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How Learning Theory Creates a Foundation for SI Leader Training

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ABSTRACT

The exploration of alternative teaching and learning strategies such as those utilised in Supplemental Instruction (SI) is becoming increasingly important as students arrive at university less prepared for the rigors of higher education. Keeping these changes in mind, it is necessary to review the theories that inform our approach to ensure the continuing impact of the SI model. This article explores the learning theories that create a foundation for successful SI programs with a focus on how they link to the effective training of SI Leaders.

INTRODUCTION

The establishment of a theoretical framework provides a sound base for viewing and analysing the Supplemental Instruction model in preparation for developing an effective training program for Leaders. Theoretical models that support SI strategies will be examined. The constructivist learning theories of Jean Piaget and Lev Vygotsky as well as Edgar Dale's Cone of Experience, focus on the cognitive development of students in which learning is constructed within an interactive social context (peer collaborative learning). The premise is that knowledge is produced rather than distributed (Zerger, 2008). These learning theories have a particular relevance for the SI training context and provide the necessary scaffolding for student learning, collaboration, and the construction of knowledge to effectively take place (Zerger, 2008; Hogan and Pressley, 1997).

DESCRIPTION OF THE SI MODEL

SI sessions are regularly scheduled informal reviews in which students compare notes, discuss readings, develop organisational tools, solve problems, and predict test items. The goals of SI include the following: improving student learning, lowering attrition rates in targeted historically difficult courses, raising student grades, and increasing reenrollment and graduation rates. The effectiveness of the SI model is viewed as a way to approach pressing educational challenges. These include rising student to teacher ratios, a shift from a more traditional teaching methodology to student-centered learning, and capitalising on the gains from students teaching one another.

To date, much of the research on SI has focused on assessing the effectiveness of the SI model and on the correlation between the academic achievement of SI participants vs. non-SI participants. The data consistently show that SI attendees

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out-perform non-SI attendees (McCarthy, Smuts and Cosser, 1997; Vorster, 1999). In the United States, SI has been validated by the US Department of Education as an exemplary higher education academic support program. USDOE notes the following outcomes: SI participants earn higher mean final course grades than students who do not participate in SI across ethnicity and prior achievement; SI students succeed at a higher rate, withdraw at a lower rate, and receive a lower percentage of D or F final course grades than non-participants; and persist, reenroll, and graduate at a higher rate than students who do not participate in SI (Martin and Arendale, 1994). According to Martin and Arendale (1994) SI increases academic performance and retention. This claim is endorsed to varying degrees by a number of studies (Martin and Blanc, 1981; Kenney, 1989; Martin and Arendale, 1990 and 1993; Lundeberg, 1990; Zaritsky, 1994; Congos and Schoeps, 2003; Jacobs and Stone, 2008).

There is a strong focus therefore on the effectiveness of the SI model in terms of its contribution to academic achievement and retention, particularly for students in high risk courses. It is important that SI Leader training reflects the theories that undergird the SI model in order to help Leaders develop strategies to help students master content in challenging courses. SI strategies that are modeled by staff and practiced by Leaders in training sessions should have a disciplinary focus. By modeling and demonstrating appropriate strategies, Leaders can assist students in developing the kind of thinking and problem-solving skills that will help them master difficult course content (Hurley and Gilbert, 2008). The content of mathematics and science courses can therefore be learned more effectively by having students work on solving problems step by step with a partner or within a small group. Students can then demonstrate at the board how they solved a particular problem.

