Understanding the Integrated Learning Course Model:

Academic Transition to Tertiary Education

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Abstract

In 1972, the TRIO program leaders at the University of Minnesota (UMN) developed the Integrated Learning (IL) course to meet academic and cultural transition needs of their Upward Bound (UB) secondary school students. These courses were offered during the UB summer bridge program for students who were concurrently enrolled in academically-challenging tertiary courses following graduation from secondary school. Later, use of the IL course shifted from the UB program to the tertiary-level TRIO Student Support Services program. An academically-challenging course like introductory psychology is linked with an IL course. The IL course is customized to use content of its companion class as context for mastering learning strategies and orienting students to the rigor of the tertiary learning environment. The IL course approach has assisted TRIO students improve their academic success in the rigorous academic environment as well as acclimate to the social climate of UMN, one of the largest universities in the United States. The primary purpose of this article is providing an overview of the IL course approach with sufficient information so other institutions could replicate it. Two quasi-experimental studies examined the possible benefits of the IL course. One was in connection with an introductory psychology course. The IL course students earned statistically significantly higher final course grades than nonparticipants. Another study with an introductory biology course replicated results of higher final course grades for IL course students. The IL course fostered higher final course grades and expanded positive study behaviors and their meta cognitive skills necessary for academic success.

Keywords: Peer learning, Learning assistance, Academic achievement, TRIO, Historically-underrepresented

1. Need for the Practice

Understanding more about TRIO programs, which serves as the host administrative unit for the IL course, helps with the historical context of its development. U.S. President Lyndon Johnson's War on Poverty focused on reducing barriers for historically-underrepresented students. These students are defined as low-income, first generation in their family to complete a tertiary degree, or those with disabilities. Up until this time, the typical students attending tertiary institutions in the U.S. were white and came from privileged backgrounds. The Economic Opportunity Act of 1964 created the Upward Bound Program that focused on secondary school students. In 1965, the Higher Education Act (HEA) created Talent Search to serve the needs of middle school students. In 1968, Student Support Services was created to serve tertiary students. These three federally-funded programs became known collectively as "TRIO". In succeeding years, additional TRIO programs were created to serve a pipeline of students from sixth grade elementary education to tertiary education: Educational Opportunity Centers (1972), Upward Bound Veterans Program (1972), Training Program for Federal TRIO Programs (1976), Ronald E. McNair Post baccalaureate Achievement Program (1986), and Upward Bound Math Science Program (1990). Nearly a million students are served annually through 3,000 TRIO programs in the U.S. Common traits of these programs are academic enrichment, tutoring, counseling, mentoring, financial training, cultural experiences, and other enrichment activities (McElroy & Armesto, 1998).

Academically-challenging courses are critical to establish a foundation for a tertiary degree, but also can serve as barriers for students. This is especially true for first-generation tertiary students who do not have family members

who can mentor them and share success strategies that helped them achieve a tertiary degree (Pascarella et al., 2004). These courses often have high rates of final course grades of D or F or course withdrawal. Students who leave the institution frequently are in good academic standing, but experience academic failure in these challenging classes during their first year (Tinto, 1994, 2003). These classes are sometimes called *gatekeepers* because completing them with passing or high marks is pre-requisite before the student has permission to enroll in advanced courses needed for completion of the academic degree. For example, successful completion of introductory biology is necessary for pursuit of a medical degree. Some academic support approaches such as Supplemental Instruction (SI) rely on voluntary attendance at weekly study groups. A challenge with this approach is students who most often need and could benefit from the experience chose not to attend (Arendale, 1994). Even the SI model only claims approximately one-third of students in a class attend SI sessions, regardless of their quartile placement on standardized tertiary entrance exams (Arendale, 2012). Research identifies often students fear stigma for self-selecting a service perceived only useful for students predicted to drop out (Blanc and Martin, 1994). Additionally, first-generation, low-income, and historically-underrepresented students experience a demanding cultural adjustment to the tertiary institution. These students often lack the social capital that students that are more privileged bring to the culture-laden tertiary environment. The cultural challenges can be as significant as the academic ones (London, 1992; Orbe, 2004). The transition from high school to tertiary learning environment is severe for these academic and cultural challenges (Terenzini et al., 1994). The challenge is even more severe for the students without parents and family members who have experienced the same environment and succeeded.

