity of the task design, and they fulfil ALiVE's reporting needs. Other assessment environments, particularly those supported by online technologies, can capture more finely delineated levels of proficiency (e.g., Griffin et al., 2013) as well as more of the behaviours that contribute to collaboration (Scoular et al., 2020a).

**Table 6.4** Activities, structure, subskills and scoring criteria for ‘make a ball’ task

Activity	Subskill	Performance indicator	Criteria to score proficiency levels			
			0	1	2	3
Discuss materials to be used in making the ball	Communication	Ability to speak and listen	Does not speak and is not attentive in the discussion	Does not speak but is attentive in the discussion	Speaks and is attentive in the discussion	Speaks, <b>prompts others</b> and is attentive in the discussion
Agree on materials to be used in making the ball	Negotiation	Ability to express own opinion and ability to accept others opinion	Does not question the views of others and is not attentive in the discussion	Questions the views of others but does not take a position	Questions the views of others and takes a position	Questions the views of others, takes a position and adds something new, contributes ideas
Make the ball	Working together	Ability to participate (in making the ball)	Does not collect materials and does not engage in making the ball	Either collects materials or engages in making the ball	Collects materials and engages in making the ball alone	Collects materials, <b>involves others</b> and makes the ball

A feature of the collaboration assessment in ALiVE was its necessary simplicity. Given reliance on daily life to act as the host and the stimulus for collaboration, and on the household-based administration mode, the provision of different resources to individuals in each of the adolescent groups was not viable. Therefore, tasks needed to be designed such that they required input from more than one individual in a less defined manner than has been the case in technology-supported large-scale programs such as OECD’s PISA and ATC21S. In this way, although the individuals within a group did not have access to different resources to bring to bear in the task, thus fulfilling the *asymmetry of tasks* criterion, they were required to work together in order for the goal of the task to be achieved.

The final element to recognise in the assessment of collaboration in ALiVE is *group composition* and its dynamic. This concern could be controlled for only by virtue of gender identity of the participating adolescents. The nature of the collaboration tasks was such that adolescents, regardless of gender, could easily engage in the activity. In order to control for possible gender effects, the group composition was two males and two females. The results (Ariapa et al., 2024; Chap. 10, this volume) of the large-scale assessment shows negligible differences in performance across gender, but since there were no single sex groups, the possible influence of gender could not be ascertained. A second variable in group composition was age and education level of the four individuals. Due to the sampling design within the local communities, it was not possible to control for this. It is therefore plausible that age and education

differences could have influenced results, with presumably older adolescents taking stronger roles in the activities. The results show that older adolescents in fact did show greater proficiencies in collaboration, and the degree to which this might be due to natural increase in proficiency with age, versus a dominant effect on younger collaborators, could not be ascertained.

To measure collaboration effectively then, there is a clear set of criteria for task requirements and development. Tasks need to be sufficiently innovative in capturing the multi-dimensionality of the skills. Asymmetrical tasks in which learners have access to different resources, and opportunities to work through a process rather than just respond to stimuli, are both essential for capturing varying levels of proficiency. The subskills in the definitional framework provide an easy transition from task to rubric criteria used to judge performance. In other words, the rubrics and associated criteria neatly map back to the framework to ensure a range of subskills are being captured, and in a way that is described as per the definition. Each of these elements has its own contexts and considerations for both development and what would be anticipated of learners. For example, decisions about group composition need to be considered with the context and the demands of the task in mind. It is possible that composition of groups could have an impact at the individual level depending on inclusion or exclusion of specific others, or on demographic criteria, and should therefore be considered at the design stage.

### 6.3 Conclusion

Collaboration is a vital component of life, whether it is in the workplace, the home, society, or the classroom. It is one of the fundamental skills that was prioritised across the three countries (Kenya, Tanzania, and Uganda) in the ALiVE project. There are some difficulties in measurement and evaluation of collaboration generally, and in integrating the skill into educational systems. Throughout this chapter, the need to define and describe collaboration is key to understanding and measuring the skill. While there are differing frameworks describing collaboration, it is clear that there is a set of underpinning skills across these frameworks internationally. This suggests that collaboration is an important skill of global interest, and there are components that transcend national or cultural specificities.

