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### Cover Page Footnote

Word Count: 3,886 (including references) Author Contact Information: Amelie D. Smucker, 109 Canterbury Place Williamsburg VA 23188, 434-249-5743, amdrake01@email.wm.edu; Sarah Nuss, slmcgu@email.wm.edu Declaration of Conflicting Interests: The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. Funding: The authors received no financial support for the research, authorship, and/or publication of this article

# Enhancing Collaborative Learning Through Design for Learning

Amelie D. Smucker<sup>1</sup> and Sarah M. Nuss<sup>2</sup>

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## Abstract

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As K-12 educators work toward targeted, small group instruction together with college and career readiness skills, many implement collaborative learning experiences within their classrooms. Collaborative learning can help students develop deeper understandings of content while building critical life-long skills, and using a design for learning approach provides teachers with a useful framework for planning, implementing, and reflecting on student learning. Together, these approaches support one another by helping teachers engage in three practical implementation tasks: designing collaborative learning environments, overcoming barriers to collaborative practices, and designing successful learning tasks. We recommend that teachers use design for learning techniques to purposefully create collaborative learning environments and tasks that engage students while scaffolding students' learning.

## Keywords

collaborative learning, design for learning, K-12 education

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Today's classrooms serve a diverse body of students (Tomlinson, 2017). Therefore, educators must meet the needs of all students, and in doing so, teaching practices have evolved to be more student-centered (Kaput, 2018), data-informed (Brookhart, 2015), and culturally responsive (Piazza et al., 2015). In response to these needs, educators have experienced increased emphasis on targeted, small group instruction (e.g., Hattie, 2019; Tomlinson, 2017) together with college and career readiness skills that better prepare diverse learners for their futures (U.S. Department of Education, 2020). Collaborative learning can help students hone critical skills, like collaboration, and can serve as a tool for learning as its focus is developing cognitive skills and deeper understandings of content through a shared learning experience (Le et al., 2018). Further, collaborative learning can positively impact student learning and achievement (Hattie, 2019; Lam et al., 2018). Based on an emerging body of research, we recommend the pedagogical practice of designing collaborative learning experiences, a broad, intentional approach to group learning where students actively co-engage in meaningful learning tasks (Barkley et al., 2014). The purpose of this article is to discuss how a design for learning approach can

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serve as a useful framework for designing engaging and effective collaborative learning experiences in K-12 classrooms.

Collaborative learning is situation-based, and educators need to assess when and if it is appropriate for their students' learning (Ludvigsen & Mørch, 2010). To address this need, we suggest design for learning, the process of designing innovative processes for, and products of, learning (Mor et al., 2015), as a framework for teachers to plan, implement, and reflect on collaborative learning. While design for learning has been conceptualized more fully within higher education contexts (e.g., Goodyear & Dimitriadis, 2013; Mor et al., 2015), it is a promising model for K-12 classrooms and can help educators determine when and if collaborative learning is more, less, or equivalently appropriate as independent learning (Ludvigsen & Mørch, 2010). We suggest that by applying a design for learning approach, K-12 teachers can enhance their classroom practices and be more purposeful in their decision-making toward utilizing collaborative learning.

### **Improving Learning Through Collaborative Learning**

Collaborative learning, or having students work in pairs or groups on a project or problem-solving task (Le et al., 2018), comprises four essential elements. First, students engage interactively. Additionally, the content and task are meaningful (Kaendler et al., 2015), the workload is shared instead of divided amongst students (Barkley et al., 2014), and the process should result in both individual and co-constructed group learning (Le et al., 2018). This definition may seem similar to collaboration and cooperative learning. However, collaboration is simply the skill and process of working together (Barkley et al., 2014). While collaborative learning involves collaboration, it is focused on the broader goal of learning content (Lam et al., 2018). Essentially, group work is used not only for honing collaborative skills but also for learning new content rather than merely applying previously learned content.

Similarly, collaborative learning may sound like cooperative learning, but cooperative learning approaches the workload of interactive tasks by dividing the labor and learning independently, then combining individual contributions into a final product (Kaendler et al., 2015). An example of this could be students creating a presentation as a team, but rather than working together to create it in its entirety, each student takes ownership of creating and presenting one slide within the overall presentation. Meanwhile, true collaborative learning is designed to enhance individual learning and co-constructed group learning through a shared workload (Kaendler et al., 2015). In the same scenario of creating a team presentation, students might do individual or shared research, but the process of developing a concept and plan, creating slides, making connections between ideas, and presenting are conducted by the team as a whole. We suggest that teachers think beyond basic collaboration and the "divide-and-conquer approach" of cooperative learning, and move toward true collaborative learning to improve student learning.

