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A RETROSPECTIVE VIEW
OF ACADEMIC PERFORMANCE
AMONG FIRST YEAR STUDENTS
AT LAKE SUPERIOR STATE UNIVERSITY
WHO SELECTED
MICHIGAN'S DUAL ENROLLMENT PROGRAM
AS THEIR POSTSECONDARY PREPARATORY
STRATEGY IN HIGH SCHOOL (1996-2003)

presented by

MaryAnne Pietraniec Shannon

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A RETROSPECTIVE VIEW OF ACADEMIC PERFORMANCE AMONG FIRST-YEAR STUDENTS AT LAKE SUPERIOR STATE UNIVERSITY WHO SELECTED MICHIGAN'S DUAL ENROLLMENT PROGRAM AS THEIR POSTSECONDARY PREPARATORY STRATEGY IN HIGH SCHOOL (1996-2003)

By

MaryAnne Pietraniec Shannon

A DISSERTATION

Submitted to Michigan State University in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Department of Educational Administration: Higher, Adult, and Lifelong Education

ABSTRACT

A RETROSPECTIVE VIEW OF ACADEMIC PERFORMANCE AMONG FIRST-YEAR STUDENTS AT LAKE SUPERIOR STATE UNIVERSITY WHO SELECTED MICHIGAN'S DUAL ENROLLMENT PROGRAM AS THEIR POSTSECONDARY PREPARATORY STRATEGY IN HIGH SCHOOL (1996-2003)

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Michigan's Public Act 160 provides incentive to secondary students for part-time participation in Dual Enrollment (DE) as a postsecondary preparatory strategy. Under the framework of anticipatory socialization, this Act allows eligible students in Michigan to earn postsecondary credit hours while simultaneously earning a high school diploma. Although this strategy has been utilized in Michigan since 1996, it has yet to be formally evaluated, creating a void of understanding between educational policy and practice.

To investigate the impact of dual enrollment participation on academic performance after high school, a 7-year retrospective case study was conducted at Lake Superior State University, a small, rural, public, baccalaureate-focused Michigan university that has fully participated in PA 160 since 1996. Records in the University's computerized Student Information System were reviewed for the population of 180 Dual Enrollment participants admitted to LSSU from fall 1996 through fall 2002. First-year academic and graduation data for dual enrollees were compared to others who entered LSSU at the same time; a population group of 38 Advanced Placement participants and a randomly selected control group of 227 first-year students who entered LSSU without postsecondary academic credits. Key findings revealed postsecondary preparatory program students demonstrated significant positive differences on the following measures when compared to the control group of students: 1) High School GPA; 2) High School Percentile Class Rank; 3) ACT Composite Score; 4) First-Semester LSSU Credit Hours Earned; 5) First-Semester LSSU GPA; and 6) Second-Semester LSSU GPA. In the short term, participation in postsecondary preparatory programming was found to be a significantly positive predictor for first-semester LSSU GPA ($p \le .05$), but not for second-semester LSSU GPA. In the long term, postsecondary preparatory students earned their LSSU bachelor's degree at significantly higher five-year graduation rates ($p \le .05$). Dual enrollees earned that credential in significantly less time when compared to all other groups ($p \le .05$), providing policy implications for the study site, the State of Michigan, and similar types of institutions nationwide.

This dissertation is dedicated to my family – to my husband Dr. Patrick M. Shannon and my sons, Tom and Jim

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CHAPTER 1

INTRODUCTION

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In 1996, the Michigan Legislature enacted the Postsecondary Enrollment Options Program (Public Act 160). Also known as the Dual/Concurrent Enrollment Program, this educational option enables eligible high school junior and senior level students to enroll in college courses "thereby exposing them to the academic and social demands of postsecondary education while still in high school" (Education Commission of the States, 2004). In Michigan, PA 160 permits the high school student to decide if the course credits accrued under the program will be earned as college credits only (dual enrollment) or earned as both high school and college credits simultaneously (concurrent enrollment). According to the Education Commission of the States (ECS), all states have dual/concurrent enrollment statutes, which allow such programs to be run by the state, district, or by educational institutions. In most cases, the K-12 school districts pay for the postsecondary courses eligible high school students elect to take under this program (Community College Research Center, 2003).

This Michigan part-time, school-of-choice option is different from the nationallybased Advanced Placement (AP) Program already established in many high schools across the country in that the Dual Enrollment (DE) Program: 1) broadens high school student eligibility for postsecondary educational enhancement; 2) is provided within the context of existing college classes on a college campus; and 3) requires postsecondary academic counseling for the participating student.

Dual enrollment programs provide a "real-life" guided university experience for eligible high school students. Viewed under a model of anticipatory socialization, participation in this program provides pre-university students an early introduction to the roles and expectations of postsecondary academics prior to full emersion after high school graduation. Although this educational option has been utilized across Michigan for the last nine years, the academic impact of participation in this program has yet to be formally evaluated at either the state or local level.

Unfortunately, Michigan is not alone in its lack of a comprehensive evaluation plan for dual enrollment. The ECS (2004) noted that although all states have policies to provide for postsecondary enrollment programming, most still do not have a comprehensive plan in place for evaluating it. Additionally, research on how students have benefited from this high school curriculum enhancement has been limited (Bailey, Hughes, & Karp, 2002; Boswell, 2001; Clark, 2001; National Center for Educational Statistics, 2001). The National Center for Educational Statistics (NCES) recently sent out its first survey to identify college/university participation in postsecondary programming nationwide, expecting dissemination of findings to begin in December, 2005.

Although Michigan has not been a national leader in the dual enrollment education movement in the past, present political and fiscal climates support an evaluation study about its impact on postsecondary education in the state. As in most US states, the fiscal climate for education in Michigan is a challenging one for both statefinanced K-12 and postsecondary institutions. Following national trends calling for increased postsecondary accountability (Fleming, 2004); educational administrators must insure all programs they offer demonstrate an academic benefit in relation to academic

cost. For example, although Lake Superior State University (which is the location for this analytical study) receives a revenue gain from additional part-time tuition fees as a provider for the state's non-mandated DE program, it does so at the cost of providing non-reimbursable ancillary services associated with full program participation. Additionally, one must also consider the indirect costs that the university incurs when it fully accepts dual enrollment transfer credits earned from a variety of educational institutions around the state.

Although K-12 and postsecondary educational institutions in Michigan share a commitment for educational success for all students in the state, some K-12 institutions participate in dual enrollment programming at a higher cost in relation to their state foundation grant awards. Since 1996, a significant amount of state education dollars in Michigan has been shifted from K-12 public school budgets to participating institutions of higher education to accommodate for DE as outlined in the state statute. In rural areas of Michigan, where smaller student numbers translate into smaller state foundation grants, K-12 school districts work hard to retain all district students within their educational institution for as much of the school day as possible. Considering the context of Michigan's present fiscal climate, one can reasonably assume that some Michigan K-12 school administrators and policy makers may not look as favorably upon participation in dual enrollment programming when compared to other "less costly" postsecondary academic preparatory options (e.g., AP) that retain high school students full-time (and the state funds that follow them) in K-12 educational settings.

Statement of the Problem

Initially viewed in the shadow of AP programming, DE programming was first identified as an educational acceleration option intended primarily for academically "gifted" high school students (McCarthy, 1999; Putnam, 2002). As more state statutes and state policies for dual enrollment were developing, educational leaders began to consider the potential benefits that dual enrollment programming could bring for educationally disadvantaged and other at-risk high school students, especially in relation to postsecondary access and educational support (Andrews, 2001; Bailey & Karp, 2003; Catron, 2001; Kleiman, 2001).

In 1996, Michigan legislators looked on dual enrollment educational programming as a mechanism to equalize postsecondary access for all eligible high school students in a state with many distinct rural constituent populations across two peninsulas. In addition to addressing the access issue in PA 160, Michigan legislators built on the value for academic support of this secondary to postsecondary academic bridging strategy by requiring a postsecondary counseling component in the Michigan's statute, a caveat not found in other dual enrollment state statues in 1996. It was hoped that this requirement would build partnerships between the many secondary and postsecondary educational institutions within the state.

Lake Superior State University (LSSU) is one of three state universities in Michigan with the two-pronged mission to function as a four-year state university and as a regional community college (LSSU Self-Study, 2000). LSSU's active and long term participation in Michigan's Dual Enrollment Program coincides well with its K-16 philosophy of service. However, as state appropriations for higher education continue to

decrease in today's fiscal climate, LSSU and other colleges and universities in Michigan are beginning to re-think their secondary/postsecondary partnerships centered on non-mandated educational programming, putting academic programs like dual enrollment at risk.

It was only recently that all 50 states in the US have come "on board" with statutes that provide for state-sponsored dual enrollment programming for high school students (ECS, 2004). The national literature base on dual enrollment programming is thin, with available data focusing primarily on findings reported from individual program efforts conducted in a few educationally progressive states across the US. Unfortunately, Michigan has not taken a lead role in studying this educational option and to date, no formal state, regional or individual studies have been conducted to assess either the short or long term impact of dual enrollment participation in Michigan (Michigan Department of Education, 2003). This lack of formal evaluation has created a void of understanding between educational policy and practice in Michigan that needs to be resolved.

Purpose of the Study

The primary purpose of this research was to conduct an institutional policy study for postsecondary dual enrollment participation in Michigan. This was accomplished through a retrospective analysis, looking at how those first-year university students, who participated in Michigan's DE program while in high school, performed academically in their first year of university study at LSSU. Traditional student performance indicators related to academic success and persistence in the first year of university study were examined. This was accomplished by using university student records for those who

entered Lake Superior State University in the seven-year period after Michigan's DE program was implemented under the Postsecondary Enrollment Options Act (PA 160) in April, 1996. In addition, this study examined the relative importance of various student factors as potential predictors for academic success in the first year of full-time postsecondary study at LSSU, persisting toward bachelor's degree attainment.

Data collected from this study were intended to: 1) identify trends in the use of dual enrollment as a postsecondary academic preparatory strategy of choice for first-year students at LSSU; 2) provide a demographic profile for those who attended LSSU after high school participation in dual enrollment programming over the first seven years of the program; 3) compare first-year academic outcomes for the dual enrollee cohort with first-year academic outcomes for LSSU students who did not participate in dual enrollment while in high school; 4) look at the impact of high school dual enrollment participation on LSSU graduation rates; and 5) provide evidence-based data for educators to consider as they make policy decisions about participation in Michigan's Dual Enrollment Program.

Research Questions

The following questions were considered during the research portion of this study: Question 1

Does the pre-university academic student profile (Sex, Race, Region of Michigan Residence, High School GPA, High School Class Rank, ACT Composite Score) of firstyear LSSU students, who selected one of two postsecondary academic preparatory strategies while a high school student (Dual Enrollment or Advanced Placement), differ from first-year LSSU students who did not select a postsecondary academic preparatory strategy while a high school student?

Question 2

Does the first-year academic university student profile (First-Semester LSSU GPA, Second-Semester LSSU GPA, Number of Enrolled Credit Hours First Semester, Number of Earned Credit Hours First Semester, and Number of Degree Major Changes in the first year of study) for LSSU students, who selected one of two postsecondary academic preparatory strategies while a high school student (Dual Enrollment or Advanced Placement), differ from the first-year academic university student profile for LSSU students who did not select a postsecondary academic preparatory strategy while a high school student?

Question 3

Does participation in DE and AP programs, high school GPA, race, sex, and region of Michigan residence, individually or additively combine to predict academic performance for students in the first year of bachelor's degree-focused postsecondary education at LSSU?

Question 4

Does the LSSU graduation profile for first-time, full-time LSSU students who selected one of two postsecondary academic preparatory strategies while a high school student (Dual Enrollment or Advanced Placement) differ from the LSSU graduation profile for first-time full-time LSSU students who did not select a postsecondary academic preparatory strategy while a high school student?

Need for the Study

The Michigan legislature enacted the Dual Enrollment Statute in 1996 to provide financial incentives for qualified students to enroll in academic college or university course work while still in high school. Although the statute requires all state-supported high schools in Michigan to participate in this academic enhancement school-of-choice option, the statute does not require state-supported institutions of higher education in Michigan to participate.

Since the statute went into effect, the Michigan Department of Education has not evaluated the academic impact of this postsecondary educational preparatory strategy on the students, high schools, colleges, or universities participating in the program. Likewise, participating and non-participating institutions of higher education in the state continue to accept or deny postsecondary educational credits earned by dual enrollment high school students without solid evidence to support or refute their practices.

This study can serve as an important educational service in several ways: 1) it will assist in promoting a state data base related to the academic impact of Michigan's Dual Enrollment initiative; 2) as a case study, it will provide seven-year snapshots of academic progress, student retention, and bachelor's degree attainment for those LSSU students who selected dual enrollment programming while in high school; 3) as an evaluative study, it will serve as a model and a credible data base for other higher educational institutions in the state as they consider future studies on the topic; and 4) it will provide data to assist in fact-based discussions for academic policy development related to participation in dual enrollment as a postsecondary preparatory educational option for eligible high school students.

Profile of the Case Study: Lake Superior State University as an Institution of Higher Education in Michigan

Lake Superior State University is the smallest of the 15 public universities in Michigan, located in a county of about 18,000 people. It was initially established in 1946 as the Sault Branch of the Michigan College of Mining and Technology (now known as Michigan Technological University). In 1969, it became the Sault Branch of Michigan Technological University and eventually evolved to the status of a free-standing fouryear degree granting institution known as Lake Superior State College. A comprehensive review of the institution in 1971 resulted in a ten-year North Central Association accreditation at the baccalaureate level. University status was granted in 1987 when the institution was renamed Lake Superior State University (LSSU).

Located in Michigan's rural Eastern Upper Peninsula, LSSU sits on the border of northern Ontario in Canada, meeting postsecondary programming needs for some Canadian students. It is one of three public postsecondary educational institutions in Michigan (along with Northern Michigan University and Ferris State University) with a state mandate to serve as both a state university and a regional community college (LSSU Self-Study, 2000). To meet its dual mission, LSSU offers its students the opportunity to meet the necessary requirements to earn a Specialty Certificate, Associate Degree, Bachelor of Arts Degree, and/or a Bachelor of Science Degree. In addition, the university has established articulation agreements with American and Canadian colleges and universities, community colleges, and high schools to assist regional students seeking smooth transitions for meeting their postsecondary educational needs.

To complement the educational programming offered at its main campus in Sault Ste. Marie, LSSU also operates administrative and academic services at two regional

community college outreach locations. Its Upper Peninsula Regional Center is located at Bay De Noc Community College, which is 175 miles west of the main campus in Escanaba, Michigan. The second outreach campus is in Petoskey, Michigan at North Central Michigan Community College which is located in Michigan's Lower Peninsula, 94 miles southwest of the university's main campus.

Academic Profile of the Institution (1996-2003)

Lake Superior State University is a non-research based educational institution primarily focused on providing bachelor's degree awards to eligible students (LSSU Self-Study, 2000). As a public university, it has been fully accredited by the North Central Association of Colleges and Schools continually since 1971. In addition, the university has specialized programs in nursing, engineering, clinical lab science, and fire science that have earned national and international program accreditations. LSSU offers a variety of educational programs in the sciences and arts from which students select a degree major.

Between 1996 and 2003, two degree major classifications were changed at LSSU. The first change occurred in the fall of 1997 and continued until the fall of 1999 when bachelor's degree business majors were merged with mathematics and engineering majors. Also, in the second year of this retrospective study (1997-1998), Health and Human Services and the Science and Natural Resources classifications were merged to create a single degree major titled "Natural and Health Sciences," that continues today. A shifting of university faculty resources from Health and Human Services to the Arts, Letters and Social Science Programs at LSSU during the 1996-1997 school year resulted in a doubling of Arts, Letters and Social Science major declarations in 1997-1998, and a

stabilization of the number of Natural and Health Sciences majors over the last six years of this study.

The number of full-time LSSU undergraduate students in each of seven general degree majors over the seven-year period under review is shown in Table 1.

Table 1.

Student Population by Acad	lemic Program Area*	
Student Population by Acad	temic Program Area*	

Academic Year	Arts, Letters & Social Science	Business	Business Math & English	Math & English	Hlth & Hum. Serv	Natural & Hlth Sci.	Science & Natural Res.
1996-1997	395	287		290	831		438
1997 -1998	803		573			766	
1998 - 1999	891		570			750	
1999 -2000	857	212		344		664	
2000 - 2001	861	226		315		579	
2001 -2002	905	227		350		587	
2002 -2003	935	215		337		615	

 Obtained from LSSU's Institutional Annual Research Reports generated by the LSSU Registrar's Office (1996 – 2003).

Successful completion of an academic program that results in degree attainment and graduation from LSSU is the ultimate success indicator for postsecondary students and their families. As a key outcome measure, graduation rates have traditionally been used at the federal and state level as a means of evaluating a university's success in meeting its obligations in educational programming (LSSU Self-Study, 2000). A student's length of attendance at LSSU is determined by the requirements of the selected academic major(s), as well as the life situation of the student seeking the postsecondary credential.