The chapter also outlines that beyond the importance of defining the skill of collaboration, developing assessment tasks that provide the opportunity to measure ability and monitor progress is essential. The ALiVE project has made progress in identifying task development considerations in the context of East African countries, focusing on measuring collaboration in adolescents using performance-based tasks at the household level. Clearly collaboration is a complex skill to measure given that its application relies on the involvement of others and requires tasks sufficiently complex and multi-faceted to enable learners to demonstrate it. Capacity development in assessment processes needs to take place among educators at all education levels and is a crucial step in ensuring the approach is integrated and sustainable in education systems.

Lastly, the chapter highlights some of the gaps in research at present, for example examining the impact of other variables of interest, such as gender and age, on collaboration. The issues highlighted in the chapter reveal the need for continued exploration of collaboration in specific contexts in order to understand the contributing dimensions and subskills to local demonstrations of the skill.

## References

- Ariapa, M., Pavlovic, M., & Care, E. (2024). Measuring adolescents' life skills and values: Method and results from East Africa. In E. Care, M. Giacomazzi, & J. K. Mugo (Eds.), *The contextualisation of 21st century skills: Assessment in East Africa*. Springer.
- Bear, J., & Woolley, A. W. (2011). The role of gender in team collaboration and performance. *Interdisciplinary Science Reviews*, 36(2), 146–153. <https://doi.org/10.1179/030801811x13013181961473>
- Care, E., Griffin, P., Scoular, C., Awwal, N., & Zoanetti, N. (2015). Collaborative problem solving tasks. In P. Griffin & E. Care (Eds.), *Assessment and teaching of 21st century skills: Methods and approach* (pp. 85–104). Springer. <https://doi.org/10.1007/978-94-017-9395-7>
- Care, E., Scoular, C., & Griffin, P. R. (2016). Assessment of collaborative problem solving in education environments. *Applied Measurement in Education*, 29(4), 250–264. <https://doi.org/10.1080/08957347.2016.1209204>
- Chisholm, L., & Leyendecker, R. (2008). Curriculum reform in post-1990s sub-Saharan Africa. *International Journal of Educational Development*, 28(2), 195–205. <https://doi.org/10.1016/j.ijedudev.2007.04.003>
- Cunningham, R. (2018). *Busy going nowhere: Curriculum reform in Eastern and Southern Africa*. UNICEF Eastern and Southern Africa Regional Office, Nairobi. [https://www.unicef.org/esa/sites/unicef.org/esa/files/2018-10/EducationThinkPieces\\_5\\_CurriculumReform.pdf](https://www.unicef.org/esa/sites/unicef.org/esa/files/2018-10/EducationThinkPieces_5_CurriculumReform.pdf)
- De Wit, F. R. C., & Greer, L. L. (2008). The black-box deciphered: A meta-analysis of team diversity, conflicts, and team performance. *Proceedings—Academy of Management*, 2008(1), 1–6. <https://doi.org/10.5465/ambpp.2008.33716526>
- Dehler, J., Bodemer, D., & Buder, J. (2007). Fostering audience design of computer-mediated knowledge communication by knowledge mirroring. In C. Chinn, G. Erkens, & S. Puntambekar (Eds.), *Proceedings of the 7th computer supported collaborative learning conference* (pp. 168–170). International Society of the Learning Sciences.
- DiCerbo, K. E. (2014). Game-based assessment of persistence. *Journal of Educational Technology & Society*, 17(1), 17–28.
- Dillenbourg, P. (1999). What do you mean by 'collaborative learning'? In P. Dillenbourg (Ed.), *Collaborative-learning: Cognitive and computational approaches* (pp. 1–19). Elsevier.
- Driskell, J. E., Salas, E., & Driskell, T. (2018). Foundations of teamwork and collaboration. *American Psychologist*, 73(4), 334–348. <https://doi.org/10.1037/amp0000241>
- Fontana, M., Peverelli, F., & Giacomazzi, M. (2022). Collaboration in East Africa: A contextual definition. *Education Sciences*, 12(10), 706. <https://doi.org/10.3390/educsci12100706>
- Griffin, P., & Care, E. (2015). *Assessment and teaching 21st century skills: Methods and approach*. Springer. <https://doi.org/10.1007/978-94-017-9395-7>
- Griffin, P., Care, E., Bui, M., & Zoanetti, N. (2013). Development of the assessment design and delivery of collaborative problem solving in the assessment and teaching of 21st century skills project. In E. McKay (Ed.), *ePedagogy in online learning: New developments in web mediated human computer interaction* (pp. 55–73). IGI Global). <https://doi.org/10.4018/978-1-4666-3649-1.ch004>
- Hesse, F., Care, E., Buder, J., Sassenberg, K., & Griffin, P. (2015). A framework for teachable collaborative problem solving skills. In P. Griffin, B. McGaw, & E. Care (Eds.), *Assessment*

