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Supplemental Instruction:
Best Practices Literature Review

DePaul University

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For more than four decades, the Supplemental Instruction (SI) model of academic assistance has provided students a supportive and cooperative learning environment to master content in traditionally challenging courses. Developed at the University of Missouri-Kansas City in 1973, SI has been implemented by hundreds of institutions world-wide and spawned a variety of collaborative, cooperative, or community learning models to mirror its success. The original goals of SI, including: improving student grades, reducing attrition, and increasing graduation rates have been widely researched; with studies outside of the United States comprising more than one-third of the literature (Arendale, 2004). Nevertheless, given cultural evolutions within higher education, student populations, and society since the 1970s, research indicates successfully implementing SI requires an adoption of new, potentially best, practices that sufficiently serve the complex needs of today's student (Keeling & Hersh, 2011).

As an urban, private, and mission driven institution, DePaul University (DePaul) facilitates learning across ten colleges, on five campuses for more than 26,000 undergraduate, graduate, and continuing education students. With fewer than forty (40) students in an average class, faculty members have the opportunity to deeply engage with students and create an environment conducive to learning. Nevertheless, historically difficult courses continue to emerge at DePaul. With this, SI provides support to students in various sections of Accounting, Biology, Chemistry, Economics, and Math through peer assisted study sessions facilitated by trained student leaders.

Given the technological and pedagogical advancements impacting higher education, coupled with the rapid growth and culturally diverse make-up of DePaul, this literature review explores new, and best, practices to enhance and expand SI at DePaul. Within the available body

of literature, SI practices related to faculty involvement, technology, multiculturalism, and mentorship were examined to meet the needs of the Office of Supplemental Instruction.

Faculty Involvement

Since the publication of *Learning Reconsidered* in 2004 and the reconceptualization of deeper learning at institutions of higher education, multiple research studies have investigated demographic, practice-based, and experiential factors impacting student development. Recent advances in psychology and neuroscience provide evidence linking rich engagement with new material to functional and structural changes within the human brain—quite literally, *changing minds* (Keeling & Hersh, 2012). While inextricably linked, the differentiation between teaching and learning not only serves as a foundation for the SI model, but also reflects contemporary conversations occurring at colleges and universities regarding shifts in institutional priorities (Arum & Roska, 2010) to refocus efforts on *higher* student learning. With SI serving as a successful peer-based learning complement to faculty-based teaching practices, the research clearly indicates the need for a collaborative effort yielding improved content mastery and self-efficacy for the student, and enhanced content delivery for the faculty (Drake, 2010; Wolniak, Mayhew & Engberg, 2012). Additionally, this collaboration benefits the institution as well with quantitative and qualitative data from the Wabash National Study (2007) revealing a positive correlation between quality faculty interaction and student retention and persistence. Increased student self-efficacy, a goal of SI, underpins this finding (Goodman, Baxter Magolda, Seifert & King, 2011; Wolniak et al., 2012).

While SI does not rely on the rigorous involvement of faculty, quantitative and qualitative data reveals high developmental returns for SI Participants and Leaders where a roadmap for academic success is co-constructed. Features of successful, supportive academic

environments include active listening, high expectations, and accountability (Goodman et al., 2011) and can be implemented in both learning contexts by faculty and SI Leaders. When applied to the SI learning model, in cooperation with faculty, these features translate into the following classroom practices (Drake, 2010):

1. Faculty members supporting and marketing SI in the classroom;
2. Faculty members devoting a section of the syllabus to SI;
3. Faculty members creating a classroom contract regarding SI;
4. Faculty members including a slide on SI at the end of each lecture;
5. Faculty members announcing the average quiz and test score differential for regular SI attendees against the non-attendee average;
6. Faculty members allowing SI attendees the opportunity to share their experience with the class;
7. Faculty members offering extra credit to inspire initial SI attendance.

