# Examining Supplemental Instruction as a Support Model for Academic Success and Equity

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## Introduction

At the most basic level, the goal of higher education institutions is accepting, educating, and matriculating students (Crow & Dabars, 2020). As employment opportunities become more dependent on individuals earning college degrees, institutions are competing for resources, the most obvious being students (Jack, 2019). This increased competition encourages higher education access to more individuals, which is beneficial for a variety of reasons, but it also means expanding the resource pool to consider students who are not always as academically or financially prepared for college as institutions would like (Cambron-McCabe & McCarthy, 2016). As a result of the increasing access to higher education, institutions are developing more extensive support programs, and supplemental instruction (SI) is one opportunity to develop students' learning, promote academic success, and encourage equitable education for all students.

In education, there is a growing movement to highlight a student-centered and inclusive approach to learning, including within colleges and universities. The increasing support for higher education access and educational equity encourages the idea "that all children do have worth and that their capabilities should be valued" (Sher & King, 2015, p. 252). Academic support programs are expanding as a result, and SI is one area with the potential for lasting impact. According to Martin and Arendale (1993), "Supplemental Instruction (SI) is a student academic assistance program that increases student academic performance and retention" (p. 3). SI is an academic support model developed in 1973 as a form of collaborative, student-centered support for historically challenging classes (Dawson et al., 2014). It can be adapted and adjusted based on the need of the higher education institution and the students, but there are several tenants that remain consistent including course integration, peer-to-peer interaction, developing metacognition and study

skills, and utilizing the SI program as proactive rather than reactive support (Arendale, 1992; Arendale, 2004; Yue, 2018). These features of SI, when properly implemented and developed by the institutions, have the potential to empower students, expand higher education access, and even replace previously established policies such as non-credit or remedial courses that often act as barriers for students success and retention.

Within this, higher education is "shifting away from standardization and control and toward a more holistic, student-centered understanding of college education" (Ris, 2018, p. 13). With supplemental instruction available as academic support, the persistent utilization of non-credit and remedial classes should be reevaluated with concern for academic equity, student success, and overall retention rates (Martin & Arendale, 1993). While non-credit courses have a valuable place in continuing education and workforce development, placing first time students in remedial and non-credit classes often puts students behind in their programs, can cause significant monetary challenges by requiring students to pay for extra classes or semesters, and might even impact their self-determination as they are being labeled remedial after the major accomplishment of being accepted to a college or university (Arendale, 1992; Dawson et al., 2014; Yue et al., 2018).

Although there has been extensive research done on supplemental instruction, non-credit courses, and self-determination theory within higher education, the intersection of these three interrelated areas of higher education has not yet been fully explored (Dawson et al., 2014; Duranczyk et al., 2015; Martin & Arendale, 1993). By examining the intersection of supplemental instruction, remedial and non-credit coursework, and the overall academic success and retention rates, higher education institutions will be able to reevaluate their policies and programming targeted toward historically underrepresented and underprepared students who are

already overcoming barriers just to be accepted. Using purposive sampling group interviews to target individuals involved in SI (students, SI leaders, faculty, and staff), this study examines how supplemental instruction encourages student success and improves overall academic performance while removing unnecessary barriers to higher education.

## Literature Review

Supplemental instruction was initially developed and implemented in 1973 at the University Missouri – Kansas City as a support model for challenging courses, rather than focusing on students who have traditionally been labelled "at-risk" or "remedial." SI consists of an SI leader – either a former student or a trained facilitator – working with groups of students outside of the assigned classroom time to develop a stronger understanding of the course content, learn study skills that will directly benefit that specific course, and facilitate peer-to-peer learning so students can achieve a higher level of success in those challenging courses (Arendale, 2004; Martin & Arendale, 1993). According to Martin & Arendale (1993), "SI does not identify *high-risk students*, but rather identifies *high-risk classes* [and] thus avoids the remedial stigma often attached to the traditional academic assistance programs" (p. 3). This is a central component to all SI support programs regardless of the college or university, the course content, or the students involved in SI related classes. In this way, SI is developed to be a proactive rather than a reactive support system (Arendale, 2004; Dawson et al., 2014; Martin & Arendale, 1993; van der Meer et al., 2017). By developing a support program that targets all students within a course, higher education institutions can focus on overall academic success, encourage student growth and learning, and increase academic equity.