Table 2 (on next page) provides the number of bachelor's degrees awarded by LSSU over the seven-year period of this study. During this time, the number of degrees ranged from a low of 464 awarded in 2002-2003 to a high of 566 awarded in 1999-2000. As shown on the table, the number of Bachelor of Science (B.S.) degrees awarded by LSSU outweighs the number of Bachelor of Arts (B.A.) degrees awarded over the same period. This is directly attributed to the type and number of academic programs available at LSSU at various stages of this study (e.g., there were 26 B.S. program options and six B.A. program options among the 1996-1997 graduates, compared to 40 B.S. program options and six B.A. program options among the 2002-2003 graduation group). The dominant B.S. programming provided at LSSU can also be attributed to the original academic legacy of the institution when it began as a branch institution of the Michigan Technological University in 1946.

Table 2.

Academic Year	Number of BAs Awarded By LSSU	Number of BS' Awarded By LSSU	Total No. Bachelor's Awarded
1996 -1997	30	455	485
1997 -1998	25	498	523
1998 -1999	14	434	548
1999 -2000	28	538	566
2000 -2001	25	487	512
2001 -2002	25	490	515
2002 -2003	23	441	464

Number of Bachelor's Degrees Awarded by LSSU by Academic Year*

* Obtained from LSSU's Institutional Annual Research Reports generated by the LSSU Registrar's Office (1996 through 2003).

Administration and Faculty Profile at LSSU (1996-2003)

During the seven years of this analysis (Fall, 1996 through Spring, 2003), LSSU was under the leadership of only one university president, Dr. Robert Arbuckle. All LSSU student data were collected by the same university administrative staff in the same way each October and reported in that year's "LSSU Institutional Annual Research Report" produced by the Office of the Registrar.

Viewed as an educational facility where the primary mission is to teach undergraduate educational programs (LSSU Self Study, 2000), faculty members at Lake Superior State University are responsible for all facets of academic support for university students. These include all classroom teaching, lab instruction, student advising, student scheduling, as well as other student activities. The 2000 LSSU Self-Study noted that during the fall semester that year, 66% of the 122 faculty members held a Doctorate credential with all other faculty members holding earned Master's Degrees. On average, faculty-student ratios at LSSU have consistently ranged from 1:17 to 1:19 over the seven-year period of this study, which supports the University slogan used during this same time period of time, "Lake Superior State University: Personal, Natural and Superior." *Student Selectivity at LSSU (1996-2003)*

According to American College Testing (ACT) classifications, Lake Superior State University has always been an "open" admissions institution for students who reside in Michigan's Eastern Upper Peninsula, and a "liberal" admissions institution for all other applicants (LSSU Retention Plan, 2004-2005). Guidelines for the "liberal" admissions category focus on applicants from outside the region who have: 1) an ACT score of 18 or better and a minimum high school grade point average (HSGPA) of 2.4; 2) an ACT score of 19 or better and a minimum HSGPA of 2.2; or 3) all applicants with a HSGPA of 3.0 or better regardless of their ACT score. Table 3 provides national context of admissions selectivity based on the distribution of ACT Composite Scores.

Table 3.

Selectivity Level	ACT Composite Scoring Range
Highly Selective	27-31
Selective	22-27
Traditional	20-23
Liberal	18-21
Open	17-20

National ACT Student Selectivity Level Guide*

* Obtained from LSSU's 2003 Student Retention Report.

Demographic Profile of LSSU's Student Population (1996-2003)

Table 4 reflects data obtained from LSSU's Institutional Annual Research Reports (1996 through 2003) depicting few changes in the LSSU student profile in relation to Sex, Race, and Region of Student's Home Residence. Although the percentage of males and females attending LSSU remained fairly equal over the 7-year time period of this study, a slight increase was reported for those who identified themselves as being either of White or Native American descent.

Through the course of this study, most students on the campus of LSSU classified their race as "White" (75% to 78%), while the majority non-white classification was reported in those who identified themselves as Native American (6% to 8%). Although the LSSU Admissions Office reported specific statistics for each of these two racial groups, those students who classified their race as "Other" or elected not to respond to this optional question were grouped together, representing 14% to 19% of the student population at LSSU during the 7-year period of this study. In addition, Table 4 shows that during these seven years, LSSU experienced a gradual but steady increase in the percentage of students who reported their permanent home residence as "Michigan's Upper Peninsula", with a corresponding decrease for the percentage of students who reported their home residence to be outside of Michigan.

Table 4.

Academic Year	S	ex		Race		Student'	s Home R	esidence
:	М	F	W	NA	O/NR	MI-UP	MI-LP	NOT MI
_ 1996 -1997	50%	50%	76%	6%	18%	36%	44%	20%
1997 -1998	50%	50%	75%	6%	19%	37%	42%	21%
1998 - 1999	48%	52%	77%	6%	17%	38%	43%	19%
1999 -2000	47%	53%	77%	7%	16%	41%	41%	18%
2000 -2001	47%	53%	77%	8%	15%	41%	41%	18%
2001 -2002	48%	52%	77%	8%	15%	40%	42%	18%
2002 -2003	47%	53%	78%	8%	14%	42%	42%	16%
M=male		W=Whi	te	<u> </u>	M	I-UP= Upp	er Peninsu	la of Mic
F=female		NA= Na	ative Am	erican	M	I-LP= Low	er Peninsu	ila of Mic

Percentage of Student Population by Year Reflecting Demographic Variables of Sex, Race, and Student's Home Residence*

* Obtained from LSSU's Institutional Annual Research Reports generated by the LSSU Registrar's Office (1996 through 2003).

During the 7-year study, reports from LSSU's Office of Financial Aid (1996 through 2003) consistently indicated that approximately 75% of full-time students at LSSU received financial assistance to cover the costs of educational programming. When compared with other state universities, the cost of attending LSSU remained somewhat in the middle of the fifteen-state university listing over this same period of time (LSSU's Institutional Annual Research Reports, 1996 through 2003). First-Year LSSU Student Enrollment Trends (1996-2003)

During the 7-year study, enrollment numbers remained fairly stable for full-time undergraduate students at LSSU. First-year student numbers ranged from a high of 795 students during 1998-1999 to a low of 715 students in 1997-1998. First-year student numbers remained fairly steady when the LSSU's undergraduate head count dipped to its lowest level in the 2000-2001 school year as noted in Table 5.

Table 5.

LSSU Total Undergraduate and First-year Student Headcounts During Each Year of the Study*

Academic Year	Total Full-time Undergraduate LSSU Student Head Count	Total First-year Full-time Student Head Count			
1996 -1997	2,581	763			
1997 -1998	2,469	715			
1 998 - 1999	2,574	795			
1999 -2000	2,440	749			
2000 -2 001	2,378	747			
2001 -2002	2,445	754			
2002 -2 003	2,477	760			

* Obtained from LSSU's Institutional Annual Research Reports generated by the LSSU's Registrar's Office (1996 through 2003).

Academic Programming Profile for First-year LSSU Students (1996-2003)

Upon application to LSSU, all students are asked to declare a degree major (field of study) to assist administration in the assignment of academic advisors. Over the 7-year period of this study, there was a low of 28% of first-year, full-time students who did not report a major upon admission in the first year of this study (1996-1997) and a high of 43% unreported majors for students in 2000-2001, which is the same year total undergraduates at LSSU was at its lowest. Table 6 shows the distribution of admitted first-year, full-time students who provided information about their selected field of study at LSSU.

Table 6.

Academic Year	Arts, Letters & Social Science	Business	Business Math & Eng.	Math & Eng.	Health & Human Services	Natural & Health Science	Science & Natural Res.	No Admiss. Major
1 996-9 7	98	84		83	184		145	169
1997-98	202		152			183		178
1 998-99	241		164			194		196
1999-00	229	55		101		175		189
2000-01	231	53		80		158		225
2001-02	250	64		80		168		192
2002-03	246	56		79		174		205

First-Year Student Population by Academic Program Area*

 Obtained from LSSU's Institutional Annual Research Reports generated by the LSSU Registrar's Office (1996 through 2003).

When considering the average number of credit hours first-year students enrolled to take their first semester at LSSU, students were consistent over the years of this study ranging from an average of 14.6 to 14.8 credit hours per student as noted in Table 7. This
reported average is above the standard 12 full-time credit load recognized by the university, but lower than the 16-credit hour average semester load reported for all fulltime LSSU students in the LSSU College Catalog (2002, p.10). Over the seven-year period of this study, LSSU students paid the same full-time tuition fee when they took from 12 to 20 credit hours per semester. One credit hour equals fifteen hours of classroom instruction in lecture/recitation courses while lab classes, field work, or other non-lecture credits meet for more than one hour a week per credit hour.

Table 7.

Academic Year	Total First-year Student Head Count	Total No. of 1 st Semester-Enrolled Credit Hours for Freshpersons	Average No. of 1 st Semester-Enrolled Credit Hours per Student
	763	11,242	14.7
1997 - 1998	715	10,613	14.8
1 998 - 1999	795	11,725	14.7
1 999 -200 0	749	10,956	14.6
2000 - 2001	747	11,061	14.8
2001 -2002	754	11,132	14.7
2002 -2003	760	11,300	14.8

First-year Student Population by Year and Total Number of Credit Hours Taken in their First Semester of Academic Programming at LSSU*

 Obtained from LSSU's Institutional Annual Research Reports generated by the LSSU's Registrar's Office (1996 through 2003).

To gain a sense of how all first-year, full-time students did in relation to earning an LSSU bachelor's degree, it is important to look at how each annual cohort persisted over time. Though all data are not available for every cohort at this time, there is value in looking at early trends from the data that are available. Table 8 reports the percentage for each annual cohort for all LSSU first-time full-time students utilizing four-, five-, and six-year graduation interval markers. When one considers the first three years of this study where complete data sets are available (four-, five- and six-year graduation percentages for fall cohorts in 1996, 1997 and 1998), in total 37% to 41% of this subgroup received a b from LSSU for the total period. During these years, the greatest percentage of first-year, full-time students received their bachelor's degree after five years of academic study (16% to 18%) running closely ahead of the percentages for those who achieved the degree after four years (15% to 17%).

Table 8.

Percentage of LSSU First-Year, Full-Time Student Cohorts Awarded A Bachelor's Degree Based on Number of Years of Academic Study at LSSU*

No. of Years of LSSU Study	Fall 1996 Cohort	Fall 1997 Cohort	Fall 1998 Cohort	Fall 1999 Cohort	Fall 2000 Cohort	Fall 2001 Cohort	Fall 2002 Cohort
4	15%	17%	15%	17%	16%		
5	18%	18%	16%	16%			
6	4%	6%	6%				
TOTAL	37%	41%	37%				

 Obtained from LSSU's Institutional Annual Research Reports generated by the LSSU Registrar's Office (1996 through 2003).

Specific Institutional Policies and Practices that Supported First-Year Academic Success at LSSU (1996-2003)

Over the study's 7-year period, LSSU's administrators, faculty, and staff developed and maintained many formal and informal practices and policies that demonstrated support for first-year student persistence and achievement. Prior to attending classes for the first time at LSSU, all prospective students were required to attend a formal orientation program on the campus of LSSU. At orientation, incoming students and their parents heard about university policies in LSSU student housing where all first-year students were required to reside. Housing assignments were made by fulltime university housing staff based on a "clustering system" where a student's academic major and interests were matched to determine sex-specific housing placements for all first-year students. In these settings, students were supported academically and emotionally with in-dorm computer labs, study group activities, and regular group and individual contacts made by trained student affairs' staff members who resided in the same setting.

To accommodate the university's open admission policy, LSSU administration supported an on-campus "University Learning Center" and a "University Services Program" (USP) during the seven years of this study. Though student participation in this programming was voluntary, these services did allow participating students to be academically tested, counseled, and tracked. All necessary course work in these programs was provided on-campus, in most cases by the same university faculty and staff that provided non-USP academic services on campus. To support faculty and staff participation in these programming efforts, LSSU administration provided free annual

educational workshops over the 7-year period, aimed at successful interaction with students as they learned to transition to student role expectations associated with postsecondary academics.

LSSU not only supported first-year students who needed academic remediation by providing USP services, but also supported those first-year students who prepared for postsecondary study while in high school, accepting all transfer credits earned through AP and DE participation. In addition, LSSU has served as a regional provider for postsecondary academic credits earned by qualified high school students under PA 160. By choosing to participate actively in this non-mandated state program, LSSU has demonstrated its commitment to expanding postsecondary educational opportunities in the region, accepting its role of assisting qualified high school students to optimize their academic capital (Berger, 2004).

LSSU's Involvement with Dual Enrollment Programming (1996-2003)

As a postsecondary educational institution that has consistently demonstrated its support for those programs that ease academic transitioning for students in the region, it is of no surprise that LSSU has been a full and active participant in dual enrollment programming since its implementation in 1996. For earned credit hours to be accepted as transfer credit hours at LSSU, the eligible high school student must have taken the course(s) at an accredited postsecondary educational institution and earned a final grade of C- or better in the course(s) taken. All qualifying transfer credits are accepted as nongraded credit hours so there is no alteration in the student's university grade point average.

Table 9 depicts the actual number of regionally qualified high school students who participated in DE programs offered by LSSU under Michigan Statute (PA 160), as

well as the number of first-year, full-time LSSU students who transferred postsecondary

academic credit hours to LSSU that were earned elsewhere during the same period.

Table 9.

Student Population Groups by Year Reflecting LSSU's Involvement with DE Programming*

Academic Year	No. of Regional High School Students Who Received DE Postsecondary Academic Credits from LSSU	No. of 1 st Year LSSU Students Who Transferred in DE Postsecondary Academic Credits Earned While in High School
1996 - 1997	57	37
1997 - 1998	61	27
1998 - 1999	59	31
1999 -2000	99	38
2000 -2001	61	34
2001 -2002	44	40
2002 -2003	41	27

 Obtained from LSSU's Institutional Annual Research Reports generated by the LSSU Registrar's Office (1996 through 2003).

Limitations

Limitations of this study include:

- The students in the study may not represent all DE participants, or first-year postsecondary students, in Michigan or the nation, limiting potential generalizations of the results of this study.
- Some of the study participants may be integrated into the culture of higher education in ways not reflected in the university data sets used for this study. For example, academic summer camp

experiences and other enrichment programs offered elsewhere are not identified in the LSSU data set.

- The quantitative academic measures utilized in this study do not take into account qualitative influences related to academic success for first-year postsecondary students.
- Although the use of LSSU Institutional student data is strength of this policy study, full understanding of the data may be limited based on how LSSU reported some of its annual data sets (e.g., racial groupings).

Definition of Terms

For consistency of interpretation the following terms have been defined:

Academic Acceleration.

Completion of an academic undergraduate program in less than the conventional time designed for program completion without suffering in academic work or time to receive degree (Pressey, 1949, p. 27). This type of educational approach is also known in the literature as "academic front-loading."

Academic Capital.

Also identified in the literature as a component of "culture capital" or "capital resources," these are symbolic and cumulative educationally associated assets earned from educational experience(s). Adapted from Bourdieu's Theory of Social Reproduction as a type of commodity (Berger, 2004), these resources are value determined by the individual who earns them and who can use them to persist and succeed in postsecondary education and beyond.

Academic Performance.

As an outcome measure, academic performance is based on educational functioning determined after the first year of postsecondary study at LSSU. In this study, three outcome measures used to assess academic performance were First Semester LSSU GPA, Second Semester LSSU GPA, and the Total Number of Credit Hours earned after the first semester of full-time study at LSSU.

Academic Success.

Scholastic status based on academic performance in full-time study at LSSU. Positive growth toward this goal is reflected in the student's ability to articulate, persist, achieve, and continually progress forward toward meeting academic graduation requirements for a bachelor's degree credential.

Anticipatory Socialization.

The sociological concept used to describe the process by which an individual undergoes socialization in anticipation of filling a future role. The strength of the effect is dependent on the condition of the exposure and the expectations it brings with it (McCormick, 1997).

Articulation.

Associated with educational programming, this is the process of a student's progression from one academic level to the next more complex academic level. In this study, articulation refers specifically to the transition of students from high school academics to university academics.

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Completers.

Completers are those LSSU students who completed a minimum of 12 academic credit hours for each of the two consecutive semesters in their first year of full-time study at LSSU.

Dual Enrollment.

Also identified in the literature as "dual-credit programming," this credit-earning, school-of-choice option is administered under state statute by each public school district. Dual enrollment allows eligible junior and senior high school students to enroll in a private or public college or university in the state and take classes at those institutions, earning high school credit, college/university credit or both, upon successful completion of the postsecondary academic course(s) (ECS, 2004). In Michigan, DE programming is provided under an amendment to the State School Aid Act of 1979. Identified as the 1996 Postsecondary Enrollment Options Act (P.A. 160), guidelines for implementation of Michigan's DE programming are noted in M.C.L.A. Chapter 388, sections 388.511 through 388.524 (Appendix A).

Eligible High School Student.

A public high school student in Michigan who successfully passes the MEAP (<u>Michigan Education Assessment Program</u>) test in the subject areas related to the postsecondary course(s) for which dual enrollment is desired (Appendix A).

Eligible Postsecondary Course.

An academic or career preparation course offered by a postsecondary educational institution not otherwise available as a part of the high school curriculum. Course credits must apply toward satisfaction of college degree requirements and cannot be classified as

a course in physical education, theology, divinity, religious education, or a hobby/craft. Questions regarding classification of courses as *academic* or *activity* are left to the discretion of K-12 public school administration taking into account the interests and ambitions of the eligible student. Eligible college courses must be offered during the K-12 public school district's regular academic year (Appendix A).