- and teaching of 21st century skills: Methods and approach (pp. 37–56). Springer. <https://doi.org/10.1007/978-94-017-9395-7>
- Kankaraš, M., & Suárez-Álvarez, J. (2019). *Assessment framework of the OECD study on social and emotional skills*. OECD Education Working Papers. <https://doi.org/10.1787/5007a4ef-en>.
- Lai, E. R. (2011). *Collaboration: A literature review research report*. Pearson Research Reports. <http://images.pearsonassessments.com/images/tmrs/Collaboration-Review.pdf>
- Language Research Team. (2020). *The Cambridge life competencies framework: Critical thinking*. Cambridge University Press. [https://languageresearch.cambridge.org/images/Language\\_Research/CamFLiC/CLCF\\_Critical\\_Thinking.pdf](https://languageresearch.cambridge.org/images/Language_Research/CamFLiC/CLCF_Critical_Thinking.pdf)
- Mashala, Y. L. (2019). The impact of the implementation of free education policy on secondary education in Tanzania. *International Journal of Academic Multidisciplinary Research*, 3(1), 6–14.
- Mattessich, P. W., Murray-Close, M., & Monsey, B. R. (2001). *Collaboration—What makes it work*. Amherst H. Wilder Foundation.
- McGivney, S. M., Smeaton, A. F., & Lee, H. (2008). The effect of personality on collaborative task performance and interaction (conference paper). In *Collaborative computing: Networking, applications and worksharing: 4th international conference* (pp. 499–511). Springer. [https://doi.org/10.1007/978-3-642-03354-4\\_38](https://doi.org/10.1007/978-3-642-03354-4_38)
- O’Neil, H. F., Chuang, S., & Chung, G. K. W. K. (2003). Issues in the computer-based assessment of collaborative problem solving. *Assessment in Education*, 10(3), 361–373. <https://doi.org/10.1080/0969594032000148190>
- OECD. (2013). *PISA 2015: Draft collaborative problem solving framework*. [http://www.oecd.org/callsfortenders/Annex%20ID\\_PISA%202015%20Collaborative%20Problem%20Solving%20Framework%20.pdf](http://www.oecd.org/callsfortenders/Annex%20ID_PISA%202015%20Collaborative%20Problem%20Solving%20Framework%20.pdf)
- OECD. (2019a). *OECD future of education and skills 2030: OECD learning compass 2030: A series of concept notes*. [https://www.oecd.org/education/2030-project/teaching-and-learning/learning/learning-compass-2030/OECD\\_Learning\\_Compass\\_2030\\_Concept\\_Note\\_Series.pdf](https://www.oecd.org/education/2030-project/teaching-and-learning/learning/learning-compass-2030/OECD_Learning_Compass_2030_Concept_Note_Series.pdf)
- OECD. (2019b). *OECD employment outlook 2019: The future of work*. OECD Publishing. <https://doi.org/10.1787/9ee00155-en>.
- Scoular, C. (2019). A design template for transforming games into twenty-first century skills assessments. *Journal of Applied Research in Higher Education*, 13(5), 1249–1268. <https://doi.org/10.1108/jarhe-02-2018-0018>
- Scoular, C., & Care, E. (2019). Monitoring patterns of social and cognitive student behaviors in online collaborative problem solving assessments. *Computers in Human Behavior*, 104, 105–154. <https://doi.org/10.1016/j.chb.2019.01.007>
- Scoular, C., Eleftheriadou, S., Ramalingam, D., & Cloney, D. (2020a). A comparative analysis of student performance in collaborative problem solving: What does it tell us? *Australian Journal of Education*, 64(3), 282–303. <https://doi.org/10.1177/0004944120957390>
- Scoular, C., Heard, J., Ramalingam, D., & Duckworth, D. (2020b). *Collaboration: Skill development framework*. Australian Council for Educational Research.
- Simon, K. D. (2022). *Curriculum reform and innovation: Experiences from Kenya’s competence-based curriculum*. African Education Hub. [https://www.africaeducationhub.org/bitstream/handle/hesa/52/CBC\\_in\\_Curriculum\\_Innovation\\_Perspection\\_Kenya.pdf?sequence=1&isAllowed=y](https://www.africaeducationhub.org/bitstream/handle/hesa/52/CBC_in_Curriculum_Innovation_Perspection_Kenya.pdf?sequence=1&isAllowed=y)
- Stevens, M. C., & Campion, M. A. (1994). The knowledge, skill, and ability requirements for teamwork: Implications for human resource management. *Journal of Management*, 20(2), 503–530. [https://doi.org/10.1016/0149-2063\(94\)90025-6](https://doi.org/10.1016/0149-2063(94)90025-6)
- Underwood, J., & Underwood, G. (1999). Task effects on cooperative and collaborative learning with computers. In K. Littleton & P. Light (Eds.), *Learning with computers: Analysing productive interaction* (pp. 10–23). Routledge.
- UNESCO. (2015). *Transversal competencies in education policy and practice (Phase I). Asia-Pacific Education Research Institutes Network (ERI-NET)*. <http://unesdoc.unesco.org/images/0023/002319/231907E.pdf>