Introductory psychology is a common academically-challenging course at tertiary institutions nationwide due to large volumes of weekly assigned readings, unfamiliar and complex vocabulary, and the speed with which the course material is presented as compared with most high school classes. A compounding variable for many UMN introductory psychology course sections is its pedagogical approach of employing Keller's (1968) *Personalized System of Instruction* (PSI). The primary professors for the Psychology course chose to use a computer-based approach to employing PSI (Brothen & Wambach, 2000). The professional literature cites many advantages of the PSI system (Kulik et al, 1990), but the UMN professors who teach the psychology course identify challenges for some students: (a) lack of peer interaction due to its focus on individual study and mastery, (b) near exclusive reliance upon textbook and computer screen readings since there were no lectures given, and (c) self-paced instruction encouraged procrastination by some students which diminished their learning experience and led to lower course performance (Madyun et al, 2004). The IL course overcomes these challenges.

Introductory biology is frequently cited as a gatekeeper course for graduate degrees in health sciences. These classes often have large enrollments, quick progression among multiple course topics, difficult vocabulary, and limited interaction within the classroom since they are heavily lecture-based by the course instructor (Freeman, et al, 2014). At UMN, some of these classes are composed of over 300 students. The IL course has been customized to help students acquire the skills needed to be successful in this challenging academic environment.

2. Unique Approach of the Integrated Learning Course

At the time of its development in 1972, the *Integrated Learning* (IL) course was unique in its approach to supporting tertiary students' success. The prevailing models for helping students were counseling centers that focused on the students' emotional state and helping them to survive the psychological trauma experienced by many historically-underrepresented students in tertiary education. However, improving the psychological well-being of the student is insufficient to meet the academic demands of the first-year courses. Another typical approach was mandatory placement of students in remedial- or developmental-level courses. Often these courses are prerequisites before students are allowed to enroll in tertiary-level courses. This required additional time and tuition costs (Arendale, 2010). The IL course approach helps students practice and master learning strategies needed for academic success concurrently in this linked course others experienced through their tertiary education journey.

A second innovation of the IL was the focus on academically-difficult courses with high rates of D, F, and course withdrawal. In 1972, focusing on the difficult nature of the tertiary course rather than the supposed deficits of the students was a major paradigm shift. This insight was shared by the SI program that evolved separately at the University of Missouri-Kansas City in 1973 (Arendale, 2002).

From the early 1970s through the 1980s, the common approach to academic support was to enroll students in learning strategy classes, new student orientation courses, and offering study skill workshops. The challenge with these traditional approaches was that study skills were not effective if learned in isolation and without direct application to tertiary credit courses. The IL course makes immediate application of the study skills with the paired academic content course such as introductory biology or introductory psychology. This illustrates a third innovation

of the IL courses, the use of learning communities which explicitly connect ideas and skills among multiple classes. One of the five common practices of learning communities is "linked courses" where two tertiary courses integrate academic material and skill development for use in each class. This approach helps students to see the connections and leads to higher student learning outcomes (Lenning and Ebbers, 1999; Zhao and Kuh, 2004).

The final innovation of the IL course is addressing cultural transition issues of entering tertiary education for these historically-underrepresented students. While current discussions about race, power, and cultural oppression are popular topics for tertiary students on many campuses, they were not common to learning assistance programs in the 1970s. These approaches do not appear in the professional literature until the past decade (London, 1992; Orbe, 2004). These topics are explored in the IL course since cultural barriers to tertiary education are as significant as the academic ones.

3. Theory and Research Informing the Education Practice

The creators of the IL course carefully followed principles of applicable learning theories, learning approaches, and published research when creating their model. Following are a sample of educational approaches and theories that guide development of the IL course.

3.1 Situated Learning. Students learn best when immediate application is made with real-life circumstances according to advocates for *Situated Learning* (Lave and Wenger, 1991). Learning occurs through interaction of the students with peers. Students are actors as well as observers who imitate behavior of fellow students solving problems. "Instruction must be situated in an authentic context that resembles that of the classroom teacher to enrich their learning process by providing realistic experiences that more easily transfer" (Willis and Cifuentes, 2005, p. 43).