K-16 Educational View.

The philosophical view that supports smooth educational transitioning from kindergarten through completion of a four-year bachelor's degree. This perspective is consistent with the belief that quality educational programming is a shared responsibility at all levels of educational preparation (Basinger, 2000).

MEAP Test.

The standardized achievement test used by the Michigan State Department of Education as both a formative evaluation tool (to compare school buildings and districts at the elementary level), as well as a summative test for all 10th, 11th, and 12th grade public school students across the state. At this time, the State Department of Education in Michigan provides high school students financial incentives to pass the MEAP Test. Students pass the test at a 1, 2, or 3 point level (based on a 4 point scaling system). *Partnership*.

A collaboration that involves mutuality and equality among its participants. It can define either a relationship or a type of program based on that kind of relationship. Postsecondary Academic Preparatory Approaches.

Also referred to as "accelerated academic programs" or "credit-transfer transition programs" in the literature, these approaches assist in the transition of students from high

school into the postsecondary academic environment. These approaches are formal academic programs that assist high school students to obtain college transfer credits prior to obtaining a high school diploma. In Michigan, eligible high school students have a variety of options for enhancing their high school course work (Michigan Department of Education, 2003). LSSU recognizes two of these postsecondary academic preparatory strategies for transfer credit earned by high school students: 1) College Board Advanced Placement (AP) Program where the student earns a final AP exam score of 3 to 5 points (final exam scale is 0 to 5), and 2) Michigan's Dual Enrollment (DE) Program where the student earns a final course grade of "C-" or better (final course grade is scaled A to F). Other postsecondary educational strategies not addressed in this study include: The Virtual AP Academy, The Virtual University, The Middle College High School Program, The Tech Prep 2+2 Program, The International Baccalaureate Program (IBP) and The College Level Examination Programs (CLEP).

Postsecondary First-year Academic Student Profile.

The following are intrinsic and extrinsic factors that describe the first-year, fulltime postsecondary student. Profile factors in this study include Sex, Race, Region of Michigan Residence, Student Experience with High School, Postsecondary Academic Preparatory Programming (AP or DE), Number of Major Degree Changes in the First-Year of Full-Time Study at LSSU, and Number of Credit Hours for First Semester of Study at LSSU. These factors work individually or in combination with other factors in the pre-university academic student profile to influence postsecondary academic experiences. Postsecondary Student Graduation Profile.

Degree status as well as the number of years needed for a first-year, full-time postsecondary student to earn a bachelor's degree credential from LSSU. *Pre-University Academic Student Profile*.

Background characteristics (demographics: Sex, Race, Region of Michigan Residence) and academic experiences (High School GPA, High School Class Ranking, ACT Composite Score, participation in postsecondary preparatory programming: AP or DE) that prepare students, in varying degrees, for full-time postsecondary academics. These factors work individually or in combination with others to influence academic decisions and behaviors associated with postsecondary academics.

CHAPTER 2

LITERATURE REVIEW

The economic value for continuing education beyond the high school diploma is well documented in the literature (Kleiman, 2001; NCES, 2001). Postsecondary educational demand is partially the result of a more complex technology-dependent economy in the US that requires workers to have higher academic skills (Viadero, 2001). Today's youth and their parents hear economically-based slogans like "if you want to earn, better learn" and "more Ed, more bread", encouraging all high school students to plan ahead in preparing for their postsecondary education (Bailey, Hughes, & Karp, 2002; Grubb, 1999).

But even highly ambitious US teenagers report that they have no clear life plans for achieving their academic goals (Schneider & Stevenson, 1999). A 2004 report from the Education Commission of the States declared college enrollment in the US at an "alltime high." However, nearly one-third of all first-year college freshmen arrive on campus unprepared for the postsecondary academic challenges ahead (Kleiman, 2001; Meeder, 2004). Although a wide variety of public educational systems are available in the US today, research statistics report that many high school graduates, who desire a postsecondary degree, never realize their dreams (NCES, 2001).

The retention literature provides many reasons why degree attainment is often not realized for qualified high school graduates today. A recurrent theme focuses on the apparent "disconnect" between America's secondary and postsecondary educational systems (Bailey & Karp, 2003; Creech, 2001; Orr, 2002; Venezia, Kirst, & Antonio,

2003). In the last 10 years, this disconnect has gained the attention of educators, policy makers, and politicians who have been working, often collaboratively, to strengthen these connections with a K-16 view of educational service (Basinger, 2000; England, 2001).

The Rationale for Supporting Seamless Educational Transitions from High School to Postsecondary Academics

For educational administrators, one of the greatest challenges is to determine how to support efforts that build a strong educational foundation for student success. In the US today, too many cast doubt that secondary schools are adequately preparing students for success beyond high school (Kirst, 2000; National Commission of the High School Senior Year, 2001; US Educational Commission on the Senior Year of High School, 2002). This is not a new criticism. More than 20 years ago, Ernest Boyer concluded that the last two years of high school and the first two years of college represented an "eclectic academic muddle" that worked to the disservice of the learner and society (Boyer, 1981). An NCES longitudinal review of postsecondary education transcripts of students, who graduated between 1992 and 2000, confirmed this concern by reporting that although 70% of high school graduates in the US enroll in college right after high school, 29% of these require costly remedial education as first-year college students (NCES, 2001).

In addition to the financial costs associated with remedial education, new costs at the other end of the academic spectrum have surfaced. Many students meeting minimum academic standards for high school graduation prior to the end of their senior year are not taking full advantage of strategies that would keep them continuously engaged and

academically challenged throughout their high school years (Kirst, 2000; US Educational Commission on the Senior Year of High School, 2002). Reports reflect that those high school students who are prepared for the academic challenges of postsecondary education are too often denied the opportunity to meet them, resulting in far too many students being caught in an "academic slump" (Andrews, 2001; Creech, 2001; Crist, Jacquart, & Schupe, 2002; Crossland, 1996; Orlowsky-Yuskis, 2000; Paige, 2002; Puyear, Thor, & Mills, 2001). The indirect costs associated with such "academic slumps" are not fully addressed in the literature and cannot be easily quantified, but they are costs nonetheless. Since these costs are incurred from the actions and/or inactions related to educational programming and participation, educational administrators must be held accountable to facilitate the changes necessary to slow this critical drain of resources.

Key to meeting present and future needs for an educated workforce in American society is greater cooperation between K-12 and postsecondary institutions. Such a cooperative approach would improve academic transitioning for high school students as they prepare to move into the world of higher education (Kleiman, 2001). One way to achieve dual-institutional cooperation is to support state-wide seamless K-16 educational programs (ECS, 2000). This approach would promote an educational flow between secondary and postsecondary systems, and support academic success for all students (Boswell, 2001). In its 2000 report on educational transition programming across the US, ECS noted that some of the more progressive state-wide Departments of Education have already demonstrated that a K-16 programming approach successfully reduces "critical disconnects" between the secondary and postsecondary educational systems.

Unfortunately, states continue to remain slow in their resolve to develop workable strategies for improving disjointed educational systems (Kirst & Venezia, 2004).

Since 2000, reports published by federal, state, and other educational entities have called for more research and reporting on innovative approaches that facilitate access to postsecondary educational programming for high school students (American Association of State Colleges and Universities, 2002; ECS, 2000; Meeder, 2004; National Commission on the High School Senior Year, 2001; US Department of Education: Office of Vocational and Adult Education, 2003). These reports state that such research efforts would strengthen the literature base and the knowledge of postsecondary academic articulation in the US. Equally important is an examination of "front-loaded" academic programs and the context in which they serve to encourage postsecondary development. Two postsecondary academic preparatory strategies that will be more fully examined in this study are Advanced Placement (AP) and Dual Enrollment (DE).

An Historical National Perspective: Advanced Placement and Dual Enrollment

Programs as Postsecondary Academic Preparatory Strategies

for High School Students

Historically, American postsecondary education has not always been open to students who requested early academic articulation from high school to college (Rendon, 1990). The first efforts for accelerating student transition to college occurred in the 1860s when the Missouri school system broke with traditional age-graded classes and began providing accelerated instruction to younger students determined to be academically qualified for the educational experience (Kulik & Kulik, 1984). Front-loaded, or

accelerated, educational programming options remained inconsistent, informal, and isolated across the US until almost a century later. In 1951, the Ford Foundation sponsored two research studies to assess the status of the perceived gap between the nation's high schools and colleges. These studies concluded that some high school students could succeed in college-level academic courses while still in high school (Crist, Jacquart, & Schupe, 2002; Gehring, 2001a), suggesting educators had an obligation to direct efforts to fill the "gap" between high school and college (Bailey, Hughes, & Karp, 2002; Boswell, 2001; Brown & Amsler, 1992).

The Ford Foundation established an educational task group that took the lead in developing curricula, academic standards, and exams to meet this need. Eventually, these efforts led to the implementation of an AP Program in the US around 1955 (The College Board, 2000). The AP program was marketed as a standardized, accelerated, educational option for academically gifted high school students who needed more challenging course work than what was available in their mainstream high school curriculum. Soon afterward, the College Board officially took over the helm of the AP program, renamed it the College Board Advanced Placement Program, and managed all 11 of its initial subject areas.

A year after Harvard President James Conant publicly praised the College Board Advanced Placement Program in 1961, New York became the first state to begin contributing resources to this educational option. Since that time, the AP program has grown, meeting the academic acceleration needs for many high school students. In 1998, over one million end-of-course AP exams were administered to high school students in the US (The College Board, 2000). This academic postsecondary educational

preparatory strategy appeared to work well for qualified high school students in districts that could afford to offer it as a part of their high school curriculum

Today, the AP program continues to strive to meet its goal for excellence in education, helping high school students prepare for the transition to postsecondary academics. However, the AP experience is offered within the confines of the high school classroom, utilizes the high school academic calendar, is taught by the high school teacher, and is attended only by other secondary students. This approach has perpetuated the view that high school academics and university academics remain distinct and sequential educational entities (Midcap, 2003).

To ease this perception, national parameters were put in place so that earned AP credits based on the level of student performance on one final AP test were to be universally accepted at postsecondary educational institutions across the nation. Over time, however, these universal transfer credit practices have eroded because some postsecondary educational institutions decided it was best to make their own determinations once the final grade on the AP test was earned (Flores, 2002).

Twenty years after the inception of AP programs in the mid-1950s, the Dual Enrollment Program option emerged as another postsecondary academic preparatory strategy for high school students seeking to make an early transition to postsecondary academics. Since DE participation qualifiers were more broadly based compared with what was used in AP programming, more high school students were eligible for this state-supported educational enhancement option. The national and state climate in the 1970s supported state educational reform and with its focus on state authorization, DE fit well within this climate of change. (Bailey & Karp, 2003; Grubb, 1999). Unfortunately,

DE programming efforts in the 1970s were only offered in a limited number of states, and nationwide popularity did not gain broader appeal until the mid-1980s.

Although there is consensus about the purpose of DE as an educational enhancement tool for qualified high school students, policies that govern each state's implementation plan vary (Community College Research Center (CCRC), 2003; Puyear, 1998). Unlike the national postsecondary academic strategy of AP programming, DE programming evolved more slowly on a state-by-state basis. States such as Alabama, Hawaii, and Virginia only began their program implementation in 2001. In sharp contrast, lead states have had fully implemented programs for more than ten years (e.g., New York State's "College Now Program" and Washington State's "Running Start Program"). Today, all 50 states have either "comprehensive" or "limited" dual/concurrent state-directed educational programs. This distinction is best understood by using the criteria outlined by the American Association of State Colleges and Universities (2002):

Comprehensive state DE programs meet two or more of the following parameters: 1) students pay little or no tuition or fees to the participating college/university institution for postsecondary education courses; 2) both secondary and postsecondary academic credits can be earned; and 3) postsecondary courses are taken with few course restrictions. Such programs are found in California, Colorado, Delaware, Florida, Georgia, Hawaii, Idaho, Iowa, Maine, Massachusetts, Michigan, Minnesota, Mississippi, New Jersey, New Mexico, North Carolina, Ohio, Oregon, Utah, Washington, West Virginia and Wisconsin.

Limited state DE programs meet one or more of the following parameters: 1) students pay postsecondary class costs; 2) more academic credit restrictions are in place; and 3) criteria for postsecondary course selection are more stringent. Such programs are found in Alabama, Alaska, Arizona, Arkansas, Connecticut, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maryland, Montana, Missouri, Nebraska, Nevada, New Hampshire, New York, North Dakota, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Vermont, Virginia, and Wyoming. (p. 2) cred the p been trans cons the s Mic acac sch Mic (P.4) exp As file Dej the stat trai sma AP and DE programs are the only two high school earned postsecondary transfercredit strategies accepted by Lake Superior State University for first-year students under the present transfer-credit policy. Nationally accepted AP transfer credits have always been accepted for the few AP first-year students who chose to attend LSSU. So when DE transfer credits started to appear for first-year students in the fall of 1996, LSSU made the conscious decision to fully accept these credits from various accredited institutions across the state. To understand better the rationale for this decision, one needs to understand Michigan's Dual Enrollment Program Option and its meaning for the K-16 focused academic community at LSSU.

Michigan's Dual Enrollment Program

In 1996, the Michigan legislature formally opened the doors for qualified high school students to take college-level coursework at state colleges and universities across Michigan with the passage of Michigan's Postsecondary Enrollment Options Act (PA 160). This bill, which provides for dual enrollment programming, modified and expanded the provisions in Section 21b of the Michigan State School Aid Act of 1979. As with DE history in many other states, Michigan has no written legislative record on file that reflects legislative intent during the gestation of this statute (Michigan Department of Education, 2003).

Michigan's former State Senator George McManus from Traverse City (one of the original bill sponsors for PA160) reported that in 1995 many rural legislators in the state started talking about the need for additional educational options for educating, training, and retaining high school graduates in all districts of Michigan. Since many smaller rural school districts were not able to finance enhancement programming for their

eligible students, legislators investigated state-supported programming options. Looking at the DE educational models from more progressive states, he worked in committee for five months, preparing legislation which called for the implementation of state-wide DE programming the following year. He noted that, at that time, all 15 public institutions of higher education in the state demonstrated trends in declining enrollment. These declines were of concern since they occurred at the same time that state businesses were calling for a more educated and trained workforce.

Michigan's DE program was officially established by state statute and became effective on April 8, 1996. Initially, all 11th and 12th grade high school students were possible candidates for this postsecondary educational option, if they qualified by meeting criteria outlined in the state statute that required the student 1) be enrolled in at least one high school course at the time DE courses were taken, and 2) successfully complete requirements for state endorsement in all subject areas under the Michigan Education Assessment Program (MEAP) Test. A 12th grade student who did not meet state endorsement in all subjects would need to meet requirements for a state-endorsed high school diploma in the subject area for which the postsecondary course was desired (M.C.L.A. 388.513 section 3 part f in Appendix A).

An eligible course for this program was defined in the statute as one that is: 1) not offered to high school students by the K-12 school district; 2) offered by the K-12 school district, but not available to the students because of a scheduling conflict; 3) normally applied toward satisfaction of degree requirement at that postsecondary educational institution; 4) offered during the school district's regular calendar period; and/or 5)

off scl Aj al ра co pc ed sc m Н 20 st tł (! offered in the area of computers, fine arts or foreign language as permitted by the public school district (M.C.L.A. 388.513 section 3 part f in Appendix A).

Charges to school districts under this statute (M.C.L.A. 388.519 section 9 in Appendix A) require that districts provide: 1) annual postsecondary option information in a letter signed by the principal and disseminated by March 1st of each year to parents/guardians of all students in 8th grade and higher; 2) postsecondary academic counseling for involved students to facilitate the process; and 3) funds to pay for postsecondary classes taken at any participating public or private degree-granting higher educational institutions in the state. Under the comprehensive state statute, K-12 public school districts must pay tuition and mandatory course fees, including technology, material, registration, and any late fees charged by the postsecondary institution. Hówever, K-12 school districts are not required to pay transportation, parking, books, or activity fees associated with postsecondary educational programming. Additionally, the statute provides the district with the option to accept students who do not qualify under the statue, but who, in the K-12 district's view could best be served under the program (M.C.L.A. 388.513 section 3 part f in Appendix A).

The state statute mandated public secondary educational institutions to function in full compliance with PA 160 as a postsecondary school-of-choice educational option. In contrast, postsecondary public educational institutions in Michigan were not mandated to participate in the program under the statute. Accordingly, DE programming has been viewed differently by various postsecondary educational institutions across the state. Some postsecondary public institutions have never participated in PA 160, others have limited their participation, and the remaining fully participated in PA 160 from the start.

According to administrators at Michigan's State Board of Education, there have been no formal evaluation studies conducted in Michigan on postsecondary institutional participation beyond summaries of annual head counts and billing notations (Michigan Department of Education, 2003).

The Michigan legislature passed additional amendments to the original Dual Enrollment Act (PA 160) over the subsequent four years since it was introduced in 1996. The original bill was tie-barred to PA 159 and PA 161, effective July 1, 1996. This change required additional notification of DE programming options by school boards to 8th grade students and their parents within the public school district. It also permitted 10th grade students to take the qualifying MEAP Test should they wish to participate in DE programming earlier in their high school career. In 2000, another amendment to the original act expanded eligible courses to include virtual educational programming courses as well as courses in career, vocational and technical education (PA 258).