- UNESCO International Bureau of Education. (2016, May 20). Collaborative learning. International Bureau of Education. <http://www.ibe.unesco.org/en/glossary-curriculum-terminology/c/collaborative-learning>
- van Boxtel, C., Van Der Linden, J., & Kanselaar, G. (2000). Collaborative learning tasks and the elaboration of conceptual knowledge. *Learning and Instruction*, 10(4), 311–330. [https://doi.org/10.1016/s0959-4752\(00\)00002-5](https://doi.org/10.1016/s0959-4752(00)00002-5)
- von Davier, A. A., & Halpin, P. F. (2013). Collaborative problem solving and the assessment of cognitive skills: Psychometric considerations. *ETS Research Report Series*, 2013(2), i–36. <https://doi.org/10.1002/j.2333-8504.2013.tb02348.x>
- Weldon, E. A., & Weingart, L. R. (1993). Group goals and group performance. *British Journal of Social Psychology*, 32(4), 307–334. <https://doi.org/10.1111/j.2044-8309.1993.tb01003.x>
- Wildman, J. L., Thayer, A. L., Pavlas, D., Salas, E., Stewart, J. M., & Howse, W. R. (2012). Team knowledge research. *Human Factors*, 54(1), 84–111. <https://doi.org/10.1177/0018720811425365>
- Wittrock, M. C. (1989). Generative processes of comprehension. *Educational Psychologist*, 24(4), 345–376. [https://doi.org/10.1207/s15326985ep2404\\_2](https://doi.org/10.1207/s15326985ep2404_2)
- World Bank. (2010). *Stepping up skills: For more jobs and higher productivity*. <http://hdl.handle.net/10986/27892>
- World Bank. (2019). *The changing nature of work*. <https://documents1.worldbank.org/curated/en/816281518818814423/pdf/2019-WDR-Report.pdf>
- World Bank. (2022). *Kenya economic update: Lessons from Kenya's education reforms*. <https://www.worldbank.org/en/country/kenya/publication/lessons-from-kenya-s-education-reforms>

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