3.2 Sheltered Instruction. A similar approach to *Situated Learning* is *Sheltered Instruction* (Gibbons, 2002). With this approach, immigrant students learn language best when it is in the context of subject matter such as literature, science, or social studies rather than the students only working within a English-as-Second-Language course. With both of these approaches to learning, students learn more deeply and retain long-term when placed within a context for immediate application of the material just learned.

3.3 Constructivism and Socio-Constructivism. Piaget and Inhelder (1958) states that students are active agents in creation of knowledge and not just receivers of it. Active classrooms that frequently use peer cooperative learning strategies and engage students to create and demonstrate new knowledge are more effective for retention and future use. Students easily move from concrete to abstract reasoning through practice and observation of others. Vygotsky (1978) identified the *Zone of Proximal Development (ZPD)*. He built upon the work of Piaget, Inhelder, and others in Constructivism with advancing Socio-Constructivism. Students are not independent agents with learning since they learn most effectively in groups with others. The *ZPD* is the learning space where students perform at higher levels of thinking when a slightly more advanced peer in their midst models and leads them. The goal of *ZPD* is gaining mastery in the group setting so students act autonomously when alone.

3.4 Learning Communities restructure the curriculum by making explicit connections among courses and ideas (Lenning and Ebbers, 1999; Zhao and Kuh, 2004). These communities were created in response to students failing to see relationships among ideas that tertiary administrators and faculty members believed obvious. Common features of learning communities are curricular coherence, peer cooperative learning activities, and more interaction of faculty members with one another and of faculty members with their students. There are five types of learning communities: *linked courses*, *learning clusters*, *freshman interest groups*, *federated learning communities*, and *coordinated studies* (Tinto, 2003). The IL approach fits with the first type, *linked courses*. TRIO students are concurrently enrolled in one disciplinary course such as psychology or biology and one learning strategies and tertiary cultural transition course.

4. Historical Background and Context for Development of IL Courses

For more than four decades, Bruce and Sharyn Schelske served at UMN by staffing and directing the TRIO Upward Bound (UB), Student Support Services (SSS), and McNair Programs funded by the U.S. Department of Education (DOE). The Schelskes were undergraduates at UMN when they began working with the UB program in 1968 as undergraduate student employees. They became co-directors for UB in 1978 and directed the program until 1991. Bruce and Sharyn wrote UMN's first successful TRIO Student Support Services grant in 1976 and later teamed to author the McNair Scholars Program grant in 1991. Bruce became director of TRIO SSS in 1991 and Sharyn appointed director of McNair Scholars the same year.

Because of the forty-year history of the *Integrative Learning* (IL) course, this curricular approach has undergone a

variety of name changes. At the beginning in 1972, the IL course was called *Mastering Skills for College Success* which was a revised version of an existing UMN course of the same name. The name changed to *Supplemental Instruction Course* when it was administratively reassigned to the College of Education. In the mid-1990s, the course name became *Structured Learning Accelerated Course*. The current name for the course is *Integrated Learning*. For purposes of consistency and reducing confusion, the commonly used name for the course throughout this document is *Integrated Learning* (IL). As the story unfolds, the various names for the course are explained and the historical context that shaped them.

The history of the IL course illustrates how it was responsive to the needs of the students, providing innovative approaches to helping students master essential skills, and interacting with changing political forces within the tertiary institution. The survival and development of the IL course was dependent upon the collegial relationships between TRIO program staff and faculty members from the corresponding academic departments that awarded academic credit for the course and offered the paired academic content course. The academic merit of the course, demonstrable positive results for the students, and personal relationships among the UMN community were needed for the IL course to persist in the face of turbulent campus curricular changes, fiscal austerity, and political unrest.