One major component of SI is the development of an academic support model that directly works alongside the course to support content comprehension. The benefit of SI over traditional

support models like tutoring or remedial coursework is that "it is directly related to course content, SI averts some of the problems of nontransferability when study skills are taught in isolation" (Commander et al., 1996, p. 9). By aligning the course content with the SI support, students can develop a deeper understanding of not only the content, but the most beneficial study skills for that type of course. In other words, the SI leader "helps students to integrate course content with learning and study strategies" (Arendale, 2004, p. 30). This context for learning and learning strategies is a necessary focus of SI, and it benefits the students by providing a "safe environment within which students can discuss and process the course material with others" (Arendale, 1992, p. 6). This combines both the academic and social support that many students require in order to be successful in higher education institutions.

Ensuring that students become invested in their own education and their own success with peer support is another key feature of SI. As a collaborative educational program, "students who attend SI sessions are responsible for teaching each other the course content and for working together to solve problems" (Dawson et al., 2014, p. 610). SI is structured to utilize peer-to-peer interaction to develop metacognition and study skills, while also working through difficult course content as a class (Arendale, 1992; Yue, 2018). This allows students to "reflect on their own learning" in order to improve their academic abilities and content knowledge (McCarthy et al., 1997, p. 225). By participating in these sessions as a group, students are "building peer relationships" which contributes to academic motivations and overall academic success, particularly in first year students (Noyens et al., 2019, p. 68). Commander et al. (1996) suggest that "[n]ot only does SI offer an opportunity for academic improvement, it also can serve another antiattrition purpose by helping students bond to each other and to the institution" (p. 9). This connection between peer relationships, the institution they are attending, and academic success is explored in a variety of studies, and

integrated course support through SI is a program that encourages and builds on that concept (Dawson et al., 2014; Martin & Arendale, 1993; van der Meer et al., 2017). Students from more diverse academic, economic, and social backgrounds are attending higher education institutions as policies encouraging access and academic equity are implemented (Cambron-McCabe et al., 2016; Crow & Dabars, 2020; Noyens et al., 2019). Supporting SI programs is one way to increase student support and peer relationships while ensuring academic development.

The United Stated Department of Education has examined the effectiveness of SI and validated three claims. They found that students who participate within the SI program earn higher final course grades within the targeted courses, succeed at a higher rate with fewer failing grades or withdrawals, and persist through to graduation at a higher rate within the institution (Martin & Arendale, 1993; McCarthy et al., 1997). These claims directly connect to some of the tangible goals within SI programs, including increased academic success and increased retention rates (Dawson et al., 2014). What is harder to validate within SI research and studies is the measurable impact SI can have on peer relationships, academic motivation, and academic equity, all of which are central tenants of SI programs (Arendale, 1992; Martin & Arendale, 1993; Yue et al., 2018).

One major gap in the literature is the inclusion of studies using not only qualitative studies, but qualitative analysis methods to research benefits of SI independent of numerical data related to student success. Even studies examining the benefits and impact of SI using qualitative methods (Adebola, 2021; Adebola et al., 2020; Dawson et al, 2014; McCarthy et al., 1997; Noyens et al., 2019) focus on connecting these results to the standard measures of academic success including attendance, final grades, and GPA. As Martin & Arendale (1993) explain, “SI focuses on both *process* and *content*. Therefore, learning/study strategies (e.g. note-taking, organization, test preparation) are integrated into the course content during the SI sessions. SI sessions

provide immediate practice and reinforcement of these acquired skills" (p. 3). Additionally, although SI was not initially created as a program supporting academic equity, there is a clear connection between policy shifts toward equitable policies and SI as an academic support model (Dawson et al., 2014). Because of this, it is not enough to focus SI impact studies solely on course completion, as academic skills, student motivation, and content reinforcement and comprehension are equally important when considering a successful academic support model.