Additionally, the features fostering student learning (active listening, high expectations, and accountability) can be similarly utilized during SI sessions to create continuity between the learning environments. Dwindling institutional resources, juxtaposed with increasing responsibilities for faculty and staff, serve as a challenge to implementation as these practices require additional SI Leader training and mentoring, SI Participant tracking, increased faculty preparation, and quarterly assessment for maximum effectiveness. Nevertheless, the student's intellectual and developmental gains, resulting from deeper faculty involvement (Astin, 1993; Drake, 2010; Keeling & Hersh, 2012) in SI cannot be ignored.

As previously noted, the benefits of faculty involvement in SI exist reciprocally with the engaged member experiencing opportunities to develop professionally. In working with the SI Leader to create effective sessions, or attending sessions as an observer, McGuire (2006)

suggests that the interaction and feedback provides the professor invaluable insight into student learning and development. With this, the participating faculty member has the opportunity to modify his/her content delivery and implement more effective strategies to facilitate learning within the classroom. Additionally, interacting with students through SI invigorates the faculty member as more intimate connections foster greater satisfaction with, and responsibility for, student success (Drake 2010). To replicate such invigoration and motivate SI participation among faculty, encouraging those involved to share their narrative may increase, or deepen, engagement across the profession.

Technology

With the widespread integration of web-based applications into higher education learning environments, research examining the relationship between student learning and technology utilization has exploded since the early 2000s (Chen, Lambert, & Guidry, 2010). While Keeling and Hersh (2011) argue that Americans progressively, and disproportionately, rely on the transformative power of technology in education, analysis of data derived from the National Survey of Student Engagement (NSSE) and the U.S. Department of Education reveals that hybrid courses have a greater impact on self-reported learning outcomes and intellectual gains than online courses (Chen et al., 2010). These findings parallel the position of Chickering and Ehrmann (1996) suggesting that while technology, as a singular intervention, will not lead to student success, it must be deployed as a complementary strategy to enhance the holistic development of students. Additionally, through the distillation of NSSE data, Chen et al. (2010) confirmed the relationship between technology utilization and holistic student development, stating,

Not only do students who utilize the Web and Internet technologies in their learning tend

to score higher in the traditional student engagement measures (e.g. level of academic challenge, active and collaborative learning, student-faculty interaction, and supportive campus environment), they also are more likely to make use of deep approaches of learning like higher order thinking, reflective learning, and integrative learning in their study and they reported higher gains in general education, practical competence, and personal and social development. These results are encouraging signs that Internet and Web-based learning technologies continue to have a positive impact on student learning and engagement (p. 1230).

Given the mission of SI, these outcomes suggest that the employment of complementary web-based platforms add programmatic value by enhancing the developmental experience of the student.

While research exploring technology related practices within SI remains limited, the literature provided a handful of incorporable strategies to benefit the student-participant, and student-leader, cognitively and emotionally. Saeed, Yang & Sinnapan (2009) suggest that the flexibility of modern student learning styles allows for the utilization of varying technologies since preferences are not limited to a particular tool. With this, processes and components within web-based strategies may be extrapolated to go beyond their intended use to advance SI goals and outcomes. The remainder of this section explores the components and processes of Video-Based Supplemental Instruction (VSI) and Online Peer Assisted Learning (OPAL), recommending additional research to confirm off-label programmatic effectiveness and impact.

Video-based Supplemental Instruction (VSI), based in the collaborative learning process of pre-recorded lectures, provides a more integrated, and intensive, approach to learning for students lacking the prerequisite knowledge, and skills, to successfully complete subjects

(Armstrong, Power, Cody & Dormer, 2011). Intending to assist students in their development as interdependent and independent learners, the research suggests that this is not achievable over the course one academic semester (Armstrong et al, 2011). Grounded in the framework of Preview, Process, Review and Polish, techniques and interventions comprising this four stage model may prove inherently valuable to achieving the goals of SI. The most notable of these strategies requires the VSI Leader to create a video module that *previews* vocabulary and content for student-participants prior to the classroom lecture. Qualitative data revealed this practice as vital to ensuring student capacity to effectively process new material (Armstrong et al., 2011). Interestingly, this best practice echoes the call for increased faculty involvement, requiring a collaborative effort between the professor and student leader to create the preview session.