5. Description of the IL Course

The curricular approach of the IL course has remained stable since inception. The IL course, along with other features of the UMN SSS program, were featured with four other institutions in U.S. Department of Education report, *Best practices in student support services: A study of five exemplary sites. Follow-up study of Student Support Services programs* (Muraskin, 1997). The IL course is reserved for students admitted to UMN in the TRIO Student Support Services program. About 80 percent of the SSS TRIO students enroll in one of the IL courses during their first year at UMN. First-year students enrolling in an introductory psychology, biology, or chemistry course during fall term are required to enroll concurrently in the companion IL course. Past experience indicates the participating TRIO students strengthen their academic skills sufficiently to not need an additional IL course. A small number of TRIO students voluntarily enroll in an additional IL course during spring semester.

5.1 Curriculum and Instructional Approach

The College of Education and Human Development (CEHD) hosts the University's Upward Bound, Student Support Services, and Ronald E. McNair Post-Baccalaureate Achievement Program. Two IL courses are offered through the Department of Postsecondary Teaching and Learning within CEHD to support the SSS students: PsTL 1081 *Integrated Learning in the Social Sciences* and PsTL 1082 *Integrated Learning in the Sciences*. The UMN course catalogue for PsTL 1081 describes it as "Intensive support for developing conceptual/contextual understanding of material presented in companion social science course, methods for critical thinking, field-specific vocabulary, core concepts, and writing for social sciences." This IL course is linked to PsTL1281, *Principles of Psychology*. These two courses then form a linked-course approach to a learning community.

The UMN course catalogue describes PsTL 1082 as, "Intensive support for mastering concepts/skills in companion science course, scientific research methods, field-specific vocabulary, core concepts, and writing/presentation styles associated with disciplinary content." One section of this course is linked to PsTL 1131, *Principles of Biological Science* and another section is linked to Chem 1015, *Introduction to Chemistry*.

Each IL course carries two elective credit hours. For nearly all students, there is no cost for enrollment in the IL course since tuition is a fixed rate when the student enrolls in 13 or more credit hours for the academic term. To ensure the class is reserved for the TRIO students, an academic advisor with responsibility for TRIO students must grant permission to add the course. The grading basis for the course is A-F. Course enrollment is limited to 24 students to ensure maximum opportunity for interaction of the students with one another and create a small-class experience within the UMN setting where some classes exceed 300 for first-year students. The IL course in social science or science can be taken a second time as long as the linked content course is different from the first one. The IL course includes content review, recitation, reflection, and application of study strategies. Significant attention is paid to systematically developing '*habits of the mind*' for educational self-regulatory capacity.

5.2 Learner Activities

Students use the same textbook, assigned readings, and other course materials as assigned in the target content class for the IL class sessions and homework. This permits direct application of study strategies to the actual course materials. In addition, the IL instructor creates handouts, quizzes, and other instructional materials for use during class sessions.

Students attend the IL class twice weekly. The IL instructor structures each class session for a mix of short lectures,

group discussions, small group assignments, and other educational activities. Typically, the IL instructors are former high school instructors or advanced graduate students with previous teaching experience. Preference is given to applicants who have worked with culturally diverse students like the TRIO population. As outlined by Madyun et al (2004), the IL course has clear objectives that guide the learning activities:

5.2.1 Use the textbook and other course materials more effectively. These activities include effective reading strategies including SQ3R and textbook note taking, taking advantage of features built into the textbook, vocabulary development, making application of material learned in the target class to real life, developing mind maps of the readings and lecture notes.

5.2.2 Build critical thinking skills. These activities include group discussions; prediction of exam questions; and synthesizing readings, lecture notes, and prior knowledge of the course material.

5.2.3 Develop self-regulated learning skills. Students journal about personal choices made regarding study strategies and effectiveness of them; debrief actions taken before exams and their potential impact on the final score; journal about their strengths, weaknesses, and plans to improve; reflect on their motivation (internal and external) and the impact upon their learning; and develop time management skills for academic and personal activities.

5.2.4 Build peer networks for learning and emotional support. Student practice making choices about selecting peers to collaborate in studying, learning different roles within groups, and building self-confidence to participate and lead small groups.