**Theoretical Constructs**

There are various theoretical constructs that make up the argument for SI as an effective and impactful academic support program. Many of these theories highlight the importance of identifying students who are deemed "at-risk" or "underprepared" for higher education (Arendale, 1992; Keimig, 1983; Noyens et al., 2019). However, the central concepts of SI support all connect back to Keimig's Hierarchy of Learning Improvement Programs developed in 1983, with the self-determination theory of Ryan & Deci (1985) acting as a natural progression of the high-impact support systems (Arendale, 1992; Noyens et al., 2019). These two theoretical constructs support the idea that SI can be developed into a form of academic equity moving forward that meets the needs of students and supports their academic achievement.

Keimig's Hierarchy of Learning Improvement Programs discusses key academic support programs and ranks their effectiveness in improving student success. Keimig (1983) identified course integrated learning services – including SI – as highly impactful learning programs due to their direct connection to the courses. Tutoring and remedial courses are ranked lower because academic skills and concepts are often "taught in isolation from actual course content" within these models (Arendale, 1992, p. 6). These methods rely on students taking the initiative when they might be struggling while SI removes that from the equation while also normalizing

receiving assistance. Keimig (1983) explains that SI is more effective since "students' learning needs are presented as being necessary because of the nature of the objectives and content of the course rather than because of students' deficiencies" (p. 23). This both strengthens the connection between support programs and the course, but also allows for more academic equity by having SI built into the courses for all students.

The self-determination theory is a framework for understanding both intrinsic and extrinsic motivation which can be applied to the factors that encourage learning and academic growth in education. Ryan & Deci (2020) examine these implications on educational growth and determine that academic outcomes are higher when three specific student needs are met: autonomy, competence, and relatedness. These three needs can be met with integrated support methods like SI, which will encourage higher intrinsic motivation and therefore "more adaptive learning attitudes, academic success, and personal well-being" (Chirkov, 2009, p. 255). These concepts are at the core of SI instruction, and determining the self-determination motivation for students will encourage stronger learning outcomes.

Conventional support methods, like tutoring and remedial courses, tend to rely on traditional reactive methods of students seeking out assistance once they realize they need it. SI is a proactive support system that encourages students to "become actively involved in their own learning" (Arendale, 1992, p. 9). In this way, SI is not only a high-level support model on the Hierarchy of Learning Improvement Programs, but it is also directly encouraging students to develop their intrinsic motivation as a feature of the self-determination theory. The combination of these two theoretical constructs align with the academic and developmental goals of the SI program.

## Research Questions

1. Is supplemental instruction a viable academic support model for educational equity? Why or why not?
2. How can supplemental instruction support underrepresented and underprepared students? Can this be done without further alienating these populations or labeling them "at-risk" or remedial?
3. What are the benefits of supplemental instruction beyond the academic support? Does supplemental instruction encourage a stronger sense of academic ability, intercollegiate collaboration, self-determination within underrepresented students, progress within academic programs, overall higher education institution retention rates?
4. Should supplemental instruction replace previous policies or can it work in conjunction with other models of academic support? Which academic policies are supporting students and which could be harming them?
5. Overall, what are the measurable takeaways from supplemental instruction? Who benefits and why?

## Methodology

Using the self-determination theory as a guiding concept, purposive group interviews will be conducted with students, faculty, and staff to identify key areas of growth that can be applied throughout SI programs. According to Noyens et al. (2019), increasing levels of student diversity in educational backgrounds can cause "challenges for higher education institutes, such as how to deal with the shock of transition that students can experience and how to cope with differences between students in their preparedness for higher education, motives for studying and expectations" (p. 68). Supplemental support embedded into required courses is one potential

solution, and while ensuring representation from students who have a high level of participation and success in the courses is important, it is equally important to examine the students who have low levels of participation or are unsuccessful in the course. The setting and sample represented in this study will reflect these varied situations while the group interview will allow for discussion among peer groups related to shared or divergent SI experiences, including those of the SI leaders, faculty, and staff members.

