

PROMISING PRACTICE

The Theoretical Alignment of Supplemental Instruction and Developmental Education: When an SI Leader Uses Adult Learning Theory to Underpin Instruction

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Supplemental instruction (SI), the offering of additional assistance outside the scheduled and required class time, was developed by Deanna Martin and David Arendale in 1974 at the University of Missouri-Kansas City (Martin & Arendale, 1992). An SI leader (SIL), who is a near-peer, provides interactive sessions to reinforce concepts delivered during class time. As SI has grown and developed over time, it has taken on several names from first being called supplemental course instruction to other names such as peer-assisted learning (PAL), peer-assisted study sessions (PASS), facilitated study groups (FSG), and peer learning sessions (PLS) (D. Arendale, personal communication, February 12, 2022; Dawson et al., 2014; Paabo et al., 2019). SI was initially developed and intended for graduate, professional, and medical students who found themselves struggling in challenging courses (Arendale, 2002; D. Arendale, personal communication, February 12, 2022). SI is now utilized in undergraduate, graduate, and professional student courses, particularly to assist students who are enrolled in high-risk courses (Martin & Arendale, 1992; Dawson et al., 2014). Targeting high-risk courses (i.e., those in

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which thirty percent or more of the students fail, withdraw, or receive a 'D' for the course) rather than high-risk students attempts to eliminate the stigma that coincides with asking for academic support and to remove the deficit language that is commonly associated with seeking help (Martin & Arendale, 1992). Furthermore, SI has been shown to be equally effective for students regardless of gender identity or ethnicity (Dawson et al., 2014; Martin & Arendale, 1992). While SI has been shown to be effective for diverse groups of students, its theoretical ties to adult learning have not been fully examined.

The purpose of this article is to explore SI's alignment to theories of adult learning and development which are the underpinnings of developmental education. We begin by identifying adult learning and development theories that have influenced the field of developmental education and then examine descriptions of SI in the literature to explore SI's utility as a student support strategy within developmental education contexts. We conclude by providing examples from our own application of SI, including pragmatic tools for helping both instructors and SIL be successful in the classroom. We demonstrate how these SI practices are consistent with adult learning and development research. The tools we describe were developed with a developmental education context in mind but can be applied in any SI context.

Foundational Theories

Several theories provide the foundation for SI, including constructivism (Piaget & Inhelder, 1958), the cone of experience (Dale, 1946), and the hierarchy of learning improvement programs (Keimig, 1983). Tinto's theory on college persistence also has been referenced as a major tenet of SI's theoretical framework because of SI's emphasis on persistence (Arendale, 2000; Hurley & Gilbert, 2008; Tinto, 1987). However, in the wake of SI's growing popularity, scholars have connected the practice to additional learning theories (James & Moore, 2018). One notable addition is the integration of Vygotsky, particularly his zone of proximal development (ZPD) and sociocultural theory of cognitive development (STCD). The ZPD posits that a learner can achieve the acquisition of new knowledge with the guidance of a person who already has that knowledge. Through scaffolding, students can move from reliance on this more knowledgeable guide to independence. SI sessions incorporate these same

techniques. Further, Vygotsky's sociocultural theory of cognitive development highlights the important role social interaction plays in human development. SI also acknowledges this importance by primarily using collaborative learning strategies during SI sessions. While the aim of this paper is to continue the conversation forward, a fuller discussion of the theoretical literature can be found in Mas (2014), Hodges and White (2001), Hurley and Gilbert (2008), and Skoglund et al. (2018).

Theoretical Connections Between SI and Developmental Education

Martin and Arendale (1992) recommended that SI be used in courses where students are motivated to learn and where the course is perceived as rigorous. Indeed, they argued, "[If] students are not being successful in courses then perhaps colleges should change the way courses are taught" (Martin & Arendale, 1992, p. 1). Despite alignment between this claim and core values of developmental education, Martin and Arendale specifically discouraged the use of SI in developmental education. The authors based this recommendation on their inclusion of Keimig's (1983) hierarchy of learning programs within the theoretical framing of SI. Keimig classified programs into four types based on the comprehensiveness of provided support services and their level of institutionalization. Martin and Arendale (1992) identified SI as a part of what Keimig described as a comprehensive learning system. Based upon Keimig's assumption that developmental education seeks to remediate academic or non-cognitive deficiencies and develop decontextualized critical thinking and academic skills, Martin and Arendale (1992) argued

against pairing SI with developmental courses:

It has been our experience that SI is least effective when it is attached to remedial classes. First, students may refuse to attend SI sessions if they do not perceive the course to be demanding. Second, SI has not been effective for students who cannot read, take lecture notes, write, or study at the high school level. Therefore, we stress to adopting institutions that they utilize SI in non-remedial settings with high-risk, demanding courses. (p. 5)

This recommendation failed to consider overlap between the purpose and practices of SI on the one

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hand and the purposes and realities of developmental education on the other. After all, developmental education has been defined as “the integration of courses and services guided by the principles of adult learning and development” (Boylan et al., 2017, p. 2), and—as we discuss below—the support offered in SI closely aligns with several adult learning and development principles (Hurley & Gilbert, 2008).

Given the role of SI in supporting remedial and other courses, why might there be caution against pairing SI with developmental courses (D. Arendale, personal communication, February 12, 2022; Martin & Arendale, 1992; Skoglund et al., 2018)? We posit their recommendation stems from two problematic assumptions: (a) that students will not find developmental courses challenging enough and thus will not warrant attending SI, and (b) that SI is ineffective for students who lack basic high school literacy and academic skills (e.g., reading, writing, note-taking). However, the authors fail to provide references to back their claims, suggesting that these assumptions are not supported by the literature. Only about half of all students enrolled in developmental reading continue on to their college-level coursework, suggesting that there is some level of difficulty in these courses (Ganga et al., 2018). Furthermore, SI can be effective for students seeking to acquire basic academic skills if modifications are made to the original model. Martin and Arendale (1992) advocated for voluntary SI attendance as outlined in the original vision for SI. Arendale argued that “students who are at risk are notorious for their reluctance to refer themselves for assistance until much too late” (2010, p. 42). As a result, some SI scholars now advocate for mandatory SI sessions (Dalton, 2011; Mas, 2014). We concur with these more recent proponents of SI and further argue that SI should be a mandatory component of a developmental course. Indeed, we see SI as providing an important instructional space for introducing and practicing skills related to core aspects of developmental education, including students’ self-regulated use of learning strategies (Weinstein et al., 2011) in order to develop competence and autonomy (Chickering, 1969). We base our position on the alignment between SI and the adult learning and development theories which create the foundation for developmental education, as well as the traditional definition of developmental education.

Connections between Adult Development and Adult Learning Theories and SI

The major elements of SI (e.g., collaborative learning, funds of knowledge, etc.) are supported by adult learning theories (e.g., humanist theory, experiential learning, and transformative learning). Reardon and Valverde (2013) articulated this connection well:

The Supplemental Instruction (SI) program relies on the foundations of adult education. In particular, it depends heavily on peer support in difficult classes. The andragogical approach highlights the importance of addressing different learning styles and helps students to engage in collaborative learning and problem solving. (p. 382)

Students who are enrolled in developmental education courses are adult learners and also need such adult learner strategies. Developmental education courses support adult learners, and thus, instructors should apply strategies grounded in theories of adult learning (Kasworm, 2000; Trotter, 2006). These learning demands are the same for students’ experience in SI.

The field of developmental education was built upon a combination of adult development theories (Hurley & Gilbert, 2008). These theories can be summarized as belonging to what Merriam and Caffarella (2006) identified as psychological (e.g., cognitive and intellectual development), sociocultural (e.g., awareness of social roles and their influence on socially constructed identity markers on development), or integrative frames (e.g., examining the interaction and intersection of biological, psychological, and sociocultural lenses). Across these distinct theorizations of how adults grow and develop, Trotter (2006) summarized foundational adult development literature as arguing that (a) adults’ experience is a resource which should be utilized in their learning, (b) adults need to be actively involved in planning their education based on their personal interests, and (c) adult education should encourage reflection and inquiry to promote individual development. While these development theories focus on learning as it applies to progressing into and through adulthood, adult learning theories explicitly focus on how and why adults seek formal and informal learning opportunities in pursuit of personal goals.

Central to many theorizations of adult learning is the notion of trust and the trusting relationship that must be cultivated by the educator and the adult learner. Indeed, Cohen (1995) describes learner-educator trust as one of the six core functions of the mentoring role. Although much of the literature emphasizes the importance of educators trusting their students (i.e., Henschke, 2012, 2013), adult learners must also be able to trust the educator in order to maximize the potential for experiential learning.