5.2.5 Develop skill for exam preparation. As previously mentioned, debrief exams to identify personal choices impacting the final score, detect error patterns, and plans for different actions on the next exam; predict exam questions; practice with quizzes and mock exams during IL class sessions; and practice in applying skills for the different types of questions on an exam (multi-choice, matching, short-answer essay, long-answer essay)

5.2.6 Provide explicit instruction to improve comprehension of the material in the target class. The IL instructor delivers short lectures on key concepts from the target course lectures and assigned readings.

5.2.7 Require students to organize small group discussions and projects related to the content course. The IL course participants prepare small group and classroom presentations – all common anxiety generating assignments that students will encounter in their academic careers.

5.2.8 Class and cultural issues. Explore critical class and cultural transition issues including the difference between secondary and collegiate expectations, personal and institutional values, first-generation tertiary concerns, and academic culture folkways.

5.3 Learning Materials Utilized

Students use the same textbook, assigned readings, and other course materials as assigned in the target class for the IL class sessions and homework. This permits direct application of study strategies to the actual course materials. In addition, the IL instructor creates handouts, quizzes, and other instructional materials for use during class sessions.

5.4 IL Staff

The TRIO SSS Program director serves as the direct supervisor of the IL course instructor. The director is responsible for hiring, training, supervising, mentoring, and evaluating the IL courses. The director holds a one-day training workshop before the beginning of the fall academic term to train the new and returning IL instructors. Throughout the academic term, the director meets periodically with the IL instructors individually or together for staff training.

The TRIO SSS program director must be knowledgeable and skilled with pedagogy, peer cooperative learning, academic coaching, and program evaluation. The director may conduct the training workshops for the IL staff or may recruit someone qualified in the skills needed to be a successful IL instructor. In recent years, someone from the campus peer study group program provides initial training for the IL instructors and is available to the SSS director throughout the year for consultation. The TRIO program director must establish collegial working relationships with the administrators and faculty members of the academic department that hosts the IL courses. Understanding changes in campus curricular practices, financial challenges, and campus politics aids the program director to proactively strengthen relationships with key stakeholders and take steps for changes as needed.

The IL instructor must be knowledgeable and skilled with pedagogy, peer cooperative learning, classroom management, curriculum development, and classroom assessment techniques. Individuals selected for this position are most often graduate students and may have previous classroom experience in a high school setting. A preference

is given to applicants with prior high school and tertiary teaching experience. Understanding the educational and emotional needs of first-generation, poor, and historically-underrepresented tertiary students is essential to make the IL experience culturally sensitive and create an effective learning environment; therefore, individuals with prior experiences working with students of similar backgrounds are given preference for hiring. Staff receives continuous training and mentorship by the TRIO staff and fellow paraprofessional staff members.

Sometimes the TRIO program has contracted for training services from the International Center for Supplemental Instruction at the University of Missouri-Kansas City (http://www.umkc.edu/ASM/si/) to train the TRIO SSS director and the IL instructors. The SI program has many similarities to the IL approach and their training workshops and materials are useful for training and providing a model to adapt for the IL approach.

5.5 Estimated Cost per Student

The primary direct cost of the IL course is the academic term salary of the IL instructor. Class size for the IL courses is capped at 24. Dividing the two numbers yields a per student cost of approximately $130. It is difficult to determine the additional revenue generated for UMN from enrollment in the IL course. Students who enroll in 13 or more credit hours pay the same flat-rate tuition for the academic term. In addition, tertiary tuition is held by UMN's central administration and then block amounts are assigned to each tertiary institution on an annual basis. While there is a vague relationship between credit hours generated and the annual allocation, it is not possible to track specific revenue and automatically assign to an individual academic department, unit, or faculty member.

The costs for food and refreshments for the training workshop are negligible and other personnel participating in training from the campus study group program donate their time. The cost to attend the Supplemental Instruction training workshop at the University of Missouri-Kansas City is approximately $1,200 USD for the TRIO SSS Program director and would only need to occur once. Training materials purchased from the SI program at UMKC are estimated at $100 USD annually. The training manual used for the IL instructors is donated by the UMN study group program (Arendale & Lilly, 2012).