**Setting**

The study will examine a liberal arts college in Western New York. This institution has the highest percentage of African American students of any private college in Western New York and also serves the highest percentage of Pell-eligible students of any private college in the area. Additionally, 68% of students are first generation and 16% of students have a documented disability (*Diversity*, 2022). This institution implemented supplemental instruction five years ago for first-year composition and math courses in an effort to support their diverse population. While many SI programs are developed to support math and science courses, this college provides a unique perspective as the English Composition classes also feature SI. By studying an SI program that is already established, the research questions can examine the full impact of SI as an academic support model after issues and challenges within SI have been identified by the institution. Beginning the study at a smaller institution allowed the researcher the opportunity gather data from students, SI leaders, faculty, and staff in a reasonable timeframe and will create the framework for analysis of SI at other institutions. Additionally, by examining

**Sample**

An ideal sample size would be based on the number of students enrolled in courses supported by supplemental instruction including all sections of English Composition I

(ENG101), College Algebra (MAT111), and Probability and Statistics (MAT112) within a Fall semester. The Fall semester would generally yield more opportunities for data gathering as there are substantially more SI supported courses offered in the Fall than in the Spring, particularly with ENG101. The data would ideally be gathered at the end of the Fall semester rather than waiting until the end of the academic year so that participants will be able to respond to interview questions accurately while their experiences with SI are still recent.

All students are required to successfully complete English Composition I and a math course before they graduate, regardless of their enrollment in a two-year program or a four-year program so nearly all students will have some experience with an SI supported course throughout their time at this institution. This will ensure student representation from a variety of backgrounds, majors of study, and levels of college preparedness. Looking at recent enrollment numbers and factoring in students who have earned credit for English Composition or withdraw over the course of the semester, typical Fall SI participation would yield a sample size of roughly 100 students, mostly from sections of ENG101. Considering the college's diverse population of students, having a core requirement supported by SI will encourage data collection from a variety of students and reflect the wide range of experiences. This will help determine the impact SI can have on students from different academic backgrounds.

In addition to working with the students participating in SI, the study would also seek the feedback, perception, and experiences of the SI leaders, course instructors, and administrative individuals involved in the implementation of the SI program. Again considering recent Fall breakdowns of instructors and SI leaders, the sample size would consist of six or seven SI leaders, and seven or eight instructors, depending on the hiring process. Administrators involved in SI instruction would be a smaller sample size of three. Although the sample for SI leaders,

course instructors, and administrators is smaller than the student population, it is still vital for the research design as their perceptions of the goals, strengths, and limits of SI could be vastly different from students—as well as each other—and their perspective is important for determining how well SI is functioning as a form of academic equity.

**Research Design**

The research study would consist of various purposive group interviews, with student groups divided based on the percent of SI sessions attended over the course of the semester, as well as a group interview of SI leaders and a final group of faculty and SI coordinators. Students would be divided into the following interview groups: students who attended 50% or more SI sessions, students who attended 25-50% of SI sessions, and students who attended fewer than 25% of SI sessions. This would encourage focused dialogue between group members, as they will have experienced a similar number of SI sessions, even if they have dissimilar experiences within those sessions. The researcher would invite all students enrolled in SI supported courses to participate, although it is unlikely that there would be a 100% response rate to this request. Depending on the number of individuals who agree to participate in the research study, the group interviews could potentially require multiple sessions for each subgroup, as too many participants – more than seven, according to Lune & Berg (2016) – in one interview group could be difficult to manage or result in inaccurate participant responses.

Each group interview will be facilitated by the researcher within a neutral space on the college campus, with an additional member of the research team present to take notes and make observations. The sessions will be semistandardized, consisting of a set group of questions with the expectation that the researcher will expanded upon certain topics with additional probing or follow up questions (Lune & Berg, 2016, p. 59). The researcher will open the group interview

with introductions, discussion guidelines, and goals for the session prior to moving into the topic questions. Before discussions start, the participants will have already signed informed consent and confidentiality forms and should understand the procedures for the interview. This will allow the researcher and participants to spend a majority of the group interview on the research questions. When the group interview is concluded, the researcher will reiterate the importance of confidentiality, both for the participants and the researcher.