Adult learning theories can be similarly divided into three forms: humanist theory (Maslow, 1970; Rogers, 1969), experiential learning (Kolb, 1984; Schön, 1983), and transformative learning (Mezirow, 1985). Like Maslow (1970) and other

humanist theorists, Rogers (1969) emphasized the importance of learning through doing, the learners' responsible participation in the learning process, the learners' continued openness to learning *the process of learning*. Humanists identify varying levels of learning based on the content's relation to learners' formal learning needs, sense of self-construction, and ability to reinforce autonomy (Bélanger, 2011). Rogers further outlined the role and methods of the facilitator as supporting the learning environment, providing resources (including themselves), and engaging as a participant learner. In particular, the importance of the facilitator as a resource provider and participant learner aligns with SI practices such as preparing review or expansion materials for students to utilize in the SI session or attending the paired class with students.

Another theoretical connection between adult learning theories and foundational SI theories can be found between Dale's (1969) cone of experience and adult learning theories such as experiential learning (Kolb, 1984) and transformative learning (Mezirow, 1985). Dale's cone of experience (1969) indicated that students learn most effectively by being actively involved in work that is relevant to their target job and suggests that instructors ought to create direct, purposeful learning experiences that provide this relevancy. Experiential learning theory posited learning as occurring within a cycle of concrete experience, reflective observation, formation of abstract constructs, and active experimentation, which in turn influences future concrete experiences. Experiential learning thus assumes that learning is an inductive process in which experience informs reflection, which ultimately results in learning. Kolb argued that through practicing a reflexive attitude toward their experiences, learners transform knowledge into learning. Furthermore, as students engage in and develop from experiential learning, they grow as autonomous learners (Boggu & Sundarsingh, 2019; Moon, 2004).

Transformative learning similarly emphasizes the importance of a highly engaged learner who is changed by their learning experience (Mezirow, 1985). The reflective aspect of experiential and transformative learning, particularly as it relates to experimentation and moving from concrete experience to abstract understanding, is highlighted in SI practices, such as Think-Pair-Share (i.e., by having students individually read a SIL's handout before

working together to fill out a chart and then sharing what they have learned from the activity). Mezirow (1985) distinguished between an assimilation process (conforming new experiences to one's existing knowledge structure) and a transformative process (reordering the knowledge structure itself), noting the essential role of the educator in transformation. Transformative learning can be conceptualized as a cyclical process involving questioning beliefs, learning by reexamining beliefs, transforming the frame of reference, and taking a new course of action, which again leads to questioning beliefs. Bélanger (2011) emphasized the connection between transformative learning and social change spurred by critical reflection and emancipation through consciousness-raising and dialogue.

Among adult development and learning theories, there are several overlapping concepts. Adult learning theory scholar, Eduard Lindeman (1926), explained that: (a) adults' needs and interests motivate their learning, (b) adults' approach learning through a life-centered orientation, (c) adult learning is best informed by experience, (d) adults need to be self-directed, and (e) individual differences increase with age. Other notable adult learning theorists similarly emphasize the importance of self-direction (Knowles, 1975; Mezirow, 1985). For example, Knowles' (1968) theory of andragogy centralizes emphasized the importance of adult learners' internal motivation and self-direction, which often provides these students with self-fulfillment in meeting their learning goals. Several of these tenets are echoed in the SI literature, which similarly emphasizes the importance of learning through experience and connecting learning to adults' needs and interests (James & Moore, 2018). In summary, adult

learning and development theories can inform the SI model design by drawing attention to the way adults learn, their motivation for learning, and their ability to reflect upon their learning experiences in order to meet their individual goals.

Adult learning theories are not flawless, however, and we suggest that SI may provide a practical opportunity to address some of the challenges stemming from instruction rooted in traditional adult learning theories. In particular, critical scholars have questioned some key adult learning theories for implicit assumptions that the individual learner is "insulated from the world, fully in control of his or her own learning" (Merriam & Bierma, 2014, p. 58; see also Lee, 2003; Pratt, 1993; Sandlin, 2005). In the tradition of critical

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educators, these scholars argue that individuals and their learning cannot be understood without acknowledging the historical, sociocultural, political, and economic contexts in which they learn. In the case of students enrolled in developmental education, adult learning and development theories must recognize how inequitable access to resources and prior formal and informal education influence students' preparation for college. Sandlin et al. (2011), for example, examined how traditional adult learning and development theories could be updated to include informal learning and learning that incorporates technology. Guided by critical adult learning lenses that incorporate the contexts in which adults learn and develop, SILs can intentionally draw from students' range of experiences as resources to deepen the relevance and increase the effectiveness of their instructional support.