6. Key Factors for Success

Based on more than four decades of the IL courses at UMN, the following factors are considered as key for its success with supporting higher academic achievement of the TRIO students: (a) The IL course instructor knows what goes on during the target content class by meeting with the faculty member weekly. (b) On-going professional development occurs for the IL course instructor before and throughout the academic term. (c) IL is only offered in tandem with classes where the course professor is supportive of the program. (d) The IL is evaluated each academic term regarding outcomes for the students and the data used for program improvement. This information is important for not only curricular improvement but also demonstrating efficacy of the IL courses and justifying their continued existence to tertiary stakeholders. (e) Classes targeted for support are academically-challenging with 30 percent or more of the students receiving final course grades of D or F or withdrawal from the course before the introduction of IL courses. (f) The IL class concurrently supports deeper understanding of the material in the target class and models appropriate learning strategies for use in it and other classes of the students. (g) Power and responsibility is shared among the IL instructor and the students so that all are actively engage with the course material and with each other. (h) Cooperative learning activities are used to foster a learning community. (i) The TRIO program director cultivates ongoing relationships with key departmental administrators and faculty members to support the IL courses. (j) Reports on the efficacy of the IL courses are provided to key stakeholders to continue their political and economic support of the IL courses and for program improvement and revision.

The resources needed include those common for any tertiary course instructor: dedicated classroom, access to media projection equipment, photocopy services, instructor copy of the textbook used in the target course and any other resources provided by the publisher (examples: test banks, PowerPoint slides, curriculum). Salary must be sufficient to attract graduate students with prior teaching experience for the position as IL instructor. The TRIO director and other staff must allocate time for selection, training, observing, coaching, and evaluating the program. Finally, a supportive academic department is essential to host the IL course, provide mentorship for the instructional component, and act collegially with the course offering.

7. Evaluation of the IL Course

There have been several formal studies of the IL course since inception in 1972. Two studies have been published in peer-reviewed journals on the effectiveness of the IL program at UMN.

7.1 Fall 2002 Study at University of Minnesota (Madyun, Grier, Brothen, & Wambach, 2004). During fall 2002, a study examined IL attached to an introductory psychology course. The IL course only enrolled TRIO students in

UMN's Student Support Services program. This group of eight students met federal guidelines for TRIO eligibility (first-generation tertiary student, low-income) and was ethnically diverse: two were African American males, two were Asian American males, three were African American females, and one was a Caucasian female. Readers of this evaluation summary are encouraged to consult the complete report for additional exploration of the study and its findings.

Data collection. Data was collected on the total points earned in the introductory psychology course at three times in the academic term: 6th week, 10th week, and 15th week. Students completed approximately one-third of their points during each of these three time periods.

Research design. A quasi-experimental study was conducted. The treatment group was defined as having completed both the introductory psychology course and the IL course with passing grades. Two control groups were created. The first was a matched-pairs group of students from the Introductory psychology course not simultaneously enrolled in the IL course with the TRIO students that completed both the introductory psychology course and the IL course (Control Group #1). The students were matched on basis of their ACT composite score. Both groups (experimental and control #1 had a mean ACT composite score of 14.5). The second control group was composed of TRIO students that completed the introductory psychology course the previous academic term but did not participate in the corresponding IL course (mean ACT composite 13.7).

The dependent variable in the study was the final course grade in the introductory psychology course. The independent variable was the grade in the IL course in which the students were concurrently enrolled. The measurable objective for the study was whether there was a statistically-significant positive relationship between the final course grade earned in the IL course and the final course grade earned in the introductory psychology course.

Results. The following table and narrative comes from the published study that appeared in *The Learning Assistance Review* (Madyun et al., 2004, p. 13).

Table 1. Z-scores of students at three points in the semester

	Week 6	Week 10	Final Points
Matched-pairs Control (7)	-.43	-.20	-.32
TRIO Control (15)	-.05	-.29	-.67
IL course students (8)	+.35	+.74	+.50

The first analysis compared the grades of the [IL course] students to those of other students in the [introductory psychology] class. The average grade for all students in the introductory psychology class was B-, which was equivalent to 6 on a 0 (F) to 10 (A) scale. The average grade for the [IL course] students was 5.5, which is between C+ and B-. The average grades for the [matched pairs] control group and the TRIO control group were both 2.5, which is between D+ and C-.