The national debate on the costs and benefits of non-traditional educational programming, such as DE, has found its way into state and local politics. Presently, Michigan funding for K-12 public education is based on a student capitation system without regard for costs of associated services not linked directly to student numbers (e.g., technology utilization costs). As Michigan's public school districts report a decline in student numbers, there is a corresponding reduction in the state's overall financial support for participating K-12 school districts. This pattern is complicated by state statutes that limit the school district's ability to seek other revenue sources for meeting educational financial shortfalls (Michigan's Proposal A, 1994). Finally, unlike the financial incentives provided to eligible high school students for their participation in

i a a COL COD imp Perfc Mento Michigan's Dual Enrollment Program, there is no financial incentive offered to educational institutions for their support of this program at this time. For these reasons, school-of-choice options, like DE, are attractive to students and their parents, but may be perceived adversely as a financial drain by K-12 school district personnel and/or postsecondary administrators.

Ironically, these educational concerns come at a time when states, such as Michigan, are also trying to comply with the federal "No Child Left Behind" initiative (20 USCA s 6301), which mandates increased accountability, a K-16 view for student performance, and greater academic choice for students and their parents (Meeder, 2004). In this educational context, it is imperative that educational resources be appropriately placed in state educational programs that have documented benefits. Michigan's DE initiative evolved from a state statute in 1996 and has yet to be evaluated for its benefits as a tax-supported postsecondary academic preparatory option. The time is right to begin a serious evaluation of this educational program so its benefits can be fully realized.

Anticipatory Socialization: A Conceptual Framework in

Support of Dual Enrollment Educational Programming

In 1968, Robert Merton reported that "anticipatory socialization" is a necessary component for successful educational preparation of professional students. He contended that an individual's socialization to a higher educational status was as important as the cognitive and psychomotor skills needed by that individual in the performance of tasks associated with such a role. As a research sociologist, much of Merton's initial work focused on the socialization of medical students and their success

in adjusting to their future role as physicians. He examined how medical students were able to draw on cues about the implications of their present training activities for their future status as physicians, and how they would adopt orientations consistent with that perception.

Other research studies on the concept of anticipatory socialization have helped to broaden the basic understanding of role adoption for individuals in a variety of other disciplines, including higher education (Bess, 1978; Clark & Corcoran, 1986). Although educational studies have primarily focused on professional identity and career development, the potential for applying this frame to other socialization situations in higher education is appealing. Anticipatory socialization may serve as a valuable framework from which to explore strategies that assist high school students as they socialize, via dual enrollment programming, into the postsecondary academic student role.

In Michigan, DE programs bring eligible high school students into participating postsecondary institutions with full access to postsecondary academic resources, optimizing academic capital. Under this program, requirements and expectations for the participating high school student in the eligible postsecondary course(s) are equal to those for all full-time postsecondary students enrolled in that course. As guaranteed by state statute, all eligible college-level courses are to be taken at certified postsecondary institutions, offered according to the university calendar, taught by postsecondary faculty, and taken with other university/college students (Appendix A).

For these reasons, DE programming fits well within the model of anticipatory socialization. It attempts to ease academic transitions for the high school student who

has one foot solidly placed in the world of high school, while the other is gaining a foothold in the world of postsecondary education. Since Michigan's state mandate for DE requires that high school participants receive postsecondary educational counseling as a part of their program, these students are guided through their initial exposure to Michigan's postsecondary education system. This guidance may increase student confidence for navigating the transition from high school to postsecondary academics (Astin, 1993; Bailey, Hughes, & Karp, 2002; Catron, 2001).

In sharp contrast, as a postsecondary academic preparatory strategy the Advanced Placement Program does not fit as well within the model of anticipatory socialization. Although AP does provide exposure to college-level academics prior to full emersion into the academic role of first-year, full-time postsecondary student, this strategy is packaged in a different way by the high school district (that may or may not be a certified institution), offered according to the high school calendar, taught by high school teachers (who may or may not be certified to teach AP classes), and taught only to selected secondary public school students. Unlike DE programming, earned college transfer credit for AP courses is based on a single score from a single test paid for by the student once all course content is completed. Additionally, unlike DE programming in Michigan, participation in AP programming does not require a supportive postsecondary academic counseling component to assist the student in the transition from high school to postsecondary academics.

A study of postsecondary educational expectations by McCormick (1997) reported that the strength of the anticipatory socialization effect for students moving into new academic roles after high school is directly related to the location of that student's

ex wi str rec stu ini stu (Ke Via scho state acac rese prog of in level cours assura likelih experience. Because DE programming occurs on the site of a postsecondary institution with all its resources readily available, it does more than other postsecondary academic strategies that do not provide this same context for learning. As Michigan's DE Program requires postsecondary guidance for all high school participants, the role of "college student" evolves in a different way when compared with other postsecondary credit based initiatives, providing for a more authentic college-level experience (CCRC, 2003).

Rationale Supporting High School Student Participation in

DE Educational Programming

If the senior year of high school has underutilized its potential for improving student preparation to enter and succeed in postsecondary academics as some claim (Kellogg, 2001; Kirst, 2000; National Committee on the High School Senior Year, 2001; Viadero, 2001), then it is important to identify cost-effective strategies that can help high school students optimize their academic capital. Dual enrollment programming is one state-endorsed venue for high school students to consider when exploring postsecondary academic preparatory options in high school. Although there have not been extensive research studies reported in the literature to address the impact of participation in DE programming for high school students, small isolated studies have reported some benefits of involvement (Windham, 1997).

An accredited educational establishment is required to function at all times at a level that meets or exceeds a minimal set of academic standards (ECS, 2004). Since DE courses are taught at accredited postsecondary educational institutions, there is an assurance that such courses are taught at a college-level. This would increase the likelihood credit hours earned through DE programming would be readily accepted as

p C ¢ ir C in CC st an pa co Po DE col adj acc part tuiti Not posts postsecondary transfer credits elsewhere (with less concern for testing standards), when compared to those postsecondary academic preparatory strategies where such assurances cannot be made (Ganeshananthan, 2000; Windham, 1997).

Under the theory of anticipatory socialization, students exposed to a life situation in a realistic context prior to full immersion into that life situation gain a greater confidence in their abilities over time, and function more effectively when full immersion into that environment is realized (McCormick, 1997). Being directly involved in contextual learning can help to demystify the postsecondary academic experience for students, providing tools that can help ease the stress associated with exiting the familiar and secure environment of high school academics (Amenkhienan, 2000).

According to advocates, the high school student, his/her parents, and those in the participating educational institutions all benefit from sharing academic expectations communicated during the high school student's DE programming experience. Postsecondary courses are provided in a postsecondary semester context, which exposes DE students to a similar academic experience they will have as first-year, full-time college students. The part-time DE postsecondary context also offers parents the adjustment time needed to help prepare them for changes in their parental role that accompanies a teenage child's transitioning into postsecondary academics.

DE participants expand their culture capital and accrue fiscal benefits from participation in this academic programming option. Under Michigan State Statute, tuition costs for this program are the responsibility of the student's K-12 school district. Not only does the student and his/her family save educational costs early in postsecondary educational programming through DE, but there is also the potential for

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additional savings if this early postsecondary academic start results in a shortened time to attain a degree (Marshall & Andrews, 2002).

In similar fashion, high school student participation in DE programming serves to expand the high school curriculum without expanding the high school budget. This benefit is especially appealing to K-12 school districts with limited resources for educational enhancement services, or when only a small number of the district's eligible high school students are involved (ECS, 2004). With DE participants taking classes on the postsecondary campus, some high school classes may decrease in size, affording high school teachers more time to work directly with "academically needier" students who remain in the high school classroom (National Commission on the High School Senior Year, 2001).

DE programming has the potential to increase teacher resource sharing as partnerships form between secondary and postsecondary educational institutions who share eligible high school students (Brown and Amsler, 1992). Through these partnerships, teachers from secondary and postsecondary settings would become better acquainted with the K-16 academic model, increasing the possibilities of bridging transitional gaps with articulating policies and practices (Gomez, 2001). Unique to Michigan's DE Program, mandated postsecondary educational counseling works in tandem with secondary counseling efforts to support eligible high school students in their transition from high school to postsecondary academics. A positive transitional experience can increase student motivation and provide support that encourages student retention (Tinto, 1993), especially for those students who might not have otherwise considered postsecondary academics as an option after high school.

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DE programming also has the potential to act as a catalyst for the development of a healthy competition between high schools and postsecondary institutions in the state. At a time when state administrators are looking to increase the number of college graduates in Michigan (Cherry, 2004), a positively competitive academic environment could result in more rigorous academic coursework at both secondary and postsecondary levels. This potential benefit is important since there is evidence to suggest that the rigor of a student's high school curriculum is a strong positive predictor for postsecondary graduation (Adelman, 1999).

Rationale against High School Student Participation

in DE Programming

When a 2003 law in Florida allowed high school seniors to forego their last year of high school and receive the high school diploma after the 11th grade, many educators responded with frustration. Under this option, high school students in Florida can graduate with fewer high school credit hours if they "double-up" on English and foreign language credits in their junior year of high school. Proponents of this strategy believe that educational compacting is good for student learning because students reach educational outcomes more quickly. Opponents who view DE as another type of educational compacting are concerned that the essence of learning can be lost once the focus shifts from educational quality to how quickly students graduate (Evening News, 2003).

Some colleges and universities do not automatically accept college transfer credits earned by high school students, even when the law provides for it (Putnam, 2002).

• a qı th 10 SO by **p**05 fear inac Well Because many DE state statutes do not mandate postsecondary institutional participation, some colleges and universities provide greater scrutiny before deciding to accept these transfer credits. Many have voiced concern that high school DE participants are "double-dipping" the educational system by counting an eligible postsecondary class twice (earning credit hours for both high school and college credit) without performing twice the work. These critics believe that such a practice inadvertently sends the wrong message to students early in their postsecondary career (Jones, 2002).

The quality of educational credits earned by high school students under DE is crucial when it comes to the decision of whether or not to accept these as college transfer credits. Many high school students who qualify for DE programming appropriately select introductory first-year postsecondary courses only to find that these courses are required for all college students on campus. Accordingly, introductory classes on college campuses tend to be much larger in size and assigned to adjunct faculty, or teaching assistant staff, instead of seasoned university faculty (Reisberg, 1998). Additional questions related to the quality of DE courses focus on states outside of Michigan where this program can be taught in the high school setting (as well as in other off-campus locations) by non-postsecondary faculty. This variability in delivery raises doubts in some minds as to how a course taught this way would compare to the same course taught by college/university faculty members with full access to the academic resources on the postsecondary campus. Still others question the quality of DE courses more broadly, fearing that the presence of high school students in college-level courses may inadvertently work to compromise the rigor of the college-level course for the teacher as well as for other college students enrolled in that course (Clark, 2001; ECS, 2004).

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Aside from concerns about course quality, opponents of high school DE programming have also expressed concerns about high school students being developmentally unprepared to take on college-level work (Amenkhienan, 2000; Clark, 2001). Those who focus on the developmental needs for high school students are quick to assert that there are many reasons that the AP Program for postsecondary educational enhancement is a better and more suitable choice when compared with DE programming. First and foremost, AP programs were created to meet postsecondary academic enhancement needs within a developmental context designed for high school students (The College Board, 2003). By providing familiar boundaries for high school students, it allows them to focus more on postsecondary academics and less on other postsecondary campus distractions. Additionally, when participants purchase the final exam for AP classes, some believe students may be more vested in their efforts with these courses and, therefore, more likely to be motivated toward achieving academic success.

Other opponents point to the additional stresses that participation in DE programs can bring to the cognitively adequate, but developmentally less mature high school student (Kirst, 2000). Since most high school DE participants attend postsecondary educational programming on a part-time basis, acclimation to postsecondary expectations can be problematic. Additional day-to-day concerns for transportation, scheduling outof-class requirements, and functioning under two distinct academic calendars can cause undue stress for the high school student, especially if adequate support systems are not in place during this important period of academic transition.

Participation in DE programming brings with it additional concerns for high school and postsecondary educational institutions alike. Because both types of

institutions can be equipped to provide postsecondary academic enhancement services to the same eligible high school student, they may focus more on competing against one another instead of maintaining a collaborative view which should be focused on what is best for the qualified student. If such a negative competitive climate is established, future collaborative efforts on other educational projects may be placed at risk. Additionally, high school students of minor age create new and different liability concerns when they attend educational programming on the college campus. Beyond new concerns for the institution, there is also the concern for the minor-aged student as well as the taxpayer who ultimately pays the costs for their additional liability coverage on the college campus (Bell, 2004).

In effort to increase accessibility to DE programming, many state statutes provide for state-tax dollars to subsidize the costs associated with program participation (ECS, 2004). Some opponents point to the fact that such subsidies create an "academic entitlement" environment, which can work against the high school student's motivation to persist with DE enhancement programming. Likewise, if high school students are illprepared academically but still manage to obtain a low but passing score on the test for DE eligibility, there is an added potential risk for student dropout or failure in DE programming. Such comments raise concerns that limited state tax dollars continue to be mobilized for DE programming which has yet to demonstrate its benefits through research study (Orr, 2002).

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Academic Student Success Measures

Prior to student admission into full-time postsecondary educational programming, members of the admissions department at competitive institutions of higher education evaluate a variety of factors that, in their view, reflect the applicant's potential for success in postsecondary education (Beecher & Fischer, 1999; Sedlacek, 2004; Tam & Sukhatme, 2004). This evaluation is conducted to select students best suited for the academic rigors required to earn a degree from that institution. Although a variety of student data sets are utilized during this process, the ultimate decision generally rests on how successful the applicant was in high school and how well that student performed academically on a set of traditional measures.

College administration teams tend to view postsecondary student success in similar terms to students and the general public by focusing on the long-range view of degree attainment (Miller, 2005; Hossler & Anderson, 2005). But outcome measures, like degree achievement rates, do not provide the full picture needed to accurately assess student achievement in the short-term. Looking at process measures provides a direct reflection of how students are achieving academically at various points in their academic programs, mirroring an indirect measure of how the institution's degree programs are meeting their obligations to facilitate that achievement. For this reason, it is essential that postsecondary institutions have an effective formative evaluation plan with set benchmarks in place to assess the educational programs they provide (Astin, 1991; Miller, 2005).

There is strong evidence that the student and the educational institution both benefit when a student's baseline academic data are compared with data obtained after the first year of postsecondary educational programming (Astin, 1993; Bailey & Karp, 2003). Administrators in higher education have shown a renewed emphasis on the first year of college for a variety of reasons, such as declining high school enrollments, intensification of recruitment of prospective freshman, and additional efforts made by universities to curb attrition rates (Hossler & Anderson, 2005). The freshman year literature consistently reports that the student's first year in postsecondary education is the most valuable one for predicting long-term success (Adelman, 1999; Crissman Ishler & Upcraft, 2005; Gerken, Volkwein & Fredericks, 2000; Noel, Levitz, & Saluri, 1985; Pascarella & Terenzini, 2005; Upcraft, Gardner, & Associates, 1989), a fact supported in the retention research literature as well (Brawer, 1996; Cambiano, Denny, & DeVore, 2000; Noel, Levitz, & Saluri 1985; Pascarella & Terenzini, 2005; Tinto, 1993).

It has been said that valid and reliable tools used to assess student success in college should be easily retrievable with commonly accepted benchmarks that gauge persistence, progression, and retention in the course of pursuing a postsecondary degree (Atwell & McLeod, 1994). Today, some postsecondary researchers are exploring new venues for expanding the toolbox used for postsecondary student assessment, especially as it relates to student success in the first year of college. Their hopes are centered on finding new valid and reliable non-cognitive measures that can more accurately assess the diverse populations commonplace in our US educational system today (Sedlacek, 2004). These researchers seek to establish a credible data base that effectively challenges primary dependence on traditional performance indicators, such as student grade point

a١ sc ar 2(lit as pr He 19 bo in 198 con firs pers con stud subs comr selec average (Astin, 1993; McKenzie & Schweitzer, 2001; Peng, 2003) and standardized test scores (Astin, 1993; Ting, 1997).

But, as an interval measure, a student's grade point average (GPA) in high school and college continues to be considered the "lingua franca" (Pascarella & Terenzini, 2005), or the "gold-standard", for measuring achievement in the world of education. The literature review has shown that over the years, student GPA has been effectively utilized as a benchmark in different ways, both as a traditional outcome measure and as a predictor of degree attainment (Adelman, 1999; Astin, 1993; Atwell & McLeod, 1994; Henderson & Masten, 1959; Kanoy, Wester, & Latta 2002; Pascarella & Terenzini, 1991). Additionally, the GPA has served as an effective formative measure with value as both an individual score and as an overall cumulative average, gauging student progress in retention throughout the course of academic programming (Noel, Levitz, & Saluri, 1985; Peng, 2003; University of Arizona, 1999).

In a similar way, pre-college standardized test scores (e.g., SAT and ACT) continue to be accepted at many universities as valid and reliable measures for predicting first-semester postsecondary GPA (Gehring, 2001b) and a student's postsecondary persistence (House & Keeley, 1997). Though repeated measures across populations continue to support these standardized test scores as statistically significant, increasing student diversity across culture, sex, and socioeconomic status raises questions as to the substantive significance of these scores for today's student (Hossler & Anderson, 2005).