**Protocols**

For each interview group, a list of base questions will be utilized to focus the session for the purpose of exploring responses to the research questions. This list of questions will provide the researcher the opportunity to compare responses across each of the interview groups, with slight modifications for the SI leaders, the instructors, and the administrators. These questions will include:

- What do you think are the goals of SI?
- What do you think are the most important features of SI?
- Why did you attend your sessions? Why didn't you?
    - Or: Why do you think students did or did not sessions? What do you think would encourage attendance?
- How prepared do you feel compared to the start of the semester?
    - Or: How prepared do you believe students are compared to the start of the semester?
- What are your thoughts on mandatory remedial courses (sessions you pay for but do not receive credit for taking)?

There will be flexibility within each group interview to allow for open discussion among peers, but it is necessary to maintain structure so that the data can be gathered and results can be analyzed. The responses to these questions will not only provide insight into the research questions, but will also connect to the theoretical frameworks of the Hierarchy of Learning Improvement Programs and the self-determination theory. Depending on the level of participation and communication, the researcher could potentially include the research questions in the group interviews as well.

**Ethical Considerations**

Participation in the study will be entirely optional for all students, SI leaders, faculty, and staff and there will be no consequence for the individuals who choose not to partake in the study. The researcher will present the goals and intentions of the research study and seek informed consent from all participants. Individuals will also be informed that they can choose not to answer any questions they are not comfortable discussing, and that they are able to discontinue participation in the study at any time. There is the potential for conversations to include private and personal reasons for non-attendance, including family concerns, illness, housing or food insecurity, or other challenges. Participants will be informed that all conversations within the group are not to be shared or discussed outside of the group interview, including the implementation of a confidentiality form (Lune & Berg, 2016, p. 95). The researcher will ensure confidentiality when recording and reporting all data and comments. All information will be kept secure and any identifying features of participants will be removed before discussing or presenting findings.

## Data Analysis Strategy

Data analysis will be performed on the results of the group interviews to determine areas of overlap or disagreement. Recordings will be transcribed and transcriptions will be annotated to identify patterns and similarities. The results will focus on the comments from the group interview participants and how the responses connect to the research questions. Special attention will be given to phrases commenting on the efficacy of SI, reasons for attendance or non-attendance, areas of potential SI improvement, opinions on remedial coursework, and discussions related to self-determination. Ideally, there will be some overlap between the various group interviews, but it is assumed that there will be differing opinions as well, particularly between student groups and professional groups.

Content analysis will be utilized to identify themes within the group interviews and see if similar phrases or concepts repeat across interviews. The researcher will pay special attention to words and phrases related to the main tenants of SI, including concepts such as peer-to-peer interaction, course integration, or proactive support (Arendale, 1992; Yue, 2018). Language will be coded for easier analysis, which will then be used to identify participant's perceptions of SI based on the language the students, SI leaders, faculty, and staff use to describe their experiences participating in the SI program. This will enable the researcher to examine both the "patterns of the language used in [the] communications exchange, as well as the social and cultural contexts in which these communications occur" (Lune & Berg, 2016, p. 182). Content and data analysis will allow responses to be compared across the different interview groups to see if any generalizations can be made about SI experiences and opinions.

## Results

While results of the above study are currently unknown, the goal of exploring SI through a qualitative lens is to identify benefits of the academic support program beyond the quantifiable data of final grades and GPAs. Many studies surrounding the efficacy of SI rely on numerical analysis and fail to account for the less measurable improvements in learning outcomes and student success. By creating a study utilizing the self-determination theory, research will expand to consider academic engagement, social well-being, and the overall perception of the goals, impact, strengths, and weakness of SI from students, SI leaders, faculty, and administrative staff. Hopefully, results would show overlap in how participants view SI, which could then be utilized to improve academic equity programs like SI and allow for the implementation of a similar survey at other institutions for form a cross analysis of various SI programs.

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