Beaumont, Mannion, and Shen (2012) argue for the implementation of Online Peer Assisted Learning (OPAL) at institutions of higher education following extensive qualitative research linking the flexibility, convenience, and anonymity of the web-based program to increases in student self-efficacy, self-confidence, and participatory persistence – particularly for commuter students unable to attend sessions in person. Given the transient nature of the DePaul campuses, OPAL practices, once further evaluated for success, may be well suited for the student population SI serves.

Multiculturalism

Over the last two decades, demographic changes in the national population coupled with the commodification of higher education, have resulted in dramatic increases in cultural diversity (race, ethnicity, religion, physical ability, sexual orientation, and socioeconomic status) on college and university campuses (White & Lowenthal, 2010). Unfortunately, the rates of persistence and retention for minority students disproportionately deviates from their White

peers (Gilardi & Gughliehmetti, 2011). An abundance of literature exists on factors contributing to attrition, with the majority of these studies utilizing Tinto's Theory of Student Integration as a research lens. Taking into account numerous demographic and environmental variables, recent efforts are tackling issues related to sociocultural cognitive linguistics and its impact on proven predictors of student retention: integration, development, and academic success (Couchman 2008; White & Lowenthal, 2010; and Gilardi & Gughilemetti, 2011). Since the goals of SI include increased course retention and rates of graduation, the intersectional areas of these higher education domains require close scrutiny.

Underpinned by three multidimensional learning theories that expose the link between experience, behavior and cognition in constructing knowledge (Couchman 2008), the SI model attempts to account for cultural variances in student learning and development. Nevertheless, as society continues to advance technologically, allowing for a deeper understanding of how humans construct new knowledge through meaning-making (Keeling & Hersh, 2011), new practices, grounded in *multiliteracy*, are required to meet the needs of students arriving at varying level of *academic literacy*. For purposes of this literature review, *literacy* shall be defined through the theory of Street (1984) as socially constructed, punctuated with culture and world views that are often in competition between the cognitive, affective, developmental, and social identities of students (Couchman 2008).

First introduced in 1996 by The New London Group, the notion of *multiliteracy* builds upon Street's definition by illuminating the multidimensional identities and learning modalities negotiated, and encountered, by students (Cummins, 2009). While the literature narrowly focuses on utilizing a multiliteracy lens in curriculum development for K-12 institutions, overlaying elements of the Literacy Engagement Framework, Four Resources Model, and Pedagogy of

Transformative Multiliteracies (Couchman, 2008; Cummins, 2009) on the SI Model may prove developmentally valuable for the SI Participant and SI Leader. While the processes and practices attached to these perspectives vary slightly, they originate from the same research finding: student persistence and success in higher education is inextricably linked to understanding and learning the discursive language of the university—with minority students entering colleges and universities at a disadvantage. Literacy perspectives argue that the language of the academy (i.e. colleges and universities) is communicated through a culturally dominant language, producing an achievement gap as the skill-based knowledge grounding student success, quite literally, gets lost in cognitive, affective, and developmental translation (Couchman, 2008; Cummins, 2009; Street, 1982; White & Lowenthal, 2010).

While closing the academic literacy gap requires significant, and systematic, change within the K-12 domain, working with Student Leaders to recognize and acknowledge this preparedness disparity will go a long way to affirm the SI Participant. Additionally, such affirmation empowers the SI Participant to utilize their cultural identity as a lens to construct meaning and develop a set of tools that does not sit in direct opposition to their native discourse (White & Lowenthal, 2010). The literature does not offer techniques to effectively implement this practice; however incorporating dialogue-based competency training within SI Leader trainings may work as a mitigating measure.