Collaborative learning has direct implications for improving student learning across multiple settings. In their meta-analysis of factors impacting achievement, Hattie (2019) found that collaborative learning likely has a positive impact on student achievement. More specifically, collaborative learning can “increase awareness of knowledge gaps, deepen understanding, and facilitate the meaning-making process” (Lam et al., 2018, p. 157). While research indicates that collaborative learning is effective across contexts, its effectiveness is dependent on the roles of both students and teachers, and how they interact with one another (Kaendler et al., 2015).

## **Refining the Roles of Students and Teachers**

The primary role of students within collaborative learning is to develop individual and joint knowledge, understandings, and skills through interaction (Kaendler et al., 2015). Further, students should share their perspectives on the process by assessing collaborative learning as a whole, as well as providing input on their peers’ contributions and learning within the process (Stevenson & Hedberg, 2013). This could look like a rubric or a journal entry in which students assess their own and their classmates’ contributions, as well as evaluate the collaborative learning process. These meta-cognitive practices, along with engagement in the collaborative and cognitive aspects of the activity, can facilitate high-quality interaction, and ultimately, a high-quality learning experience because the students focus on both the learning process and the product (Kaendler et al., 2015).

Meanwhile, the primary role of teachers within collaborative learning is to plan when and how collaborative learning should occur, serving as facilitators of students’ interactions with each other (Kaendler et al., 2015). When facilitating collaborative learning, teachers should consider establishing clear expectations for students, setting ground rules, assigning students individual roles and responsibilities, and encouraging both group and individual contributions (Williams, 2015). This is especially true in virtual learning environments where collaboration should be implemented to allow for interaction even though students may be physically distant (Dijkers, 2018), and consequently, teachers may need to facilitate this interaction more directly (Kaendler et al., 2015). Regardless of the context, teachers must evaluate each learning opportunity and decide if collaborative learning is appropriate and worthwhile, thereby being purposeful in their use of this instructional strategy (Sankaranarayanan et al., 2020; University Park Campus School, 2016).

## **Shifting from Instructional Design to Designing for Learning**

We argue that when considering collaborative learning, K-12 teachers should approach this decision using design for learning, rather than instructional design. While instructional design is traditionally teacher-centered and focuses on the structure and sequence of learning (Stefaniak & Xu, 2020), design for learning is student-centered and focuses on purposeful learning activities, specifically learning objectives, a sequential structure,

multiple learning activities, and a variety of learning resources and supports (Ryberg et al., 2015). Essentially, this means that teachers design for learning instead of for teaching in the sense that they design the contexts within which learning can occur (Goodyear & Dimitriadis, 2013). In doing so, teachers—as designers—answer key questions, such as<sup>3</sup>

- “Who is doing the designing?”
- “Who is doing the learning?”
- “Who else is involved?”
- “Why is the design work being done?”
- “Why are the learners doing what they are doing?”
- “What is designed?”
- “What is learned?”
- “How is the design work undertaken?”
- “How does the learning activity occur?”

While many of these questions may sound familiar, there are distinct differences between design for learning and instructional design that can subtly, but significantly, change a teacher’s approach to planning. While design for learning is an emerging topic, especially in K-12 research, we believe that this shift away from instructional design aligns with widely accepted planning and instructional approaches within the K-12 setting. For example, both instructional design and design for learning respect diverse classroom and school populations and support techniques like differentiated instruction (Tomlinson, 2017) and Universal Design for Learning (Rose & Strangman, 2007). However, design for learning utilizes a constructivist approach to understanding the context(s) and learning processes of individuals and groups of students, emphasizing the context and specific learners’ needs at hand (Mor et al., 2015). Vygotsky (1978) posited that constructivist learning is based on the ideas that (a) learning is an active, rather than passive, activity, and (b) meaning is created based on students’ past and current contexts. Design for learning honors these ideas by shifting students’ roles in the learning environment and process to be more active and honoring students’ past experiences, perspectives, needs, and goals when learning.