Because the TRIO control group class from the previous fall semester did not have exactly the same number of points possible, we converted each of the two semesters to standard (z) scores. That is, we subtracted the class mean total scores from each student's total and divided by the mean for that class. We then computed one-way analysis of variance (ANOVA) with Scheffe posthoc contrasts to determine if there were differences between groups. We also computed the percent of points completed at each grading interval.

The [IL course] students' point total exceeded those of the control groups in all three data collection points (see Table 1). However, the group scores on the 6-week and 10-week grade reports did not differ by tests of significance. On total points at the end of the semester, the three groups showed the same basic pattern as in weeks 6 and 10 and these differences were statistically significant. The overall ANOVA revealed $F(2, 29)=6.53$, $p<.01$ and the Scheffe contrasts showed the [IL course] students differed significantly from the TRIO controls ($p<.01$) (Madyun et al., 2004, p. 13)

Discussion. The researchers found the IL course worked well for TRIO students, especially since they were less academically-prepared than typical students enrolled in the introductory psychology course. Earlier in this report the professors teaching the Psychology course identified some challenges for students: (a) lack of peer interaction due to its focus on individual study and mastery, (b) near exclusive reliance upon textbook and computer screen readings since there were no lectures given, and (c) the fact that self-paced instruction through PSI also was subject to procrastination by some students. The researchers believed that the findings of this research study and personal observation of the students in the class affirmed that these needs were addressed by the IL through the highly

interactive peer learning in the IL class sessions, modeling of effective reading and study strategies by the IL instructor and fellow students, and encouragement to keep up with peers since the IL class sessions were designed to match the progression of topics and assignments in the targeted Psychology course.

7.2 2002 and 2003 Study at University of Minnesota (Moore, 2008/2009) Another study examined the efficacy of IL courses were examined by studying TRIO SSS students concurrently enrolled in a IL course and a large introductory biology course. The same study also examined a different subpopulation of students who were recent immigrants concurrently enrolled in an intensive language program at the same time of enrolling in the introductory biology course. No students enrolled in that program were also members of the campus SSS program. For purposes of this report, those findings are excluded. Readers are encouraged to read the entire report for additional discussion and exploration.

The introductory biology course was four credits and designed for non-majors. Two 75-minute lectures were offered each week. The topics in the course were representative of those in most introductory courses in this area. The IL course was offered for only one credit and offered two 50-minute sessions each week. The course professor did not provide information to the IL instructor not also given to all students enrolled in the biology course. The students enrolled in the IL course were ethnically and gender diverse: 52% male, 47% female; 50% Caucasian, 25% African-American, 9% Asian Pacific, 6% Native American, 5% Chicano, 3% Hispanic, and 2% Other.

Data Collection. The following data was gathered for all students enrolled in the biology and the IL courses: course grades, class attendance, attendance at exam prep sessions run by teaching assistants not part of the IL program, and submission of extra-credit homework. To understand the preentry attributes of the students, an ACT Aptitude Rating (AAR) was calculated for each student. The AAR is the student's ACT composite score plus double their high school graduation rank percentile. In addition, a survey was given to students in the biology class on the first day that asked questions to determine their interest in completing extra-credit assignments and the percent of class lectures the students planned to attend.

Research Design. A correlational study compared two groups of students: TRIO SSS students (experimental group) enrolled in an IL course and concurrently in introductory biology and students not enrolled in IL, but enrolled only in the same introductory biology course during the same academic term (control group). The focus of the design was to analyze the impact of attendance in either class and the final course grades in both. Additional data was collected regarding preentry attributes of the students, academic engagement activities in the biology course, and the distribution of final course grades in the biology course. The additional data are presented without statistical analysis due to the narrow focus of this study.

There were two independent variables in the study: class attendance and final course grade in the IL course. There was two dependent variables in the study: final course grade and academic engagement in the introductory biology course. Academic engagement was operationally defined as including three behaviors in the biology course itself: class attendance, submitting extra credit homework, and attending exam preparation sessions. Descriptive statistics were gathered for these variables and correlational methods were applied to determine if there were a statistically-significant positive relationship between class attendance and final course grades in the IL course and academic engagement and final course grades in the introductory biology courses, as was hypothesized would happen.