SOCIAL CONSTRUCTIVISM

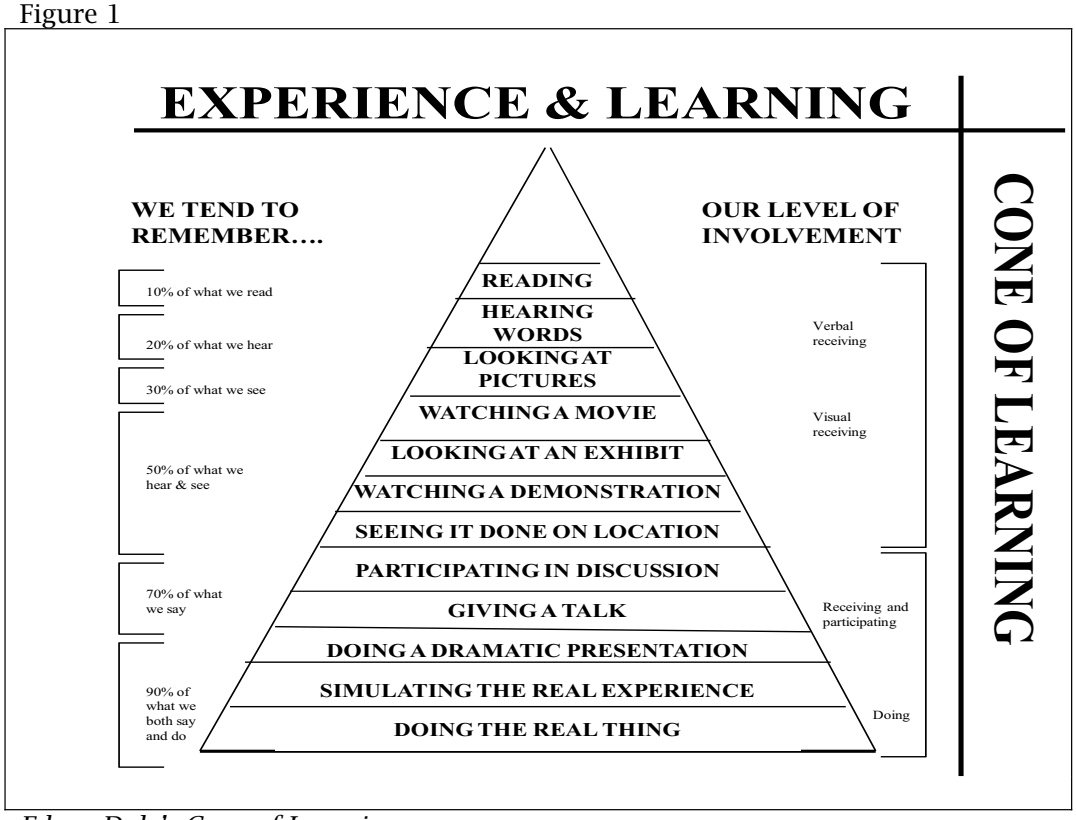
Vygotsky (1978) believed that knowledge is socially constructed and learning develops as a result of dialogical and dialectical interactions between teachers (facilitators) and students and between students. This process underlies the methodology of SI and should be a fundamental element included in SI Leader training. In other words, Leaders should be given the opportunity to construct knowledge through social discourse. This too can be applied to the strategies they use in SI sessions to aid students in reviewing and revising their understanding of content. Vygotsky (1962) also believed that as students use language to communicate they are able to express their growing awareness and understanding of a topic which impacts their cognitive development.

Piaget thought that the lecture, even with demonstration, was not the most effective teaching method unless students were also able to discover their own ways to learn. The cognitive development and mental processes of students should be studied and understood by teachers (facilitators). He felt there should be more freedom and initiative built into teacher training which would give instructors the opportunity to focus more on student interaction and learning rather than on teaching (Hurley, 2000).

CONE OF EXPERIENCE

Compatible with Piaget's and Vygotsky's constructivist theory base, Edgar Dale's Cone of Experience (Dale, 1969) conveys similar ideas on learning in a graphic form. He proposed that learning is stimulated progressively from concrete to abstract. He believed that the foundation for instruction depended upon direct sensory experiences combined with purposeful interaction with stimuli sources (Martin, Arendale and Blanc, 1997). By directly involving students in constructing meaning, they can learn at a deeper level. Active learning therefore must be imbedded into SI Leader training. Leaders can practice and simulate learning experiences and receive feedback from staff and peers in a comfortable environment. Dale's model diagrammed in Figure 1 shows ways we retain information by reading, listening to a lecture, viewing a chart or graph, observing a demonstration, participating in a discussion, presenting a simulation, or engaging in an activity. The idea is that the more involved one is in the process (students teaching and demonstrating to others in an SI session) the deeper the learning and the better the recall.

Figure 1



Edgar Dale's Cone of Learning

COLLABORATIVE LEARNING

Another important theoretical principle underlying the SI model is collaborative learning. The effectiveness of this method has been well researched and

substantiated. It is based on the idea that learning is a naturally social act in which students talk to one another. It is through talk that learning occurs (Gerlach, 1994). According to Vorster (1999) collaborative learning suggests many types of learning situations in which groups of students are involved in mutual exploration and the educator (facilitator) is a chief actor in the exchange. Sampson, Vorster, Burton and Collet (1999) believe the educator should facilitate knowledge (learning) rather than just convey it. Once again, this theory is appropriate and necessary to demonstrate in Leader training. These learning theories are utilised with the intent of preparing Leaders to be equipped to conduct effective SI sessions.