Design for learning’s constructivist approach makes it a particularly appropriate approach for collaborative learning. First, design for learning helps teachers answer the foundational planning question of how the design work will be undertaken, including why learning - and therefore designing - needs to occur, who will be engaging in the learning process, and who (teachers, staff, students, etc.) will help design the learning activities (Goodyear & Dimitriadis, 2013). This process helps teachers explicitly consider diverse learner needs, as well as collaborative teaching and learning approaches. Then, design for learning asks teachers to consider various possible learning activities, such as collaborative learning, based on student needs and the intended learning outcomes. In doing so,

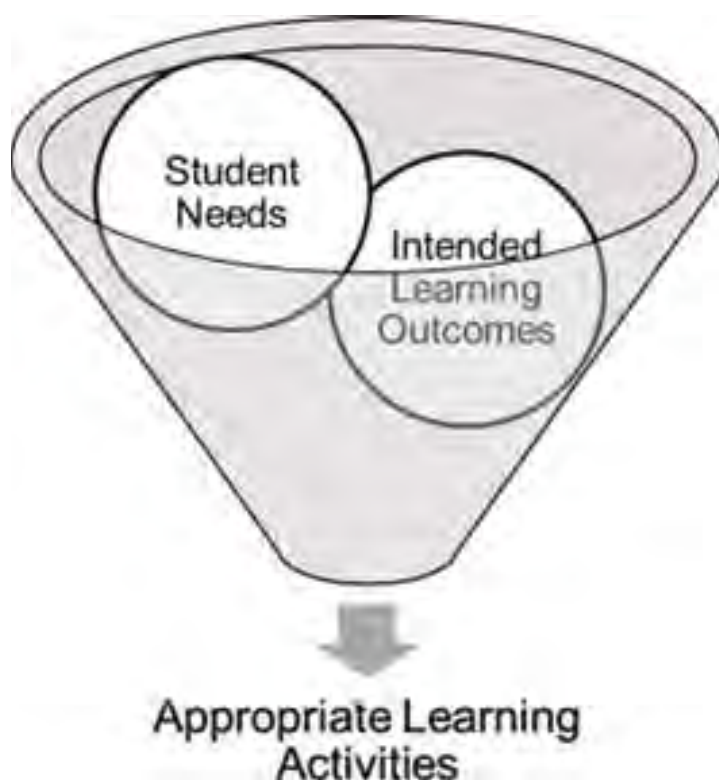
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<sup>3</sup>From Goodyear and Dimitriadis, 2013, p. 5.

teachers question the purpose of learning, whether collaborative learning is an activity that appropriately addresses both student needs and that purpose, and how collaborative learning can be designed as such (Goodyear & Dimitriadis, 2013). As we conceptualize in Figure 1, by following a design for learning process, teachers can be more intentional and student-centered when making decisions about students' learning and the application of collaborative learning practices.

**Figure 1**

*Applying Design for Learning as a Filter for Selecting Appropriate Learning Activities*



As an example of what this process might look like, let us consider applying it within the context of a fifth grade classroom. A fifth grade teacher team is planning a lesson on understanding the format and structure of a paragraph because they are planning on integrating writing into more of their social studies lessons, and the students are showing interest in writing letters to one another in their free time. After the team curates multiple resources and ideas for learning how to write well constructed paragraphs, one fifth grade teacher meets with the special education teacher as several of their shared students receive support for writing tasks. The two teachers review the class's writing samples



and determine that most students have strengths in brainstorming ideas and sequencing ideas logically, but several students are not using introductory topic or conclusion sentences and another small group needs to strengthen their transitions between sentences. Almost all students need continued practice with editing and revising. As the teachers discuss the diverse needs of their students, they determine that collaborative learning would allow students to work in both homogeneous and heterogeneous groups to work with the teachers for targeted skill development, as well as revise and edit their writing through peer feedback. The teachers also determine that collaborative learning would not be helpful with writing initial drafts or typing final drafts at this time, so they design the lesson to include time for independent drafting and typing. Together, the teachers in this scenario (a) considered the learning needs and desires of their students, (b) worked together to share ideas and make decisions about teaching and learning, and (c) designed learning activities that accounted for the intended learning outcomes and student needs.

### **Implementing Collaborative Learning**

Design for learning supports collaborative learning in three practical ways. It can help teachers design collaborative learning environments, overcome barriers to collaborative practices, and design successful learning tasks.