An Example of Practical Application of Adult Learning Theory-Aligned SI

In the following section, Katy Glass describes her work as a SIL, connecting her work in gateway and developmental education courses to the literature discussed above.

In the fall semester of 2011, I began working as a SIL in an algebra-based physics class while pursuing my bachelor's degree at a regional university in a large city. At the university, the students were self-driven; thus, they came to class prepared and ready to learn. The majority of students performed successfully in the class even without attending SI sessions. Although there were approximately 100 students in the course, my sessions were small, averaging about five students. The small number of students volunteering for my SI session was consistent with the predictions of Martin and Arendale (1992), who stated that only those students who found a course challenging would seek out extra help. My lessons consisted of practice worksheets and physics quizzes, discussions, or sessions in which we focused on students' homework. Primarily these students saw me as a less intimidating authority figure that could answer their questions, which seemed to be enough to help them succeed.

In 2018, I started working at a community college in the same city as a tutor and SIL for English Mega Plus and Integrated Reading and Writing (INRW) courses. My experience at the community college was drastically different than my experience at the university because of the different types of learners I encountered at the two institutions. At the community college, students who were placed in an English Mega Plus or Plus course (two variations of a corequisite developmental English and Composition course) were just beginning to learn to use learning and study strategies. Many of these students were also forming their first positive relationships with their instructors. Students who were

placed in these courses commonly fit into one or more of the following categories: those experiencing financial hardship, non-traditional adult learners, and English Language Learners (ELLs).

How much students trusted me as a SIL truly guided my instructional practices. I knew the more students trusted me, the more beneficial the sessions would be for them. Therefore, I have developed many strategies over the semesters to make my students think of SI as a reliable resource for learning and encouragement instead of yet another stress-inducing task. Thus, my lessons for students at the community college are creative, sensitive, and far less off-putting than the practice physics quizzes I used in the university setting. Although trust is not an area that has been previously explored in SI literature, it is a foundational concept in adult learning (Cohen, 1995) and is essential to establishing a strong SI relationship.

Aware of the critical adult learning theories which challenge educators to recognize the influence of learners' lives and experiences outside of the classroom, I assumed that many of my students had negative previous academic experiences and that these experiences might influence their ability to succeed in college classes. Rogers' (1969) humanist theories underline the importance of learners' openness to exploring the learning process. If my students did not feel comfortable or safe enough to share, they would have yet another barrier added to their learning. Much of a SIL's job is to gain students' trust so that students will be comfortable enough to seek advice when they need help. At the university, because my physics students knew I was an English major, I was constantly trying to prove that they could trust me to understand physics. At the community college, I found myself trying to prove to my students that they could trust me to read their writing and help them get that piece of writing into the student's best draft. Whether in class or in an SI session, some community college students remained fearful of sharing their assignments with their peers and me. When a student showed up for SI but was afraid to share their work or to participate, as a SIL, I tried my best to find a way for the student to comfortably gain knowledge from the lesson. I realized that although there were differences between the type of learners that I dealt with at the university versus the community college, trust and comfort were central to relationships I developed with my students in both settings.

At the college, the standard SI rules of presenting myself as a near-peer, attending class, and preparing group-centered sessions for SI remained important, but I've discovered that because attending students already found college to be an intimidating or unwelcoming space, paying attention to the session environment was of

equal importance to the success of the SI session as were the standard SI rules. Beginning lessons in SI with blank walls, blank poster paper, or blank documents is too similar to classwork and can often be more stress-inducing (Grube, 2014). With students uncomfortable with subjects that they have always found challenging, the lessons, environment, and leader need to work together to create an inviting study group, not a boring and intimidating one. Motivating educational posters and work from past students are important instructional resources that add to the credibility of a SIL while increasing student comfort levels and displaying work from past students shows upfront that the SI program is proud of the students it served. Therefore, when students walked into our lab, they were immediately greeted with music, posters, snacks, and positive feedback. I preferred to have Lo-fi music playing in the background of all my lessons because I found that my students in the developmental corequisite classes were less likely to provide answers in a room of dead silence. My intentional choice to attend to the physical and emotional comfort of my students aligned with the scholarship of humanist theorists such as Maslow (1970) and Rogers (1969).