Other indicators that reflect the student's goal orientation, motivation, and commitment to postsecondary academics focus on a variety of issues related to student selection of an academic major (Bouffard, Boisvert, Vezeau, & Larouche, 1995;

Crissman Ishler & Upcraft, 2005). In and of itself, the actual selection of an academic field of study in college "exerts a contextual influence" on a student's academic motivation and engagement behaviors (Pascarella & Terenzini, 2005). Academic advising and other individual and group activities associated with declaring a degree major in postsecondary education serve as catalysts for student integration in academics (Guerrero, 2001; Ting, 1997), strengthening academic identity and promoting student retention (Kanoy, Wester, & Latta, 2002; Kuh & Love, 2004; Osborne, 1997; Tinto, 1993).

While some researchers have investigated assessing postsecondary academic major decision-making for its role as a predictor for career and economic achievement (Pascarella & Terenzini, 2005), others have looked at the negative impact frequent degree major changes create for the student focused on earning an academic credential (Mitchell, Goldman, & Smith, 1999; Osborne, 1997). A 1995 study by Bouffard, Boisvert, Vezeau, and Larouche reported that postsecondary students who made frequent declaration of major changes, had matriculation difficulties and were the least likely to persist in meeting their established academic goals. This idea adds to an earlier study by Meulemann (1992) who reported that the risk of a student changing a major course of study is highest in the second semester of the first year of academic study; a time when change can threaten student confidence and persistence in the education process. Although some research has addressed degree major decision making in the context of specific types of postsecondary courses and learning opportunities selected by students in their first year of college (Pascarella & Terenzini, 2005), others have looked more closely at the number of course selections students make while progressing towards a bdchelor's degree credential (Astin, 1993).

Summary

Historically, dual enrollment as a postsecondary academic preparatory strategy for high school students emerged in the US in the 1970s. As a postsecondary preparatory academic strategy, it has served as an important vehicle for increasing secondary student access to postsecondary academics. Over the years, various states developed their own dual enrollment statutes to provide guidelines for DE program participation. It was not until 2003 that all 50 states had statutes for this postsecondary preparatory academic option (ECS, 2004). Although there is variability among state statutes, each one is rooted in the belief that all high school students need to remain academically engaged and working to their full-potential during the final years of high school. This is important since the intensity and quality of a student's high school curriculum is commonly recognized as a strong positive predictor for bachelor's degree attainment (Adelman, 1999).

Dual enrollment is a postsecondary preparatory strategy focused on academically enhancing high school curricula and creating a smooth transition into the academic culture of the university. Viewed within the framework of anticipatory socialization, DE offers eligible postsecondary-bound high school students a preview experience of academic expectations that will confront them after high school. Since it is often postsecondary educational programming that ultimately helps the student realize their full economic potential as a citizen and taxpayer, it is important that all eligible high school

students be provided access and an early guided exposure to the cultural expectations that await them in postsecondary academics.

To help foster this realization, educational institutions at all levels need to work together to reduce the "disconnect" between secondary and postsecondary educational institutions (Basinger, 2000; Creech, 2001). Federal reports on the status of secondary education in the US today identify a common series of recurrent disruptions in the flow of educational transition, adversely affecting student achievement (National Commission on the High School Senior Year, 2001; US Education Commission on the Senior Year of High School, 2002). These reports recommend that disjointed transitions be overcome through greater collaboration promoted by a K-16 educational model. Such a view establishes a collaborative educational environment where all academic transition programs that demonstrate effectiveness would be welcomed.

Unfortunately, "disconnects" can also result from simple wording in a state statute intended to create educational opportunity and cooperation. As an example, the language in Michigan's 1996 Dual Enrollment Statute (PA 160) mandates secondary state educational institutions to participate in such programming but does not require postsecondary state educational institutions to do the same. State educational funding based on a capitation formula (which is the primary revenue source for both K-12 and postsecondary educational programming in Michigan) has been steadily decreasing over the last seven years. With this steady decline in funding there has been greater scrutiny of all educational programming services in the state. Coupled with the greater demands from state and federal agencies for program accountability, many postsecondary educational institutions now question the logistics of continuing support for non-

mandated, unevaluated educational efforts which put programs like dual enrollment at risk.

Because the national literature base on the impact of dual enrollment participation is relatively new and thin, first-level descriptive and correlation studies are needed to help develop an understanding about the role such educational transition programming plays for students after matriculation to the university. As with other states, Michigan's Department of Education has yet to develop a comprehensive plan for evaluating the impact of participation in Michigan's Dual Enrollment Program. An initial study of postsecondary academic measures obtained from a small student group that participated in this program while in high school, would help broaden the understanding about how such participation translates to first-year postsecondary academic success.

This study helps to define first-year postsecondary students who participated in dual enrollment while in high school using the single case of Lake Superior State University. It explores how these students performed on a set of traditional institutional measures that reflect academic progression toward bachelor's degree attainment. Additionally, this study compares first-year LSSU dual enrollment program participants with a randomly selected sample of first-year postsecondary LSSU students who did not elect to participate in a postsecondary academic preparatory program while in high school. In efforts to see the impact of participation in dual enrollment programs within a broader academic context, the final step in this study reports how a small population of first-year, postsecondary LSSU students who selected Advanced Placement as their postsecondary preparatory strategy while in high school, performed on the same measures.

It is important for academic policy purposes, that educational administrators at all levels have their eyes open to those academic opportunities that may facilitate student success in the early years of postsecondary education. This case study will produce a series of academic snapshots from the first seven-year period of dual enrollment programming in Michigan as demonstrated at Lake Superior State University. These snapshots will expand the present view of dual enrollment as a state-supported postsecondary preparatory strategy by exploring its impact on first-year academic performance at LSSU to the benefit of students, the university, and the State of Michigan.

CHAPTER 3

METHODOLOGY

In 1996, legislators in the State of Michigan approved a dual enrollment state statute (PA 160) that increased access to colleges and universities for eligible high school students around the state. This part-time school-of-choice option differed from the nationally-based Advanced Placement Program already established in many Michigan high school settings in three ways related to academic programming: 1) it broadened high school student eligibility for postsecondary educational enhancement; 2) it was provided within the context of existing college classes on college campuses; and 3) it required a postsecondary academic counseling component for the participating student.

Dual enrollment provides a "real-life" guided university experience to eligible high school students. As a state-supported program, it is intended to help ease the academic transition for students as they move from high school to university. Viewed under a model of anticipatory socialization, participation in this program provides preuniversity students an early introduction to the roles and expectations of postsecondary academics prior to full emersion after high school graduation. Although this educational option has been utilized across Michigan (and at Lake Superior State University) for the past nine years, the impact of participation in this program has yet to be formally evaluated at either the state or local level.

Case study research is a type of exploratory research. It can be used to identify complex relationships between different experiences and multiple outcome measures for a given condition (Burns & Grove, 1999). Though not directly applicable to other

settings where the same condition occurs, a case study provides basic insights that can be used to "set the stage" for future research, strengthening the literature base while providing information to assist in decision making and policy development. In an effort to understand DE and its influence on academic performance for those first-year LSSU students who participated in such programming in high school, a case study design was selected. This chapter reviews the methodology used in the study and includes discussion about the conceptual framework and study variables, the research questions, the study participants, data collection techniques, rationale for secondary data analysis, and specific methods of analysis for each question under review.

Characteristics of the Conceptual Framework and Study Variables

The framework for this study assumes that students come to Lake Superior State University with the intent to learn and progress toward achieving an academic credential. It is also assumed that postsecondary student learning develops from the meanings made in the context of experiences that begin when students first enter the postsecondary setting. The pre-university student comes into the university setting with an array of unique characteristics that include demographic variables (e.g., Sex, Race, Region of Residence), measures that reflect secondary level academic ability (e.g., High School GPA, High School Class Rank and ACT Composite Score), and high school postsecondary academic preparatory experiences (e.g., DE or AP programming), which combine to influence academic motivation in first-year, full-time university study (e.g., first-year retention) and academic achievement (e.g., LSSU GPA and number of credits hours earned which demonstrate progression toward earning a bachelor's degree

credential). Each step in the process influences the continuing development of the student's academic identity beyond the pre-university profile.

The institutional context of the university affects how students choose to engage in academic activities while in the university setting (e.g., enrolled number of credit hours taken the first semester of study and declaring a major field of study). To foster success in all its first-time students, most universities require students to attend a formal group orientation session on the university campus prior to the start of their first full-time academic semester. This is done in part because universities recognize that individuals perform more to an expected student norm when they are formally "oriented" to it.

Michigan's DE Program takes this orientation concept a step further. Through DE, eligible high school students are provided a part-time semester-long experience in postsecondary academics on the university campus. This guided participatory postsecondary experience helps DE students derive meanings about postsecondary academics first-hand before earning their high school diploma. It is assumed that this form of anticipatory socialization enlightens these high school students to the role they will eventually play as university students, by providing early exposure to build their academic confidence and self-direction for the period of time when they become immersed in first-time full-time postsecondary study after high school.

Outcome measures are a mechanism used to help determine whether or not a student has met a desired level of academic achievement. Student learning is best assessed formatively with measures that are commonly accepted as valid and reliable tools for academic evaluation (LSSU GPA and Number of Credit Hours Earned in the First Semester of Postsecondary Academics). In this study, all participants started their

first year of full-time postsecondary academics at LSSU the same year they graduated from high school. In addition, they all completed their first two consecutive full-time semesters of postsecondary academics at LSSU. These factors may work individually or in combination to predict academic performance (LSSU GPA and the Number of Credit Hours Earned) in the student's first year of university study.

Figure 1 provides a conceptual model that summarizes the literature. Though not a path analysis, it identifies the variables under study in relation to a high school student's participation in dual enrollment. As a program intended to optimize a student's academic capital (Berger, 2004), DE provides a multi-phase, variable, participant observer approach within the dynamic institutional context of postsecondary academics. Although DE programming in Michigan provides the eligible high school student with many participation options (e.g., one class vs. multiple classes, one experience vs. multiple experiences); this study is focused on the impact of participation in DE on a student's first-year academic performance at LSSU.



Figure 1. Conceptual Model for Academic Success Among High School Students who Utilized DE as their Academic Postsecondary Preparatory Strategy while a High School Student (adapted from Terenzini & Associates, 1995)

Research Design

As an exploratory method that usually includes the element of time, case study analysis is dependent on the thorough and detailed examination of a variety of factors that may affect the condition under study (Burns & Grove, 1999). Well-designed case studies can serve as good sources of descriptive information that can be used as evidence to support or refute theories about a given condition. Because case study analysis is dependent on the circumstances of the particular case under review, it requires precise specifications of situational characteristics. As a method, case study has the potential to generate information that can influence policy directives, developing new hypotheses to facilitate future research study.

Selection of Study Participants

Participants in this study included all students from the state of Michigan who attended their first year of full-time postsecondary academics at Lake Superior State University the same year as their Michigan high school graduation (between fall semester, 1996 through fall semester, 2002). The start year of 1996 coincides with the implementation of Michigan's Dual Enrollment Statute. Demographic and academic data were examined only for students seeking a bachelor's degree, and only those who successfully completed the first two semesters of their first year of full-time study at LSSU. Initially, a total of 2,031 qualified students were classified into four mutually exclusive groups based on high school postsecondary preparatory status (DE only, AP only, DE and AP, and neither DE or AP).

First-year, full-time students who matriculated to LSSU with transfer credit awards were identified as having either DE credits (N = 198), AP credits (N = 44), and both (N = 6). The researcher eliminated the six study subjects who had earned transfer credits from both DE and AP programs because of the ambiguity that would be introduced in interpreting the study results. This step left 192 DE students and 38 AP students in two separate postsecondary preparatory strategy groups and 1,801 first-year, full-time LSSU students that did not begin LSSU with transfer credits from participation in a postsecondary preparatory strategy while in high school.

From this group of 1,801 students, the researcher randomly selected 250 study subjects who would make up the third group of control participants. At this stage, there were 480 study subjects in three groups: DE students (N=192), AP students (N=38) and control students who used no postsecondary preparatory strategy while in high school (N=250). The next step required identifying educational program "completers" who, according to LSSU guidelines, took a minimum of 12 credit hours for each of the first two semesters in their first year of full-time study.

With the assistance of staff in the LSSU's Registrar's Office, student records were individually evaluated to determine the standing of the 56 students in the subject pool of 480 that had .00 LSSU GPA's noted in either the first or second semester of their first year of postsecondary study. This was done to distinguish between those who earned their .00 LSSU GPA academically with "F" grades from study students who were awarded that GPA by default due to "a full academic drop in the first week of the semester" or "no matriculation to classes that semester". This analysis showed that twenty-one of the 56 students had earned their .00 GPAs for the semester under question,

so these 21 were retained in the subject pool of first-year "completers". The remaining 35 students who did not earn their .00 LSSU GPA were identified as "non-completers." Since first-year persistence was a qualifier for subject group membership, thirty-five subjects were dropped from the subject pool after their status was verified a second time through LSSU's Housing records. This step left a subject pool consisting of 445 "completers" who were either DE participants (N = 180), AP participants (N = 38), or control participants (N = 227).

All data sets for each of the 445 students were complete except for two of three areas that represented high school academics. One DE participant did not have an ACT composite score on the LSSU student admission record. Further investigation revealed that this student did not take the ACT or any standardized test prior to admission to LSSU the fall semester following high school graduation. Also, there were eleven other students (seven control students and four DE students) without high school percentile class rank data available on their university computer records. Further investigation into each subject in this subset revealed that all were either home-schooled or from Michigan school districts that did not rank their high school graduates. After consideration for the type and amount of missing data, the researcher decided that there was not enough evidence to warrant further removal of study subjects, so the 445 subjects were retained.

In summary, this study examined 445 students in three mutually exclusive postsecondary preparation groups: 1) DE student population group (N = 180); 2) AP student population group (N = 38); and 3) a randomly selected sample of control group students who did not select a postsecondary preparatory strategy while in high school (N = 227).

Data Collection Techniques

Two different data sets were utilized for this study using Lake Superior State University's computerized Student Information System (SIS): (1) data obtained from each first-year student's "admission application file"; and (2) data obtained from each first-year student's "academic persistence file." All data were transcribed from the SIS Program into an Excel program and eventually transformed by the researcher into SPSS format for analysis. In addition to describing the first-year student cohort at LSSU demographically, this study provided descriptive snapshots of academic progress for all students who entered LSSU the same year as their high school graduation, between the fall of 1996 through the fall of 2002. Once academic snapshot information was evaluated for the DE student cohort, findings were compared with the other first-year student groups at LSSU.

Arrangements for Data Collection

Archival data were reviewed for this retrospective study after approval was received from Lake Superior State University's Institutional Review Board (IRB) and Michigan State University's Committee on Research Involving Human Subjects (UCRIHS). Appropriate safeguards were put into place as directed by both university institutional research boards to safeguard all the student information obtained for data analysis in this study. These safeguard remained in place until full completion of the project. Rationale for Using Secondary Data Analysis in this Study

In any research study, it is important that the researcher select the best data available based on the researcher's perception of the quality and relevancy of that data (Burns, 1999). Because the goal of the study was to describe and compare demographic characteristics and academic performance measures for selected LSSU students, the logical research approach was to use LSSU's archival student information data. There was greater accuracy in both the collection and reporting of LSSU student demographic and academic performance data since they had been managed the same way, using the same format, by the same persons, in the same university office over the duration of the seven-year study (1996 through 2003). Additionally, most of the raw data used in this study were retrieved through admission and persistence data sets from LSSU's computerized Student Information System (SIS). SIS data was available for all first-year students who graduated from a Michigan high school the same year they enrolled for their first year of full-time postsecondary study at Lake Superior State University.

Method of Analysis by Research Question

Question 1

Does the pre-university student profile (Sex, Race, Region of Michigan Residence, High School GPA, High School Class Rank, ACT Composite Score) of first-year LSSU students who selected one of two postsecondary academic preparatory strategies while a high school student (Dual Enrollment or Advanced Placement) differ from first-year LSSU students who did not select a postsecondary academic preparatory strategy while a high school student?

All pre-university LSSU student demographic data were collected via computer using information provided in each subject's original admission application and stored in the university's SIS files. The demographic data sets in the "student admission file" included Sex (categorized as Male or Female), Race (categorized as White, Native American, or Other/No Response), and the Student's Region of Michigan Residence (categorized as Upper Peninsula or Lower Peninsula). These data were grouped in relation to each student's high school postsecondary preparatory program status (AP, DE, or neither AP or DE). Other pre-university profile factors of interest included common measures used by the LSSU admission's team that indicated the applicant's academic potential for success at LSSU (High School GPA, High School Percentile Class Rank and ACT Composite Score).

An analysis of student demographics began with recoding all categorical variables into dummy variables. For categorical data analysis, basic descriptive analysis, frequency tables and chi-square measures were used. Chi-square was selected to determine whether the proportion of categorical groupings were the same for the three mutually exclusive groups of students in the subject pool (postsecondary preparatory participants who utilized DE programming during high school, postsecondary preparatory participants who utilized AP programming during high school, and participants who did not use a postsecondary preparatory program during high school).