### **Designing Collaborative Learning Environments**

There are several guiding principles when designing collaborative learning environments. First, the environment should reflect the specific students in your classroom, as design for learning honors the diversity within and between classrooms (Mor et al., 2015). Additionally, collaborative learning environments should be viewed and designed to promote both individual and group learning as students will transition between individual processing and group collaboration throughout the learning task (Kirschner et al., 2004). Further, when designing the learning environment, think about potential interactions among the physical space, teacher(s), students, content, and resources (Blyth, 2014). For in-person classrooms, consider multiple seating options, including no definitive front to the room so that all students are seen as equal facilitators of their own learning (Williams, 2015). Finally, consider allowing time and space for interdisciplinary collaboration, with students and teachers from different disciplines and classrooms working together (Josband, 2019).

Similarly, virtual classrooms can be designed with opportunities for students to interact in groups, demonstrate leadership, receive and provide scaffolding, and get support from the instructor (Blake & Scanlon, 2013). To this end, breakout rooms, discussion boards, and collaborative documents can be used (Barkley et al., 2014). However, technology-enhanced collaborative learning can also lead to unexpected responses from students, so designers must try to predict and accommodate students' technology-readiness, accessibility, student responses, and levels of engagement (Blake & Scanlon, 2013). Fur-



ther, teachers will need to scaffold both learning and technology use for students while using design for learning practices to ensure the technology utilized serves to enhance learning (Ludvigsen & Mørch, 2010).

## **Overcoming Barriers to Collaborative Practices**

Collaborative learning can provide many opportunities to improve student learning, but there are also potential barriers of which teachers should be aware. Le et al. (2018) found four common obstacles: students' underdeveloped collaborative skills, overreliance on group members to complete assignments, becoming distracted by social interactions, and misconceptions about their partners' ability levels. While these challenges were noted in pre-service teachers working collaboratively, we suspect that K-12 teachers observe similar tendencies within their students. In response to these challenges, teachers must take the time to prepare students, tasks, materials, and expectations for collaborative learning and allot the time required to manage conflicts, scaffold learning, and develop students' teamwork skills (Kirschner et al., 2004; Tinzmann et al., 1990). The key to overcoming these barriers is time, and we believe design for learning can help teachers maximize their planning and implementation time as the design for learning process asks teachers to predict and purposefully respond to students' needs.

Some educators might also consider virtual learning environments to be a potential barrier to collaborative learning. As with in-person settings, collaborative learning in virtual environments takes time and planning, but collaborating in this environment can also build and integrate communication, problem-solving, and creative thinking skills through group tasks (Van den Bossche et al., 2006). Virtual collaborative learning can also facilitate making connections between classmates and between students and their instructors in a setting that can often be isolating (Spencer, 2020). As virtual collaborative learning supports critical skill development and a sense of connectedness, we highly recommend collaborative learning within virtual learning environments, as well as in-person environments.

## **Designing Successful Learning Tasks**

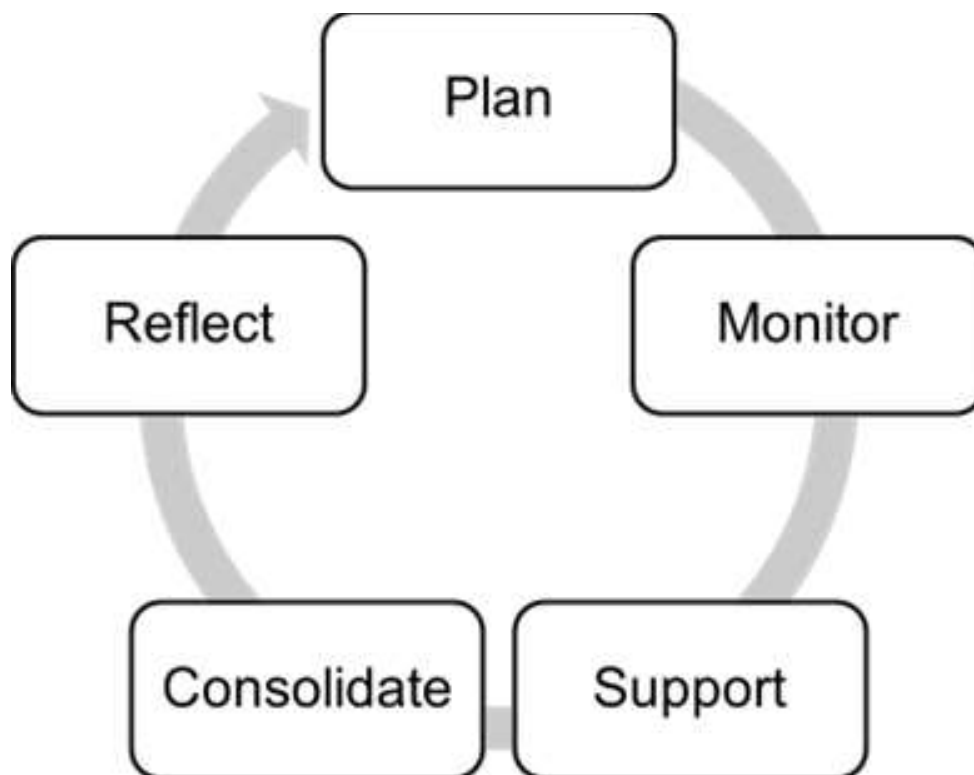
Collaborative learning can provide many opportunities to improve student learning, but there are also potential barriers of which teachers should be aware. Le et al. (2018) found four common obstacles: students' underdeveloped collaborative skills, overreliance on group members to complete assignments, becoming distracted by social interactions, and mi Regardless of setting, in order for collaborative learning to be successful, collaborative skills must be explicitly taught and scaffolded. Teachers at University Park Campus School (2016) recommend that students start with more structured group work with assigned responsibilities, then transition to tasks with less structure, more autonomy, and more choice. Meanwhile, teachers can transition between instructor, facilitator, and supporter as students become more skillful at collaboration (University Park Cam-