Although the Literacy Engagement Framework (Cummins, 2009) and the Four Resources Model (Luke & Freebody, 1990) address literacy as a competency attached to reading and writing, application of Street's (1984) social constructivist definition allows for a seamless conversion into SI practices to bolster student success. Attending to experience, experimentation, observation, and conceptualization the Literacy Engagement Framework resembles the cyclical

Experiential Learning Model developed by Kolb (1984) to construct meaning. Utilization of this framework within SI would heavily rely on the SI Leader and their capacity to facilitate the following processes (Couchman, 2008; Cummins, 2009):

1. Activation of Prior Knowledge: Determine student understanding of subject matter in relation to their previous educational experiences;
2. Scaffold Meaning: Provision of linguistic support for *multiliteracy* development through utilization of advanced subject knowledge;
3. Affirm Identity: Validate student culture and identity in the context of higher education and challenge dominant narratives that negatively impact their identity;
4. Extend Language: Encourage application of learned study skills and academic languages across their curricular experiences.

To enhance framework application, SI may pull from the critical thinking elements of the Four Resources Model (Freebody & Luke, 1990) to deepen student learning. Here, SI Leaders can encourage SI Participants to simultaneously consider their cultural and academic identities through a critical learning lens (Couchman, 2008). As SI Participants engage in sessions, SI Leaders should encourage material, and curriculum, examination by posing identity affirming questions, including (Freebody & Luke, 1990):

1. What kind of person, with what interests and values, could both write and read this naively and unproblematically?
2. What is this text trying to do to me? In whose interest?
3. Which positions, voices, and interests are at play? Which are silent and absent?

These queries may feel clumsy, and require modification, when applied to mathematics and the sciences; however, the literature does not provide direction for developing such revisions.

Finally, the Pedagogy of Transformative Multiliteracy (Cummins, 2009), pulling from the Literacy Engagement Framework and the Four Resources Model, prioritizes the role of identity to promote learning. As with the previous theoretical perspectives, little practice-based research exists on the Pedagogy of Transformative Multiliteracy in higher education. However, given the revelations in the existing literature on the intersectionality of identity, learning, and persistence, augmenting the SI Model with the following principle-based practices may prove fruitful (Cummins, 2009):

1. Construct an image of the student as intelligent, imaginative., and linguistically talented;
2. Acknowledge and build on the cultural and linguistic (bilingual and multilingual) capital of students;
3. Promote cognitive engagement and identity investment on behalf of students;
4. Construct knowledge, create literature and art, and act on social realities through dialogue and critical inquiry;
5. Employ a variety of technological tools to support students' construction of knowledge and present knowledge to multiple audiences through an identity lens.

Ultimately, regardless of the framework, model, or pedagogy utilized to strengthen the SI Model, Couchman (2008) advocates for the unwavering pursuit of multicultural awareness for SI Leaders and Supervisors—a pursuit guided by the recognition of lacking cultural neutrality in the academic language. With this, goals of increased course retention, graduation rates, and academic success for the Student Leader and Student Participant require the continued exploration, and implementation, of high impact practices related to academic challenge, intergroup dialogue, and explicit curricular instruction (Goodman et al., 2011) through a

multiliteracy lens. (Couchman 2008; White & Lowenthal, 2010; and Gilardi & Gughilemetti, 2011).