A one-way ANOVA was conducted to assess the relationship between postsecondary preparatory status (DE, AP or No Preparatory Program) and student entering characteristics in more detail. Interval level admission data (High School GPA, ACT Composite Score and High School Class Rank converted by the LSSU Institutional

Research Office into a percentile ranking score) were analyzed using one-way analysis of variance with postsecondary preparatory status as the between-groups independent variable.

Question 2

Does the first-year academic university student profile (First Semester LSSU GPA, Second Semester LSSU GPA, Number of Enrolled Credit Hours First Semester, Number of Earned Credit Hours First Semester, and Number of Degree Major Changes in the First Year) for LSSU students who selected one of two postsecondary academic preparatory strategies while a high school student (Dual Enrollment or Advanced Placement) differ from the first-year academic university student profile for LSSU students who did not select a postsecondary academic preparatory strategy while a high school student?

All first-year student academic university data were collected via computer using information provided directly from each subject's LSSU "student persistence file". Three different academic data sets were utilized to investigate the question under study. The first variables of interest were the student's First Semester and Second Semester LSSU GPA (interval level data scaled from .00 to 4.00). These measures were used as outcome criteria for this question since GPA continues to be viewed as the "gold standard" for assessing academic success by both external and internal stakeholders at LSSU. To gain the most from the LSSU GPA variable, the researcher opted against using cumulative first-year LSSU GPA as a single outcome measure in this study, and instead looked at First Semester and Second Semester LSSU GPA as two separate outcome measures.

The next two variables of interest focused on the academic choices students made early in their postsecondary academic career (Number of Credit Hours First Semester and Number of Degree Major Changes Made in the First Year of Full-Time Study at LSSU). These variables reflect student identity, motivation, and engagement with postsecondary academics (Bouffard, Boisvert, Vezeau, & Larouche, 1995). By investigating the number of first-semester, full-time credit hours the student elected to take at LSSU (interval level data from 12 to 20), information was gained regarding the student's academic focus at the start of the university experience. Since the students in this study were all full-time LSSU students, each student had a minimum of 12 credit hours on record. However, LSSU allows students to select up to 20 credit hours per semester at no additional cost. When one considers that DE and AP are both considered high school academic "jump start" programs, the interest here is whether or not students with prior postsecondary experience maintained the earlier momentum when it came to decisions about credit hour enrollment in the early phase of first-year full-time postsecondary study at LSSU.

The first-year student's decision about a major course of study was the second academic identity, motivation, and engagement factor investigated in this study. Upon admission to LSSU, all students were asked to identify their degree major from a listing that included an "undecided" option. Studies have reported that postsecondary student persistence is related to the student's declaration of a major course of study (Mitchell, Goldman, & Smith, 1999; Osborne, 1997) as well as the number of changes a student makes in his or her degree major in the first year of postsecondary academics (Bouffard, Boisvert, Vezeau, and Larouche, 1995).

These factors were analyzed for the three mutually exclusive groups in this study (DE group, AP group and control group) using one-way ANOVAs. In *post hoc* testing, *F* tests were calculated to identify specific group differences when a significant main effect existed. In effort to adjust for statistical error, the Dunnett's T3 measure was applied whenever the Levene Statistic indicated an unequal variance between subject groups. When the Levene Statistic indicated equal variance, the Bonferroni measure was used for *post hoc* analysis.

Question 3

Does participation in Dual Enrollment and Advanced Placement programming, High School GPA, Sex, Race, and Region of Michigan Residence, individually or additively combine to predict academic performance for students in the first year of bachelor's degree focused postsecondary education at LSSU?

This analysis focused on multivariate analysis to identify possible predictors of student success in the short-term, as measured by the student's academic performance in the first year of full-time study at LSSU. To answer this question, data were obtained from both the "student admissions" and "academic persistence" files at LSSU for the groups under study. Dummy coded categorical variables (Sex, Race, Region of Michigan Residence, DE participation and AP participation) were included with an interval level variable (HS GPA) in efforts to determine a possible relationship to the outcome measures under study (First Semester LSSU GPA, Second Semester LSSU GPA and Number of Credit Hours Earned First Semester at LSSU) for all study subjects. After viewing scatter plots and evaluating a bivariate correlation matrix of independent

variables, three multiple linear regressions were conducted to examine the relationship(s) between predictor and outcome variables.

Choosing Prediction Variables for Question 3. Pre-university student profile factors focused on demographics and high school academic indicators as short-term predictor variables in this phase of the study. In considering the demographics, I decided to include Sex to account for the possibility that male students attending LSSU might not select postsecondary preparatory options while in high school at the same rate that female students did. The categorical variables were re-coded ("0" for Female students and "1" for Male students) prior to Sex being entered as a predictor variable in the multiple regression models.

Race was selected as a second demographic factor selected for answering Question 3. Although there is very little racial diversity on the campus of Lake Superior State University, overall LSSU continues to have the greatest proportion of Native American students when compared with other public postsecondary institutions in Michigan. First-year academic performance for this group has special interest for LSSU as both a state and regional institution. This categorical data was re-coded ("0" for White students, "1" for Native American students and "2" for Other/No Response students) prior to Race being entered as a predictor variable in the multiple regression models.

The Region of Michigan Residence was selected as the third demographic factor in the multiple regression models. Region of Michigan Residence is relevant because LSSU has both state university and regional community college missions. In the seven years of this study, considerable resources had been allocated to the LSSU Admissions Office for activities focused on recruiting high school students who reside in Michigan's

Lower Peninsula (sometimes at the cost of doing less regionally with Upper Peninsula students). By including Region of Michigan Residence in this study, a closer look between DE and institutional policy could be examined. Prior to entering Region of Michigan Residence in the regression models, permanent addresses from the LSSU student admission's file were numerically coded ("1" to denote an Upper Peninsula residence and "0" to denote a Lower Peninsula residence).

To account for pre-university academic preparation, High School GPA, High School Percentile Class Rank and ACT Composite Score were included. Because these measures were highly interrelated, their combined use in the regression model for Question 3 would be problematic. Based on the fact that two of the three outcome measures used in the regression models for this question were LSSU GPA, coupled with the fact that the literature supports that HS GPA has long been recognized as the strongest predictor of postsecondary academic achievement (Adelman, 1999; Astin, 1993; Atwell & McLeod, 1994; Henderson & Masten, 1959; Kanoy, Wester, & Latta 2002; Pascarella & Terenzini, 1991), I decided to select High School GPA alone for use as a predictor in the regression analyses for Question 3.

It must be noted, however, that a total of five study subjects representing all three groups (AP, DE and control groups) presented with HS GPAs above the standardized 4.0 level (4.39, 4.14, 4.07, 4.04 and 4.01). Further investigation of these five individual cases revealed that one, two or three courses taken as a part of each subject's high school curriculum were weighted more heavily into the HS GPA by each student's differing K-12 school district. Considering the small number of courses that were weighted differently in relation to each student's total high school record, the distribution of the

scores across the three groups in the study and the small number of students involved, I decided to retain all five students as subjects in this study.

Since the primary concern for this study focused on postsecondary preparatory strategies utilized while in high school, the two other pre-university academic preparation factors included in the regression models for this study were participation in DE programming (numerically coded as "0" for no participation and as "1" for participation) and participation in AP programming (numerically coded as "0" for no participation and as "1" for participation). Once the six regression predictors were selected (Sex, Race, Region of Michigan Residence, High School GPA, DE high school participation status and AP high school participation status) and the three outcome variables determined (First Semester LSSU GPA, Second Semester LSSU GPA, and Total Number of Credit Hours Earned in the First Semester of Study at LSSU), the assumptions for using multiple linear regression were reviewed. Afterward, three separate multiple linear regression analyses were conducted (one for each outcome measure) to determine the significance of each predictor in the outcome models.

Question 4

Does the LSSU graduation profile for first-time, full-time LSSU students who selected one of two postsecondary academic preparatory strategies while a high school student (Dual Enrollment or Advanced Placement) differ from the LSSU graduation profile for first-time full-time LSSU students who did not select a postsecondary academic preparatory strategy while a high school student?

To determine the long-term impact of high school student participation in one of two postsecondary academic preparatory programs (DE or AP) on postsecondary

academics, this study examined each subject's "student graduation profile." This profile included graduation status (defined as whether or not a bachelor's degree credential was earned from LSSU) and for those with an earned bachelor's degree from LSSU, the number of years of attendance at LSSU before that bachelor's degree credential was earned.

By design, the academic semester of entry was the same for each student in the study (fall semester of the same year that the subject earned a high school diploma) with the year of entry ranging from 1996 to 2002. To look at five-year graduation rates for all students since the implementation of PA 160 in Michigan in 1996, a set point of fall 2001 was established. Every subject in the study admitted to LSSU prior to fall 2001 was evaluated on academic persistence toward earning a LSSU bachelor's degree. This graduation rate applies only to 314 students in the study who could have graduated within the period of time covered by the set point. Categorical data for graduation status were re-coded into dummy variables ("0" for no earned LSSU bachelor's degree under the established set point and "1" for those who earned a bachelor's degree under the groups under study differed on the variable of "Degree Status".

As a second step, the 133 students who earned a LSSU bachelor's degree within the established set point were evaluated on the time it took to earn that degree. As an interval measure, the "Years of Attendance" variable was created by subtracting each subject's First Semester Attendance variable from their corresponding Last Semester Attendance variable, taking semester attendance into account. A one-way ANOVA

determined whether or not the means for each group differed in the amount of time taken for earning a LSSU bachelor's degree credential.

Conclusion

This chapter presented the methodology for studying first-year academic performance as well as long-term academic persistence toward earning a bachelor's degree at LSSU. Three groups of first-year, full-time LSSU students who started at LSSU from fall of 1996 through the fall of 2002 were examined in this study (DE high school participants, AP high school participants and control high school participants students who had no postsecondary preparatory programming while in high school). In the chapters that follow, I present the findings from my data analysis, a discussion of these findings and my recommendations for future research on this topic.

CHAPTER 4

DATA ANALYSIS

This chapter presents the results of the statistical analyses for this study, which are provided in context of the four research questions and the hypotheses generated from each (as described in Chapter 3). As a case study analysis, descriptive analyses are followed by univariate, multivariate, and linear regression analysis.

Many of the variables in this study were categorical in nature. These included Sex, Race, Region of Michigan Residence, and Participation in Postsecondary Preparatory Programming While in High School (Dual Enrollment or Advanced Placement). One variable in the pre-university student profile was considered ordinal in nature (Student High School Percentile Class Rank). The High School GPA, ACT Composite Score, and measures that reflected the subject's academic decision-making in the initial phases of postsecondary programming (Enrolled and Earned First-Semester Credit Hours, and Number of Degree Major Changes the Student Made in the First Year of Postsecondary Academics), were continuous interval measures.

The three dependent variables reflecting academic achievement in the short-term phase of this research project were all continuous interval measures: First Semester LSSU GPA, Second Semester LSSU GPA, and Total Number of Credit Hours Earned in the First-Semester of Full-Time Study at LSSU. The two dependent variables that reflected academic achievement in the long-term phase of this research project, focused on bachelor's degree attainment. The first variable noted whether or not the study subject earned a bachelor's degree using a set point of fall 2001. Categorical in nature, this
variable was re-coded as a numerical dummy variable for statistical purposes. The second dependent variable in the long-term phase of this analysis was a continuous interval measure that looked more closely at the "Number of Years" it took for the subset of study subjects to earn a bachelor's degree from LSSU.

The secondary data for this study were obtained from Lake Superior State University's Office of Institutional Research, specifically found in "student admission" and "student persistence" files. Data for this study were analyzed using Microsoft Excel 98 and SPSS 12.0 for Windows computer software programs.

Data Analysis by Research Question

Question 1

Does the pre-university student profile (Sex, Race, Region of Michigan Residence, High School GPA, High School Percentile Class Rank, ACT Composite Score) for firstyear LSSU students who selected one of two postsecondary academic preparatory strategies while a high school student (Dual Enrollment or Advanced Placement) differ from the pre-university profile for first-year full-time LSSU students who did not select a postsecondary academic preparatory strategy while in high school?

- H_o1₁: There is no Sex difference for first-year LSSU students who participated in a postsecondary academic preparatory program (DE or AP) while in high school when compared with non-participants.
- H_o1₂: There is no Racial difference for first-year LSSU students who participated in a postsecondary academic preparatory program (DE or AP) while in high school when compared with non-participants.
- H_o1₃: There is no Region of Michigan Residence difference for first-year LSSU students who participated in a postsecondary academic preparatory program (DE or AP) while in high school when compared with non-participants.

- H_o1₄: There is no High School GPA difference for first-year LSSU students who participated in a postsecondary academic preparatory program (DE or AP) while in high school, when compared with non-participants.
- H_o1₅: There is no High School Percentile class ranking difference for first-year LSSU students who participated in a postsecondary academic preparatory program (DE or AP) while in high school when compared with non-participants.
- H_o1₆: There is no ACT Composite Score difference for first-year LSSU students, who participated in a postsecondary academic preparatory program (DE or AP) while in high school when compared with non-participants.

Descriptive methods were used to evaluate Question 1. In addition to comparing the frequency tables for the variables under study, chi-squared measures were used as non-parametric tests of statistical significance for Sex, Race, and Region of Michigan Residence. Analysis of variance measures were utilized to compare the three groups (DE population group, AP population group, and the randomly selected control group) on the percentile measure of High School Class Rank, as well as the interval measures of High School GPA and ACT Composite Score.

To help in defining this DE student cohort, the researcher first considered the distribution of the three student groups over the seven-years of the study, as provided in Table 10. Three to five percent of first-year, full-time students from Michigan entered LSSU (fall 1996 through fall 2002) with postsecondary transfer credits earned while in high school. Of these 218 students, most selected Michigan's DE programming option as their postsecondary preparatory strategy of choice (82.5%), with the remainder selecting AP programming.

Table 10.

First Academic		Group Preparation					
Year at LSSU	None	Dual Only	AP Only				
1996 - 97	30	21	15	66			
1997 - 98	24	20	6	50			
199 8 - 99	43	14	16	73			
1999 - 00	25	36	0	61			
2000 - 01	33	32	0	64			
2001 - 02	39	35	0	75			
2002 - 03	33	22	1	56			
Total	227	180	38	445			

Frequencies by Group: All Groups by Year $(1996-2003)^*$: N = 445

* Obtained from LSSU's Institutional Annual Research Reports generated by the LSSU. Registrar's Office (1996 through 2003).

Cross tabulation for sex found a slightly higher percentage of female students in

both the DE and AP programming groups when compared with the control study group as

verified in Table 11.

Table 11.

Frequencies by Group: Sex, All Groups, All Years*: N = 445

			Gr	Total			
			None	Dual Only	AP only		
Sex	Female	Count % within grp prep	123 54.2%	105 58.3%	22 57.9%	250 56.2%	
·	Male	Count % within grp prep	104 45.8%	75 41.7%	16 42.1%	195 43.8%	
Total		Count % within grp prep	227 100.0%	180 100.0%	38 100.0%	445 100.0%	

* Obtained from LSSU's Institutional Annual Research Reports generated by the LSSU. Registrar's Office (1996 through 2003).

However, a chi-square test to determine whether the proportion for Sex for each group was not significant, x^2 (2, N = 445) = .751, p = .687 as noted in Table 12. Accordingly, the null hypothesis for Sex (H_o1₁) was accepted in this model. Table 12.

	Value	df	Asymptomatic Significance (2-sided)
Pearson Chi-Square	.751(a)	2	.687
Likelihood Ratio	.752	2	.687
N of Valid Cases	445		

Chi-Square: Sex, Across All Groups: N = 445

(a) 0 cells (.0%) have expected count less than 5. The minimum expected count is 16.65.

Race was the second demographic variable under study for the student groups. Most racial diversity at LSSU comes from the Native American population, since the university is closely located to two federally recognized Indian communities. LSSU has consistently demonstrated a greater proportion of Native Americans among its student population, when compared with the other 14 public universities in Michigan (LSSU Self Report, 2000). Native American student numbers at LSSU averaged about 7% for each year during the seven-year period of this study. During the same period of time, an average of 76.7% of the student population at LSSU declared their Race as White, and the remaining 16.3% of the student body declared themselves as Other when it came to Race (or they chose not to declare their racial background on the application form). A cross tabulation for Race confirmed a dominant percentage of White students across all groups with few Native American students participating in either the DE or AP programming as is noted in Table 13.

Table 13.

			Gro	ition	Total	
			None	Dual Only	AP only	
Ethnic Group	Native A	Count	12	7	2	. 21
		% within grp prep	5.3%	3.9%	5.3%	4.7%
	NR/Other	Count	4	0	0	4
		% within grp prep	1.8%	.0%	.0%	.9%
	White	Count	211	173	36	420
		% within grp prep	93.0%	96.1%	94.7%	94.4%
Total		Count	227	180	38	445

Frequencies by Group: Race, All Groups, All Years*: N = 445

 Obtained from LSSU's Institutional Annual Research Reports generated by the LSSU. Registrar's Office (1996 through 2003).