One strategy to ease anxieties and boost group participation in poster activities was color-blocking. Color-blocking involves using multi-colored construction paper to organize pre-grouped ideas on blank posters. When I prepared a poster by color-blocking and adding titles or captions, it was easier to get the entire group to participate in writing rather than having to appoint one reluctant person. Another participation-boosting and anxiety-easing strategy was letting students with writer's block type a text to a friend on their phones rather than type text in a blank Word document. Yet another strategy that helped attendance and participation was the snack bowl. Students who participated during SI got to choose (at least) one snack from the coveted snack bowl. For students with food insecurity, the SI snack is a small resource, but it also is another physical reminder that students are cared for in SI. Faculty demonstrations of care for their students support students' growth in part by creating spaces that students feel are safe for risk-taking (Thayer-Bacon & Bacon, 1996). Students came to my SI sessions knowing there would be comforting music, encouraging posters, a snack, and maybe their own work on the wall. All of these aspects of the space encouraged them to engage and develop.

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For SI sessions with my English 1301 Mega Plus students, I discovered that students had a greater comprehension of and participation in my lessons when I gamified the curriculum in ways that provided students with a sense of power rather than helplessness. This is a practical application of Rogers and Maslow's belief that lessons should reinforce autonomy and appeal to the adult learner's formal needs (Bélanger, 2011). In the activity titled "Who's Getting Promoted?," I asked my students to analyze a series of emails for errors from three fake employees in a Think-Pair-Share collaborative learning format. This task referenced Dale's (1946) cone of experience by requiring participants to apply the group's combined knowledge of grammar and punctuation to sample work emails, which many of them were already writing

for work or would need to write in their future careers. "Who's Getting Promoted" followed the process of experiential learning theory as it gave students the power to choose which of the three pretend characters would receive a promotion. During this one SI session, we covered all four stages of the learning experience outlined in Kolb's (1984) experiential learning theory (Abdulwahed & Nagy, 2009). During the concrete experience stage, students individually read through the fake employee emails and began applying their own knowledge as they noticed errors. Next, during the reflection observation stage, students began to share observations with the group as they sought commonalities between editing processes. The abstract conceptualization stage followed with the small group discussions, in which all groups and the SIL came together, confirmed the errors, and decided which employee

had won the promotion. Students experienced the final stage of Kolb's (1984) experiential learning theory, active experimentation, when they then applied the editing knowledge acquired during the SI session to peer editing and their own writing.

The students were invested in this lesson because it allowed them to act out a concrete experience in the shoes of an employer. Students successful with experiential learning grow into autonomous learners who work well in groups or alone (Boggu & Sundarsingh, 2019; Moon, 2004). Although there is ultimately one correct answer to the "Who's Getting Promoted" activity, its focus is more on the group editing process. Peer collaboration provides both comfort and motivation for individual students early in the learning process as

they provide their group or partners with answers in which they are confident. Students can discuss and work together through the difficult parts of the activity, such as determining how many errors are in each email or the winner of the job promotion.

Additionally, by avoiding excessive cold-calling on students and allowing them to edit and present in pairs, this activity and other games like it allow the SIL or the student's partner to be discrete towards students when they make mistakes or struggle by addressing concerns within small pairs and not in front of the entire class, which can be embarrassing and discouraging to an anxious learner. The SIL can also provide additional opportunities for small successes by checking in often on groups. This way, every student gets at least one "good job" per session. Throughout group activities or while working one-on-one, SILs should give praise to each instance of growth they notice, no matter how small. In this way, not only do students feel comfortable enough to allow themselves to learn, but they also receive encouragement each and every session. Giving specific and personal praise is imperative for the SIL when working with adult learners who too frequently have been made to feel like outsiders in their own educational experiences (Henderson et al., 2019). By offering clear and individual praise, the SIL can provide a new foundation of learning experiences for students to build upon.

Conclusion

The major tenets of SI and the theoretical underpinnings of developmental education both align in that they are founded in adult learning theories. Therefore, it made sense to forego some of the earlier warnings against using SI with students placed into developmental education and attempt to integrate SI within our courses. This alignment between the theoretical underpinnings of SI and developmental education—through andragogical principles—becomes evident when framed within the context of Katy's SI sessions. By framing the collaborative learning techniques of SI around the needs and anxieties of adult learners, SILs can effectively engage students placed in developmental coursework. With this article, we have presented our best practices for SILs to engage with students in developmental education in impactful ways. However, there is still much more work to be done to hone SI practices in developmental spaces to ensure the needs of our students are being met in the best possible way. Thus, by sharing our best practices, we hope to create an initial point of discourse for practitioners who are adopting similar practices, as well as engaging in conversations with those who are curious about implementing SI in developmental classrooms.

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