Mentoring

Derived from ancient Greek Mythology, the word Mentor, in its earliest form, described a wise and trusted guardian. While societal changes have led to paradigmatic shifts related to gender and position, the original meaning remains mostly intact (Corbin, Smith, Dugan & Komvies, 2012). Nevertheless, contemporary mentoring models have transitioned to frameworks facilitating symbiotic growth and development for each individual within the relationship, not solely the mentee or protégé (Corbin et al., 2012; Deaton & Deaton, 2012; Malm, Bryngfors, & Momer, 2012). Within SI, these deeply personal relationships grow from the roots of learning-centered theories with the aim of perpetuating academic persistence, success, and graduation rates for the SI Participant (Arendale, 2004). While the SI Model emphasizes results achieved by the SI Participant through its peer-collaborative structure, the inextricably linked interpersonal relationships formed between Staff Mentor (Graduate Student Manager), Student Mentors (PEAC Mentors), SI Leaders, and SI Participants, achieve secondary outcomes positively impacting growth within the cognitive and affective developmental domains for all relational stakeholders (Corbin et al., 2012; Deaton & Deaton, 2012; Ward, Thomas & Disch, 2012).

In 2007, the National Leadership Council for Liberal Education and America's Promise published a series of recommended learning outcomes for institutions of higher education (AAC&U, 2007). This publication cited Socially Responsible Leadership, Intercultural Effectiveness, Inclination to Inquire and Lifelong Learning and Moral Reasoning as essential to the holistic development of students (Wolniak et al., 2012). Subsequent studies looked for predictive correlations related to persistence, retention, and success that result from student

understanding of these domains. Interestingly, outside of academic content mastery, Socially Responsible Leadership (SRL) served as the lone predictor of college persistence (Wolniak et al., 2012). The literature indicates that Student Affairs Professionals most effectively augment SRL understanding for students through mentoring relationships (Corbin et al., 2012), with peer relationships serving as the primary conduit for SRL practice. Given its framework and theoretical roots, SI is uniquely situated to intentionally incorporate mentoring models that advance SRL among students, ultimately leading to increased self-efficacy, leadership capacity and professional competency while simultaneously advancing its primary goals of persistence, retention, and graduation rates.

Through case study research, Deaton and Deaton (2012) developed an SI specific mentoring model to positively impact all stakeholders. The Educative Mentoring Model (Deaton & Deaton, 2012) allows the Staff Mentor, Student Mentor, SI Leader, and SI Participant to equally engage in the following capacities: colleague, peer, support system, and scaffolder (see Multiculturalism section for definition). Featuring various best practices, the Educative Mentoring Model reciprocally, and positively, impacts each SI role through (Deaton & Deaton, 2012):

1. Student Mentor/Mentee pairing based on interpersonal approaches;
2. Experience threshold set at two years of Student Leadership with SI;
3. Inclusion of professional and developmental opportunities through workshops;
4. Weekly observation of Student Mentor by Staff Mentor;
5. Weekly observation of SI Leader by Student Mentor;
6. Weekly meeting between Staff Mentor and Student Mentor-SI Leader pairing

While the PEAC Model within SI currently employs some of these practices, SI Mentors, Leaders and Participants may benefit from the exercise of unutilized programmatic components

through an SRL lens. Additionally, current research is exploring the benefit of online mentoring for Student Mentors and Leaders through the lens of Social Learning Theory and Social Exchange Theory (Dawson, 2010). More research is required before technological mentoring recommendations can be made for SI.

Conclusion

As a peer collaborative learning model, Supplemental Instruction (SI) continues to successfully provide academic assistance to students in traditionally challenging courses at colleges and universities throughout the world. Nevertheless, four decades of cultural evolutions within society and higher education require SI to consider new practices that serve the complex, ever-changing needs of contemporary students. According to the literature, the continued success of SI, and its students, requires programmatic modifications related to faculty involvement, technological advancement, multicultural proficiency, and intentional mentorship. While an overhaul of the SI framework are not necessary, the application of recently conceptualized theoretical lenses addressing these programmatic factors may enhance academic retention, persistence, and graduation rates, while positively influencing the self-efficacy, leadership capacity, and future success for each SI student stakeholder.