A chi-square test was conducted to determine the proportion for Race for each group in the study. Table 14 indicates that the relationship between Race and Postsecondary Preparation status was not significant, x^2 (4, N = 445) = 4.390, p = .356. Accordingly, the null hypothesis for Race (H_o1₂) was accepted for this model.

Table 14.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.390(a)	4	.356
Likelihood Ratio	5.943	4	.203
Linear-by-Linear Association	1.464	1	.226
N of Valid Cases	445		

Chi-Square: Race, Across All Groups: N = 445

(a) 4 cells (44.4%) have expected count less than 5. The minimum expected count is .34.

To determine where first-year LSSU students obtained their high school postsecondary academic programming opportunities, a further look into the Region of Michigan Residence was conducted. For this study, students were identified by the permanent address they provided on their LSSU application form and by that, were assigned to either the Upper Peninsula or Lower Peninsula of the Michigan group. Over this 7-year study period at LSSU, an average of 39.2% of the students were members of Michigan's Upper Peninsula group, 42.1% reported their residence in Michigan's Lower Peninsula, and the remaining 18.7% were out-of-state or international students (LSSU Admissions Report, 2003). Table 15 notes that during this same seven-year period 84.7% of the first-time, full-time students in this study came to LSSU from schools located in Michigan's Lower Peninsula. Since both the AP and DE groups were population groups, it is obvious from Table 15 that LSSU's first-year full-time students were more likely to have high school experiences in DE or AP programming if they came from high schools located in Michigan's Lower Peninsula.

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Table 15.

Region of Michigan Residence		G	on	Total	
		None	Dual Only	AP only	
UP	Count % within grp prep	50 22.0%	14 7.8%	4 10.5%	68 15.3%
LP	Count	177	166	34	377
	% within grp prep	78.0%	92.2%	89.5%	84.7%
Total	Count	227	180	38	445

Frequencies: Region of Michigan Residence (UP or LP) by Group: All Groups All Years*: N = 445

* Obtained from LSSU's Institutional Annual Research Reports generated by the LSSU. Registrar's Office (1996 through 2003).

Table 16 shows the findings of a chi-square test that indicated that the relationship between Region of Michigan Residence and Postsecondary Preparatory status was significant, x^2 (2, N = 445) = 16.470, p < .000. Accordingly, the null hypothesis for Region of Michigan Residence (H_o1₃) was rejected for this model.

Table 16.

Chi-Square: Region of Michigan Residence: Across All Groups: N = 445

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	16.470(a)	2	.000
Likelihood Ratio	17.188	2	.000
N of Valid Cases	445		

(a) 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.81

To broaden the pre-university student profile picture for first-year LSSU students, it was important to move beyond demographics and include an analysis of some preuniversity academic measures. High school grade point average (HS GPA) is an interval level variable used as an academic predictor by many university admission teams (Astin, 1993; McKenzie & Schweitzer, 2001; Peng, 2003). Based on a 0.0 to 4.0 interval scale, High School GPA measures academic performance over time. Table 17 depicts mean GPA for the three LSSU student groups in this study (1996 to 2003).

Table 17.

Group preparation: 0=selected controls, 1=dual only, 3 =AP only	Mean	Ν	Std. Deviation	Range
None	3.05	227	.533	2
Dual Only	3.41	180	.466	2
AP only	3.67	38	.408	2
Total	3.25	445	.540	3

Mean: HS GPA by Group: All Groups All Years*: N = 445

* Obtained from LSSU's Institutional Annual Research Reports generated by the LSSU Registrar's Office (1996 through 2003).

Table 18 shows the results of a one-way ANOVA where the three subject groups differed significantly, F(2, 442) = 41.077, p < .000, $eta^2 = .157$. The *eta*-squared measure tells us that 15.7% of the variance in the total scores is due to membership in one of the three groups. With this finding, the null hypothesis was rejected for High School GPA $(H_o 1_4)$ in this model.

Table 18.

High School GPA		Sum of Squares	df	Mean Square	F	Sig.
* Group preparation (0=selected controls, 1=dual only, 3=AP only)	Between Groups	20.303	2	10.151	41.077	.000
	Within Groups	109.231	442	.247		
	Total	129.534	444			

One-Way ANOVA: HS GPA, All Groups All Years: N = 445

* $eta^2 = .157$

To further assess and compare means of results for HS GPA among the groups, a Levene's Test was conducted to determine the equality of variance between the groups. Since the results of this test showed that the variances were not equal (L = 5.080, p < .007), the Dunnett's T3 *post hoc* test was applied to conduct a pair-wise comparison based on the Studentized Maximum Modulus. The results of these finding are noted in Table 19 below. Table 19.

Post hoc (Dunnett's T3) for One-Way ANOVA: HS GPA by Group: All Grou	ps All Years:
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N = 445

(I) Group preparation (0=selected controls, 1=dual only, 3=AP only)	(J) Group preparation (0=selected controls, 1=dual only, 3=AP only)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
None	Dual Only	361(*)	.050	.000	48	24
	AP only	616(*)	.075	.000	80	43
Dual Only	None	.361(*)	.050	.000	.24	.48
	AP only	255(*)	.075	.003	44	07
AP only	None	.616(*)	.075	.000	.43	.80
	Dual Only	.255(*)	.075	.003	.07	.44

* The mean difference is significant at the .05 level.

The mean High School GPA for both the DE and the AP groups were significantly higher when compared with the High School GPA for the control group students. As expected, students in the AP group (often referred to as the "honors" group in many high schools) had the highest mean High School GPA when compared with the other study groups.

Class rank helps one look at high school academic performance within an academic programming context. Table 20 depicts High School Class Ranking for the groups under study reported in percentile rankings. As was discussed earlier, eleven students did not have a HS class rank noted in their LSSU student admission files (7 control students and 4 Dual Enrollee students) as they were either home-schooled or from K-12 districts in Michigan that did not rank their high school graduates.

Table 20.

Mean: HS Percentile Class Rank by Group: All Groups All Years*: N = 434

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
None	220	60.58	23.577	1.590	57.45	63.71	4	99
Dual Only	176	75.10	19.906	1.500	72.14	78.06	12	99
AP only	38	85.84	18.356	2.978	79.81	91.88	19	100
Total	434	68.68	23.367	1.122	66.48	70.89	4	100

* Obtained from LSSU's Institutional Annual Research Reports generated by the LSSU Registrar's Office (1996 through 2003).

To analyze these data in more detail, one needs to consider the level of measurement that High School Class Rank holds in the context of these data. Because the original class ranking data were not ordered from one reference pool, HS class rank was converted by the LSSU Admission Team into percentile ranking. By treating this transformed variable as interval data, a one-way ANOVA was the appropriate statistical procedure to use for further analysis.

Table 21 reports a one-way ANOVA for High School Percentile Class Rank. The three subject groups differed significantly on this measure, F(2, N = 431) = 34.809, p < .000, $eta^2 = .139$. The *eta*-squared measure in this model tells us that 13.9% of the variance in the total scores is a result of membership in one of the three groups. With these results, the null hypothesis for high school rank (H₀1₅) was rejected in this model.

Table 21.

High School Class Rank		Sum of Squares	df	Mean Square	F	Sig.
* Group preparation (0=selected controls, 1=dual only, 3=AP only)	Between Groups	32879.381	2	16439.690	34.809	.000
	Within Groups	203554.739	431	472.285		
	Total	236434.120	433			

One-Way ANOVA: HS Percentile class rank. All Groups All Years: N = 434

 $eta^{2} = .139$

Table 22 shows the *post hoc* evaluation of high school percentile ranking using Dunnett's T3 measure for unequal variance among the groups (L = 9.140, p < .000). Of those with a High School Percentile Class Rank noted in their LSSU student admissions file, students in the Dual Enrollment group ranked significantly higher (p < .000) than students in the control group. Students from the Advanced Placement group outranked both the DE students (p = .006), and control students (p < .000) at an even higher level. This result is not surprising given the fact that AP students presented with the highest HS GPA mean score which is a determinant for calculating the student's High School Percentile Class Rank. Table 22.

Post hoc (Dunnett's T3) for One-Way ANOVA · HS Class Rank by Group: All Groups All Years: N = 433

(I) Group preparation (0=selected controls, 1=dual only, 3=AP only)	(J) Group preparation (0=selected controls, 1=dual only, 3=AP only)	Mean Difference (I-J)	Std. Error	Sig.	95% Cor Inte	nfidence
		,		_	Lower Bound	Upper Bound
None	Dual Only	-14.520(*)	2.186	.000	-19.76	-9.28
	AP only	-25.260(*)	3.375	.000	-33.54	-16.98
Dual Only	None	14.520(*)	2.186	.000	9.28	19.76
	AP only	-10.740(*)	3.334	.006	-18.93	-2.55
AP only	None	25.260(*)	3.375	.000	16.98	33.54
	Dual Only	10.740(*)	3.334	.006	2.55	18.93

* The mean difference is significant at the .05 level.

The final academic pre-university measure in this question was the ACT Composite Score for each student. All study subjects except one (from the DE group) had an ACT Composite Score in their LSSU student admission file. A description of the mean ACT Composite Score, and the score distributions for all first-year full-time students who entered LSSU between the fall of 1996 and the fall of 2002 are reported in Table 23 for each group under study. It is interesting to note that the DE group (N=179) had a range of ACT Composite Scores from 15 to 32. When considering selectivity based on ACT Composite Scores, the range for the DE subject group dipped below the lowest "open" selectivity level (ACT score of 17) and soared to the top of the "highly selective" level (ACT Composite Score of 31). In Table 23, the Dual Enrollees in the seven-year period of study (M = 23.07, SD = 3.978) appear to have performed more like the control group than the Advanced Placement group of study subjects on this measure.

Table 23.

Mean: ACT Composite Scor	es by Group: All Groups	<i>All Years</i> *: <i>N</i> = 444
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Group preparation (0=selected controls, 1=dual only, 3=AP only)	Mean	N	Std. Dev.	Range for ACT Composite Scores
None	21.39	227	3.791	14-34
Dual Only	23.07	179	3.978	15-32
AP only	27.11	38	2.275	23-32
Total	22.56	444	4.086	14-34

* Obtained from LSSU's Institutional Annual Research Reports generated by the LSSU Registrar's Office (1996 through 2003).

Figure 2 is a bar chart that plots the distribution of ACT Composite Scores across the three student groups addressed in this study. This chart supports the finding that DE students are more like the control group than the AP group on this measure. For ACT Composite Score, the figure reveals a positively skewed curve for the control group subject scores, a negatively skewed curve for AP group subject scores and a more midrange bi-modal curve for the DE group subject scores. Figure 2.



Bar Chart: ACT Composite Scores: By Group for All Groups All Years*: N = 444

* Obtained from LSSU's Institutional Annual Research Reports generated by the LSSU Registrar's Office (1996 through 2003).

A one-way ANOVA of ACT Composite Scores indicated significant differences in ACT Composite Score among the three subject groups under study, F(2, 441) = 40.2, p < .000, $eta^2 = .154$ as noted in Table 24. The *eta*-squared measure indicated that 15.4% of the variance in the total scores was related to membership in one of the three groups. Since ACT Composite Score statistically differed by group, the null hypothesis for ACT Composite Score (H₀1₆) was rejected in this model.

Table 24.

ACT Composite		Sum of Squares	df	Mean Square	F	Sig.
* Group preparation (0=selected controls, 1=dual only, 3=AP only)	Between Groups	1140.712	2	570.356	40.200	.000
	Within Groups	6256.880	441	14.188		
	Total	7397.592	443			

One-Way ANOVA: ACT Composite Score: All Groups All Years: N = 444

 $*eta^2 = .154$

A post hoc evaluation of ACT Composite Score means was conducted using Dunnett's T3 measure for unequal variance (L = 7.746, p < .000) as presented in Table 25. All the between-group analyses were statistically significant (p < .000) revealing that the DE students had a somewhat higher mean ACT Composite Score when compared with the control group in the study (mean difference of 1.675). This statistical comparison belies the less vigorous comparison in the previous bar chart. On this measure, the AP students out-preformed both the DE students (mean difference of 4.038) as well as the control group students (mean difference of 5.713).

Table 25.

Post hoc (Dunnett's T3) for One-Way ANOVA: ACT Composite Score: All Groups All

Years: N = 444

I) Group prep. (0=selected controls, 1=dual only, 3=AP only)	(J) Group preparation (0=selected controls, 1=dual only, 3=AP only)	Mean Difference (I-J)	Std. Error	Sig.	95% Confide	nce Interval
					Lower Bound	Upper Bound
None	Dual Only	-1.675(*)	.390	.000	-2.61	74
	AP only	-5.713(*)	.447	.000	-6.80	-4.62
Dual Only	None	1.675(*)	.390	.000	.74	2.61
	AP only	-4.038(*)	.474	.000	-5.19	-2.89
AP only	None	5.713(*)	.447	.000	4.62	6.80
	Dual Only	4.038(*)	.474	.000	2.89	5.19

* The mean difference is significant at the .05 level.

Question 2

Does the first-year academic university profile (First Semester LSSU GPA, Second Semester LSSU GPA, Number of Enrolled Credit Hours First Semester, Number of Earned Credit Hours First Semester and Number of Degree Major Changes in the First Year of Study) for LSSU students who selected one of two postsecondary academic preparatory strategies while a high school student (Dual Enrollment or Advanced Placement) differ from the first-year academic university profile for LSSU students who did not select a postsecondary academic preparatory strategy while a high school student?

- H_o2₁: There is no difference in First Semester LSSU GPA by first-year LSSU students who participated in a postsecondary academic preparatory program while in high school (DE or AP) when compared with non-participants.
- H_o2₂: There is no difference in Second Semester LSSU GPA by first-year LSSU students who participated in a postsecondary academic preparatory program while in high school (DE or AP) when compared with non-participants.
- H_o2₃: There is no difference in the number of enrolled first semester postsecondary credit hours by first-year LSSU students who participated in a postsecondary academic preparatory program while in high school (DE or AP) when compared with non-participants.
- H_02_4 : There is no difference in the number of earned first semester postsecondary credit hours by first-year LSSU students who participated in a postsecondary academic preparatory program while in high school (DE or AP) when compared with nonparticipants.
- H_o2₅: There is no difference in the number of student declared degree major changes in the first year of full time academics by first-year LSSU students, who participated in a postsecondary academic preparatory program while in high school (DE or AP) when compared with non-participants.

Postsecondary GPA's are based on a scaling system of .00 to 4.0. Table 26

presents means and variances for First Semester LSSU GPA in relation to the three LSSU

student groups under study.

Table 26.

Means and Variances: First Semester LSSU GPA by Group: All Groups All Years*: N=445

	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
None	227	2.476	.999	.066	2.345	2.607	.00	4.00
Dual Only	180	2.977	.733	.054	2.869	3.084	.62	4.00
AP only	38	3.400	.446	.072	3.253	3.546	2.44	4.00
Total	445	2.757	.915	043	2.672	2.843	.00	4.00

* Obtained from LSSU's Student Persistence File on LSSU's SIS Program.

A one-way between-groups ANOVA in Table 27 indicates a significant difference in First Semester LSSU GPA for the three groups, F(2, 442) = 28.365, p < .000, $eta^2 = .113$. Accordingly, I rejected the null hypothesis for First Semester LSSU GPA (H_o2₁) in this model.

Table 27.

First Semester LSSU GPA		Sum of Squares	df	Mean Square	F	Sig.
* Group preparation (0=selected controls, 1=dual only, 3=AP only)	Between Groups	42.285	2	21.142	28.365	.000
	Within Groups	329.454	442	.745		
	Total	371.739	444			

One-Way ANOVA: First Semester LSSU GPA: All Groups All Years: N = 445

 $* eta^2 = .113$

Because Levene's Test showed that the variances with the groups differed from one another (L = 14.956, p < .000), Dunnett's T3 *post hoc* test was used to compare the means for the three groups under study. Table 28 shows that the DE group and the AP group had a statistically and significantly higher First Semester LSSU GPAs when compared with the control group (p < .000). In addition, the DE group had a significantly lower First Semester LSSU GPA when compared with the AP group in this study (p < .000).

Table 28.

Post hoc (Dunnett's T3) for One-Way ANOVA: First Semester LSSU GPA: All Groups

All Years:	<i>N</i> = 445
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(I) Group preparation (0=selected controls, 1=dual only, 3=AP only)	(J) Group preparation (0=selected controls, 1=dual only, 3=AP)	Mean Difference (I-J)	Std. Error	Sig.	95% Co Inte	nfidence erval
				-	Lower Bound	Upper Bound
None	Dual Only	500 (*)	.085	.000	706	294
	AP only	923(*)	.098	.000	-1.161	685
Dual Only	None	.500(*)	.085	.000	.294	.706
	AP only	423(*)	.090	.000	643	202
AP only	None	.923(*)	.098	.000	.685	1.161
	Dual Only	.423(*)	.090	.000	.202	.643

* The mean difference is significant at the .05 level.

Next, Second Semester LSSU GPA was compared for the three groups under study. Table 29 reports mean and variance for Second Semester LSSU GPA.

Table 29.

Mean: Second Semester LSSU GPA by Group: All Groups All Years*: N = 445

Group preparation (0=selected controls, 1=dual only, 3=AP only)	Mean	N	Std. Dev	Var	Min	Max
None	2.317	227	1.037	1.077	.00	4.00
Dual Only	2.831	180	.758	.57 6	.00	4.00
AP only	3.132	38	.760	.578	.84	4.00
Total	2.595	445	.956	.915	.00	4.00

* Obtained from LSSU's Student Persistence File on LSSU's SIS Program.