pus School, 2016). Because collaborative learning focuses on both individual students' knowledge-building and group co-constructed knowledge (Van den Bossche et al., 2006), teachers may need to scaffold collaborative skills, such as cooperation, problem-solving, conflict-management, and communication. Therefore, we suggest continually engaging in collaborative learning with teacher scaffolding to help students build these skills.

Not only can collaborative learning be designed to allow students to share knowledge, it can be designed to encourage shared authority, group composition, goal setting, and assessment (Tinzmann et al., 1990). As students become more skillful at collaborative learning, more shared decision making can occur. Two key strategies for ensuring equity of authority in decision-making are to change group membership regularly and design appropriate group sizes based on the nature of the learning task (Sankaranarayanan et al., 2020; Tinzmann et al., 1990). In the virtual environment, it is particularly important to include synchronous collaborative learning activities so that students will not divide up the assignment and work independently (Sankaranarayanan et al., 2020). As with collaborative skills, shared decision-making needs to be scaffolded and supported by teachers (Van den Bossche et al., 2006).

**Figure 2**

*Iterative Teacher Behaviors that Support Collaborative Learning Based on the ICLC Framework*



Finally, Kaendler et al.'s (2015) Implementing Collaborative Learning in the Classroom (ICLC) framework includes five competencies that can guide teachers' professional learning and practice, including planning, monitoring, supporting, consolidating, and reflecting, which we have visualized as Figure 2. They suggest teachers plan for student accountability and positive interdependence, such as answering the design for learning who, why, what, and how questions mentioned earlier. During collaborative learning tasks, Kaendler et al. encourage teachers to monitor student interactions by comparing intended and actual student activities and then adapt support based on these observations. Further, they emphasize the need to consolidate student learning by facilitating reflection upon different teams' approaches to the learning task or problem. Finally, Kaendler et al. recommend that teachers reflect on their own facilitation behaviors, students' learning processes and achievements, and the collaborative learning task. By continually engaging in these behaviors, we believe teachers can use design for learning thinking to enhance collaborative learning within their classrooms.

## Conclusion

Utilizing a design for learning approach can allow teachers to support student learning through purposeful classroom practices, such as collaborative learning. Effective collaborative learning can build students' collaboration skills while also encouraging meta-cognitive reflection on their own learning processes (Kaendler et al., 2015; Le et al., 2018). Design for learning allows teachers to select appropriate opportunities for purposeful collaborative learning while scaffolding students' learning and skills. We suggest that teachers use design for learning techniques to create environments that help students engage in collaborative learning both as and for learning. Our recommendations are limited to the currently available work from both scholars and practitioners on collaborative learning in K-12 settings and design for learning. As such, additional empirical research is needed on how these two approaches can effectively be implemented in K-12 classrooms. To support the evolution of this innovative approach, we challenge fellow educators to apply design for learning in K-12 contexts as a way to explore how and when to best employ collaborative learning.

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