Results.

Table 2. Comparison of behavior of two students groups enrolled in the biology course

	Concurrent IL + Biology	Biology-Only
Academic Behaviors in Biology Course		
Rate of class attendance	80%	73%
Percent submitting extra credit work*	47%	28%
Percent attending exam prep sessions**	74%	28%
Grades in the Biology Course		
Mean final course grade percent	83%	70%
Final course grade distribution		
%A	68%	4%
%B	17%	29%
%C	7%	46%
%D	4%	8%
%F	4%	11%

* = Submitted at least one extra-credit project over course of academic term.

** = Attended at least one exam prep session over course of academic term.

Table 3. Correlation coefficients of class attendance and course performance: All IL and introductory biology course sections combined: 2002 and 2003

	Correlation Coefficient
IL attendance + Biology final grade	0.588
IL final grade + IL attendance	0.848
IL attendance + Biology attendance	0.607
IL final grade + Biology final grade	0.820

The mean AAR scores for the biology-only students (control group) was 83. In comparison, the AAR scores for the concurrently enrolled IL students in the biology course (experimental group) was 84. There was no statistically significant difference in the predicted academic ability of biology-only students and the TRIO-only students enrolled in the IL course.

The correlation between class attendance in biology or IL courses was strong. So was the grade received in the IL course with final course grade in biology. As demonstrated in Table 3, the correlations were consistently strong ($r = 0.588$ to 0.848). Similar patterns occurred in every class section in each academic term over the two years of the study.

Discussion. The data indicates that the IL course had a positive impact on the final course grade in the biology course since higher levels of attendance strongly correlated with higher attendance and higher grades in biology. The attendance and grade received in the IL course was a stronger predictor of final course grade in the biology course than the AAR. This suggests that preentry measures like the AAR are not predictive of student performance in tertiary-level courses if students enroll in the corresponding IL course. Students from the IL course were more likely to attend the biology class at a higher rate, submit more extra-credit projects, and attend exam preparation sessions in comparison to the biology-only students. This suggests that the IL course and the activities within it may have had an impact on students being more engaged in the biology course and taking advantage of opportunities to improve their grade performance.

Students concurrently enrolled in the IL and biology courses outperformed their counterparts enrolled only in biology. The mean grade in the biology class for the IL group was 83% as compared with 70% for the biology-only group. Table 1 also displays a higher percentage of IL students earning grades of A and B than their counterparts. Since the focus of this particular study was class attendance and final course grade received in the IL and biology courses, statistical analysis was not applied to this data.

8. Limitations of the Two Evaluation Studies

These evaluation studies have several limitations in terms of generalizing the results of the Integrated Learning approach implemented here. The first limitation is that the courses studied were limited to introductory biology and introductory psychology. It is possible a wider range of academic courses served could have shown different results. Second, the selected courses for IL course support were at the lower-division of the undergraduate curriculum. It is possible that a different experience could have resulted from classes served at the upper-division undergraduates or graduate level. A third limitation is the size of the sample for data analysis. Analysis from a longer time period might have yielded different trends for the results. Fourth, UMN had a competitive admissions process during the time period of these studies. The IL course experience at an open admissions institution might have derived different results than those in this research study. Finally, this study only included the experiences of students from one institution. UMN is a Research Intensive I public university with over 53,500 undergraduate and graduate students. This is an atypical environment for most tertiary students in the U.S.

9. Conclusion

The Integrated Learning courses have successfully served the needs of TRIO SSS students for over four decades at UMN. More than just academic support for students concurrently enrolled in several rigorous tertiary courses, the IL course experience is a powerful transitional learning experience preparing students for academic success in the wider campus learning environment. As an early learning community, the IL course was paired with a rigorous content course so immediate application was made of newly learned study strategy and metacognitive skills. The learning community formed creates an environment for students, especially those that are first-generation tertiary students, low-income, or those with disabilities to acclimate to the social climate of a large university. This attention to both the academic and social demands of tertiary institutions help explain the positive outcomes from it. The IL course experience provides fertile ground for development and strengthening of attitudinal and behavioral skills needed for success in the competitive tertiary environment.

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