STUDENT DEVELOPMENT

Literature on student development and retention (Smith and MacGregor, 1992) builds on the discoveries of early researchers in suggesting that various elements of collaborative learning are helpful to students. Learning is an active, constructive process in which students integrate new information with prior knowledge to create new understanding and meaning. Further, learning is dependent on the manner in which students collaborate with peers to identify and solve problems by engaging in higher order reasoning and problem-solving skills. Students bring their own backgrounds and experiences to this endeavour. In collaborative learning, students are required not only to voice their own ideas but also to listen to the views of others. They need to give authority to fellow students and accept authority from them as suggested by Vorster (1999). They no longer need to rely solely on the instructor or textbook for information. From the SI perspective, the goal of collaborative learning is to 'have students talking to students about difficult course content, as soon as possible, as much as possible, and for as long as possible' (Wilcox and Jacobs, 2008, p. vii). As suggested, utilising collaborative learning in Leader training can provide more effective tools for Leaders to create dynamic and meaningful SI sessions.

COLLABORATIVE VS. TRADITIONAL LEARNING GROUPS

Vorster (1999) suggests that collaborative learning groups differ from traditional learning groups in significant ways as indicated in Table 1 (Johnson and Johnson, 1991).

Table 1

Collaborative Learning Groups	Traditional Learning Groups
Positive interdependence	No interdependence
Individual accountability	No individual accountability
Heterogeneous membership	Homogeneous membership
Shared leadership	One appointed leader
Responsible for each other	Responsible only for oneself
Task and maintenance emphasised	Only task emphasised
Social skills directly taught	Social skills assumed or ignored
Teacher observes and intervenes	Teacher ignores groups
Group processing occurs	No group processing

A Comparison of Collaborative and Traditional Learning Groups

SOCIAL INTERACTION

Compared to more traditional learning groups, collaborative learning has many benefits. Johnson and Johnson (1991) indicate that social interaction leads to advanced cognitive development and promotes higher academic achievement than individual learning activities do. However, for collaborative learning groups to be successful, students are required to make a paradigm shift from the traditional model. This transition is not always an easy one, as many of our students have been conditioned since junior school to acquire knowledge from the teacher who is considered the key transmitter of knowledge. McCann (2003) suggests the use of simulations, case studies, and even drama to help prepare them for effective facilitation of learning. Leaders benefit substantially from session simulations during training because they have the opportunity to make and correct mistakes before their first real session (McDaniel, 2008). Once SI Leaders have mastered the art of facilitating small group learning in training, it will be easier to model for students how this methodology will work successfully. Initial training sessions as well as ongoing meetings for Leaders to practice these strategies will give them more variety and confidence to utilise these learning techniques.

The social skills needed to facilitate effective SI sessions include the ability to monitor and control the group's progress through a task, to manage conflict and competition, to modify and use different viewpoints, and to be willing to receive coaching from the SI coordinator. Barnes and Todd (1977) indicate that useful behaviours for effective interactions include soliciting opinions, encouraging explicitness, indicating differences, and making connections between viewpoints. Collaborative learning demands a degree of metacognitive awareness from participants (Barnes and Todd, 1977). This awareness is the understanding of how one learns and what strategies work best to master different content.

CONCLUSION

The analysis of theoretical frameworks as a sound basis for the Supplemental Instruction model helps inform SI Leader training. The learning theories that have been described underpin the strategies used in SI. The developmental theories of Piaget and Vygotsky focus on the cognitive development of students, in which learning is constructed within an interactive social context (peer collaborative learning). This has particular relevance within the SI training context.

When preparing for an SI Leader training the following theoretical elements are therefore critical for successful implementation:

Firstly, a conducive environment needs to be established to enable the SI Leaders to construct their own meaning and practice their newly acquired skills within a safe space, as learning has both affective and cognitive dimensions.

Secondly, the training should promote a social process in which students talk in order to learn through peer to peer interaction. Collaborative learning is therefore encouraged to promote structure as well as a student-driven focus. Learning depends on asking students to collaborate with peers to identify and solve problems by engaging in higher order reasoning and using problem-solving skills. Students have diverse backgrounds and experiences which also contribute to a rich

tapestry of learning.

Finally, active learning is encouraged by simulating the experience or doing the real thing (Dale, 1969). Learning is an active, constructive process in which students integrate new material with prior knowledge to create new ideas and new meaning. In this way new knowledge is acquired from the reconstruction by discovery and experimentation within an SI setting.

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