References

- Arendale, D. (2004). *Best Practices for Access and Retention in Higher Education. Pathways of Persistence: A Review of Postsecondary Peer Cooperative Learning Programs*. Minneapolis: University of Minnesota.
- Association of American Colleges and Universities (AAC&U). (2007). *College learning for the new global century*. Retrieved July 23, 2014, from http://www.aacu.org/leap/leadership_council.cfm
- Astin, A.W. 1993. *What matters most in college*. San Francisco: Jossey-Bass.
- Armstrong, L., Power, C., Coady, C., & Dormber, L. (2011). Video-based supplemental instruction: creating opportunities for at-risk students undertaking engineering mathematics. *The Journal of Peer Learning*, 4(1).
- Beaumont, T., Mannion, A., & Shen, B. (2012). From the campus to the cloud: The online peer assisted learning scheme. *Journal of Peer Learning*, (5)1.
- Chen, Pu-Shih Daniel (2010). "Engaging online learners: The impact of web-based learning technology on college student engagement. *Computers and Education*. 54(4), 1222-1231.
- Corbin C., Smith, M., Dugan, P., Komives, S. (2012). Mentors and College Student Leadership Outcomes: The Importance of Position and Process. *The Review of Higher Education*, 35(1), 595-625.
- Couchman, J.A. (2008). Who am I now? Accommodating New Higher Education Diversity in Supplemental Instruction. *Journal of Peer Learning*. 1(1), 80-90.

- Cummins, J. (2009). Transformative Multiliteracies Pedagogy: School-based Strategies for Closing the Achievement Gap. *Multiple Voices for Ethnically Diverse Exceptional Learners*, 11(2), 2009, 38-56.
- Dawson, Phillip John. (2010). Examining how an online mentoring model may support new supplemental instruction leaders. Doctor of Philosophy Thesis. Faculty of Education, University of Wollongong. <http://ro.uow.edu.au/theses/3208>
- Drake, R. (2010). Why should faculty be involved in supplemental instruction? *College Teaching*, 59(1), 135–141.
- Freebody, P. and Luke, A. (1990). 'Literacies' programs: debates and demands in cultural context. *Prospect*, 5(3), 7-15.
- Gilardi, S., & Guglielmetti, C. (2011). University life of non-traditional students: Engagement styles and impact on attrition. *Journal of Higher Education*, 82(1), 33–53.
- Goodman, K., Baxter-Magolda, M., Seifert, T., King, P. (2011). Good practices for student learning: Mixed-method evidence from the wabash national study. *About Campus*, 1-8.
- Keeling, R.P., & Hersh, R.H. (2011). *We're losing our minds: Rethinking Higher Education in America*. New York, NY: Palgrave/Macmillan.
- Malm, J., Bryngfors, L., and Momer, L. (2012). Benefits of Guiding Supplemental Instruction Sessions for SI Leaders: A Case Study for Engineering Education at a Swedish University. *Journal of Peer Learning*, 5(1), 32-41.
- McGuire, S. Y. 2006. The impact of supplemental instruction on teaching students how to learn. *New Directions in Teaching and Learning*, 106(1), 3–10.
- Phillips, R. 2005. Challenging The Primacy Of Lectures: The Dissonance Between Theory And Practice In University Teaching. *Journal of University Teaching & Learning Practice*, 2(1).

- Street, B. (1984). *Literacy in theory and practice*. Cambridge, England: Cambridge University Press.
- Ward, E., Thomas, E., Disch, B. (2012). Protégé Growth Themes Emergent in a Holistic, Undergraduate Peer-Mentoring Experience. *Mentoring & Tutoring Partnerships in Learning*. 20(3), 409-425.
- White, J., & Lowenthal, P. R. (2010). Minority college students and tacit “codes of power”: Developing academic discourses and identities. *Review of Higher Education*, 34(2), 283–318.
- Wolniak, G.C., Mayhew, M.J., and Engberg, M.E. (November/December 2012). Learning’s weak link to persistence. *The Journal of Higher Education*, (83)6, 795-823.