A one-way ANOVA in Table 30 showed a significant difference in Second Semester LSSU GPA among the three subject groups, F(2, 442) = 23.197, p < .000, $eta^2 = .094$. Accordingly, the null hypothesis was rejected for Second Semester LSSU GPA (H₀2₂) in this model.

Table 30.

Second Semester LSSU GPA	-	Sum of Squares	df	Mean Square	F	Sig.
* Group preparation (0=selected controls, 1=dual only, 3=AP only)	Between Groups	38.602	2	19.301	23.197	.000
	Within Groups	367.767	442	.832		
	Total	406.369	444			

One-Way ANOVA: Second Semester LSSU GPA: All Groups All Years: N = 445

 $*eta^{2} = .094$

The Levene's Test reported that the variance in the groups under study differed significantly (L = 10.514, p < .000). Therefore, Dunnett's T3 measure for unequal variance was used for *post hoc* evaluation of Second Semester LSSU GPA for the groups in the study.

Both the DE group and the AP group had a significantly higher Second Semester LSSU GPA when compared with the control group in this study (p < .000) as depicted in Table 31. Although it appears that the AP students outperformed the DE group on this measure, the difference between the DE and the AP groups was not statistically significant in this model (p = .089), a change from the findings for First-Semester LSSU GPA. Overall, all three groups presented with a lower LSSU GPA the Second Semester

of analysis when compared with the First Semester with the DE group demonstrating less of a decline from first to second semester on the measure of LSSU GPA when compared with both the control group and the AP group. Although this finding warrants further investigation, it is beyond the scope of the present study.

Table 31.

Post hoc (Dunnett's T3) for One-Way ANOVA: Second Semester LSSU GPA: All Groups All Years: N = 445

(I) Group preparation (0=selected controls, 1=dual only, 3=AP only)	(J) Group preparation (0=selected controls, 1=dual only, 3=AP only)	Mean Differen ce (I-J)	Std. Error	Sig.	95% Confide	ence Interval
					Lower Bound	Upper Bound
None	Dual Only	514(*)	.089	.000	728	301
	AP only	815(*)	.141	.000	-1.161	469
Dual Only	None	.514(*)	.089	.000	.301	.728
	AP only	300	.135	.089	634	.033
AP only	None	.815(*)	.141	.000	.469	1.161
	Dual Only	.300	.135	.089	033	.634

* The mean difference is significant at the .05 level.

Two additional variables, Number of Enrolled Credit Hours and Number of Earned Credit Hours by students in their first semester of full-time study at LSSU reflect early academic student engagement and decision making behaviors. Table 32 depicts very similar findings when one considers the mean number of credit hours all study subjects in all groups enrolled to take before the start of their first semester of full-time postsecondary study at LSSU (a task usually accomplished in summer session during the university's orientation program).

Table 32.

Mean: Number of First Semester LSSU Credit Hours Enrolled by Group: All Groups All Years*: N = 445

Group preparation (0=selected controls, 1=dual only, 3=AP only)	Mean	N	Std. Dev	Var	Min	Max
None	15.039	227	1.347	1.817	12.00	18.00
Dual Only	15.111	180	1.516	2.300	12.00	20.00
AP only	15.368	38	1.441	2.077	13.00	18.00
Total	15.096	445	1.425	2.033	12.00	20.00

* Obtained from LSSU's Student Persistence File on LSSU's SIS Program

A one-way between-group ANOVA compared First Semester Enrolled LSSU

Credit Hours for the three groups of students. Table 33 revealed no statistically

significant difference F(2, 442) = .880, p = .415, eta² = .063, which resulted in an

acceptance of the null hypothesis for this measure $(H_0 2_3)$.

Table 33.

One-Way ANOVA: Number of First Semester LSSU Credit Hours Enrolled: All Groups All Years*: N = 445

No. of Enrolled 1st Semester LSSU Credit Hrs.		Sum of Squares	df	Mean Square	F	Sig.
* Group preparation (0=selected controls, 1=dual only, 3=AP only)	Between Groups	3.582	2	1.791	.880	.415
	Within Groups	899.263	442	2.035		
	Total	902.845	444			

 $*eta^{2} = .063$

Because of my interest in examining variables that reflect student engagement behaviors in the first year of postsecondary academics, I took a second look at LSSU credit hours upon completion of the first semester of study for all groups. Table 34 depicts the Number of Earned Credit Hours across groups for the first semester of fulltime study at LSSU for all groups.

Table 34.

Mean: Number of First Semester LSSU Credit Hours Earned by Group. All Groups All Years*: N = 445

Group preparation (0=selected controls, 1=dual only, 3=AP only)	Mean	N	Std. Dev	Var	Minimum	Maximum
None	12.030	227	4.402	19.384	.00	18.00
Dual Only	13.738	180	2.990	8.943	3.00	20.00
AP only	14.631	38	2.572	6.617	5.00	18.00
Total	12.943	445	3.866	14.950	.00	20.00

* Obtained from LSSU's Student Persistence File on LSSU's SIS Program

To determine whether or not there were differences in the number of firstsemester credit hours earned across the three groups of students, I conducted one-way between-groups ANOVA. The results presented in Table 35 show a statistically significant difference for first-semester credits earned by the groups, F(2, 442) = 14.597, p < .000, $eta^2 = .062$. Accordingly, the null hypothesis for actual Number of Credit Hours Earned First Semester at LSSU (H₀2₄) was rejected in this model.

Table 35.

ANOVA: Number of First Semester LSSU Credit Hours Earned: All Groups All Years:

N = 445

No. of Earned First Semester LSSU Credit Hrs.		Sum of Squares	df	Mean Square	f	Sig.
* Group preparation (0=selected controls, 1=dual only, 3=AP only)	Between Groups	411.241	2	205.621	14.597	.000
	Within Groups	6226.354	442	14.087		
No. of Earned First Semester LSSU Credit Hrs.	Total	6637.596	444			
eta' = .062						

Although the Number of Enrolled Credit Hours First Semester at LSSU did not differ significantly for the groups in this study, the Number of Earned Credit Hours First Semester did show a significant difference. Further analysis was done using a *posthoc* test for unequal variance (L = 19.639, p < .000). Table 36 indicates a statistically significant difference among groups for Number of Earned Credit Hours by academic preparatory programming group. Both DE and AP groups earned more credit hours in the first semester of full-time postsecondary academic programming at LSSU compared to the control group. However, mean scores between the DE and AP groups did not differ significantly in this model (p = .178).

Table 36.

Post hoc (Dunnett's T3) for One-Way ANOVA: Number of First Semester LSSU Credit Hours Earned by Group: All Groups All Years: N = 445

(I) Group preparation (0=selected controls, 1=dual only, 3=AP only)	(J) Group preparation (0=selected controls, 1=dual only, 3=AP only)	Mean Difference (1-J)	Std. Error	Sig.	95% Con Inter	ifidence val
					Lower Bound	Upper Bound
None	Dual Only	-1.708(*)	.367	.000	-2.589	826
	AP only	-2.600(*)	.509	.000	-3.842	-1.359
Dual Only	None	1.708(*)	.367	.000	.8269	2.589
	AP only	892	.473	.178	-2.053	.268
AP only	None	2.600(*)	.509	.000	1.359	3.842
	Dual Only	.892	.473	.178	268	2.053

* The mean difference is significant at the .05 level.

On average, the control students in this study dropped about 3.001 credits hours during the first semester of postsecondary study, compared to a drop of 1.373 credit hours for the DE group and a drop of .737 credit hours for the AP group during the same period. Although dropping credit hours in the first semester can be viewed as an indicator of student engagement in postsecondary academics, it also implies a "disconnect" in relation to the student's postsecondary academic expectations and postsecondary academic realities. This type of a "disconnect" has wide-range qualitative implications for academic persistence and academic retention in the postsecondary academic journey (Kanoy, Wester, & Latta, 2002; Kuh & Love, 2004; Osborne, 1997; Tinto, 1993). Successfully identifying a major curriculum for study (also called a degree major) is another academic indicator that may reflect first-year student engagement with postsecondary academics. Frequent changes in this initial selection (especially changes made in the first year of academic programming) have been found to impede student progression and persistence toward obtaining a postsecondary degree (Bouffard, Boisvert, Vezeau, & Larouche, 1995). Table 37 identifies the mean number of degree major changes (ranging from 0 to 4) for each student group in their first year of full-time academics at LSSU (fall 1996 through fall 2002).

Table 37.

Mean: Number of Degree Major Changes in the First Year At LSSU by Group: All Groups All Years*: N = 445

Group preparation (0=selected controls, 1=dual only, 3=AP			Std.			
only)	Mean	<u>N</u>	Dev	Var.	Minimum	Maximum
None	.511	227	.712	.508	.00	3.00
Dual Only	.533	180	.779	.608	.00	3.00
AP only	.657	38	.937	.880	.00	4.00
Total	.532	445	.760	.578	.00	4.00

* Obtained from LSSU's Student Persistence File on LSSU's SIS Program

A one-way ANOVA (Table 38) showed no significant differences in the Number of Degree Major Changes the student made in the first year of full-time postsecondary academics at LSSU by group, F(2, 442) = .606, $p = .546 eta^2 = .087$. With this, I accepted the null hypothesis for number of degree major changes (H_o2₅) in this model.

Table 38.

One-Way ANOVA: Number of Degree Major Changes in the First Year at LSSU: All Groups All Years: N = 445

No. of Degree Major Changes in 1 st Yr.		Sum of Squares	df	Mean Square	F	Sig.
* Group preparation (0=selected controls, 1=dual only, 3=AP only)	Between Groups	.702	2	.351	.606	.546
	Within Groups	256.075	442	.579		
	Total	256.778	444			

 $eta^{2} = .087$

At LSSU, all first-year students with an "undeclared" and/or "undecided" degree major were administratively assigned to the Arts/Letters and Social Science degree major classification. This step was done to assist with initial academic advising and to have full-time first-year students meet eligibility requirements for financial aid. After a review of individual student files over the seven-year period, only 17.2% of the students in the DE groups did not specify a major course of study on their LSSU application form which compares with 25.2% of students in the control group. According to LSSU's Admission Department Records, 22% to 30% of all LSSU first-year university students did not declare a major field of study on entry to LSSU during the same period of time (between fall 1996 and fall 2002). The fact that more DE students entered their first semester of full-time postsecondary academics with a declared major may imply academic engagement associated with the DE participant's early exposure to the

postsecondary academic advising, mandated for DE participants by Michigan statute.

Question 3.

Does participation in Dual Enrollment and Advanced Placement programming,

High School GPA, Race, Sex, and Region of Michigan Residence, individually or

additively combine to predict academic performance for students in the first year of

bachelor's degree-focused postsecondary education at LSSU?

- H_o3₁: Four Pre-University Student Profile Factors (Sex, Race, Region of Michigan Residence and HS GPA) and Participation in Postsecondary Preparatory Programming While in High School (DE or AP) do not individually or additively combine to predict successful academic performance (First Semester LSSU GPA) for students focused on earning a bachelor's degree credential at LSSU.
- H₀3₂: Four Pre-University Student Profile Factors (Sex, Race, Region of Michigan Residence and HS GPA) and Participation in Postsecondary Preparatory Programming While in High School (DE or AP) do not individually or additively combine to predict successful academic performance (Second Semester LSSU GPA) for students focused on earning a bachelor's degree credential at LSSU.
- H_o3₃: Four Pre-University Student Profile Factors (Sex, Race, Region of Michigan Residence and HS GPA) and Participation in Postsecondary Preparatory Programming While in High School (DE or AP) do not individually or additively combine to predict the number of earned credits hours in the first-semester of fulltime postsecondary academics for students focused on earning a bachelor's degree credential at LSSU.

Multiple regression analysis can determine complex relationships between and

among variables. This statistical tool was employed to answer Question 3 of this study

because of the need to evaluate simultaneously the effects of different types of predictors

(continuous as well as categorical factors) on three separate continuous dependent

variables: 1) First Semester LSSU GPA; 2) Second Semester LSSU GPA; and 3) the

Total Number of Credit Hours Earned After the First-Semester of Full-Time Study at

LSSU.

Multiple linear regression was selected as a tool for analysis once it was determined that the assumptions for this approach were met (Cohen & Cohen, 1983). An analysis of residuals and scatter plots of residuals vs. predicted residuals resulted in no detectable abnormalities for either the DE population group or the randomly selected control group of students. However, box plot analyses revealed outliers and scatter plots showed visual clumping at the top of the plots (ceiling effect) only for the small AP subject group (N = 38).

Multiple linear regression analysis on first semester LSSU GPA. Table 39 and Table 40 provide results from the multiple linear regression performed using one dependent variable (First-Semester LSSU GPA) and six independent predictor variables in this model (Sex, Race, Region of Michigan Residence, DE participation status, AP participation status, and HS GPA).

This model significantly predicted first semester LSSU GPA, F(6, 438) = 39.347, p < .000. The adjusted R^2 was .341, which means that about 34% of the variation in First Semester LSSU GPA could be explained by the predictors in this model. Given these findings, the researcher rejected the null hypothesis (H_o3₁) for this model.

Table 39.

Multiple Linear Regression: Postsecondary Preparatory Programs (DE participation, AP participation), HS GPA, Sex, Race, and Region of Michigan Residence as Predictors of First-Semester LSSU GPA.

Model	R	Adjusted R Square	Std. Error of the Estimate
1	.592	.341	.742

Table 40.

ANOVA for Regression Variables (DE participation, AP participation, HS GPA, Sex, Race and Region of Michigan Residence) As Predictors of First Semester LSSU GPA.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	130.193	6	21.699	39.347	.000
	Residual	241.545	438	.551		
	Total	371.739	444			

Table 41 depicts three of the six variables under study (Sex, Race, and Region of Michigan Residence) were not statistically significant predictors for First Semester LSSU GPA in this model. However, High School GPA (t = 12.276, p < .000), AP participation (t = 2.623, p < .009), and DE participation (t = 2.145, p < .032) were all statistically significant and within expectations for each variable. Together these variables account for 34% of the variance accounted for in first semester GPA in this model. As expected and supported in the literature, HS GPA (with a beta score of .537) serves as a strong predictor for First Semester LSSU GPA in this model.

Table 41.

Coefficient Analysis for Multiple Linear Regression: Postsecondary Preparatory Programs (DE participation, AP participation), HS GPA, Sex, Race and Region of Michigan Residence as Predictors of First Semester LSSU GPA.

Model		Unstandardized Coefficients	Standa Coeffi	rdized cients	t	Sig.
		В	Std. Error	Beta		
1	(Constant)	327	.245		-1.333	.183
	aporno: 0=0,1=0, 2=0_3=1_4=0	.361	.138	.110	2.623	.009
	dualorno:1=0_1=1 2=0_3=0_4=0	.170	.079	.091	2.145	.032
	Sex: Female = 0 Male = 1	.069	.073	.037	.945	.345
	ethgroup: White, N=0_Native, A=1_Other=2	.082	.131	.025	.624	.533
	miregion: UP = 1_LP=0	062	.102	024	609	.543
	High School GPA	.910	.074	.537	12.276	.000

Multiple linear regression analysis on second semester LSSU GPA. Tables 42 and Table 43 repeat the results for the same predictor variables using Second Semester LSSU GPA as the criterion. The findings F(6, 438) = 37.521, p < .000 with an adjusted R^2 of .330 reveal that about 33% of the variation in Second Semester LSSU GPA could be explained by the predictors in this model. The researcher rejected the null hypothesis (H_o3₂) for this model based on the statistical significance that was determined with this analysis. Table 42.

Multiple Linear Regression: Postsecondary Preparatory Programs (DE participation, AP participation), HS GPA, Sex, Race and Region of Michigan Residence as Predictors of Second Semester LSSU GPA.

Model	R	Adjusted R Square	Std. Error of the Estimate
1	.583(a)	.330	.782

Table 43.

ANOVA for Regression Variables (DE participation, AP participation, HS GPA, Sex, Race and Region of Michigan Residence) as Predictors of Second Semester LSSU GPA.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	137.960	6	22.993	37.521	.000
	Residual	268.409	438	.613		
	Total	406.369	444			

Table 44 shows that of these six predictor variables, only High School GPA was statistically significant as a predictor for Second Semester LSSU GPA (t = 12.001, p < .000). Region of Michigan Residence (p = .051) as a negative predictor and participation in DE as a positive predictor were marginally significant (p = .072) for Second Semester LSSU GPA.

There was slightly more variance accounted for with the six variables presented to predict the First Semester LSSU GPA when compared with the amount of variance for the same variables on Second Semester LSSU GPA. HS GPA continues to serve as the strongest positive predictor in the model, with a standardized beta score of .530 on Second Semester LSSU GPA.

Table 44.

Coefficient Analysis for Multiple Linear Regression: Postsecondary Preparatory Programs (DE participation, AP participation), HS GPA, Sex, Race and Region of Michigan Residence as Predictors of Second Semester LSSU GPA.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		В	Std. Error	Beta		
1	(Constant)	499	.258		-1.932	.054
	aporno:_0=0_1=0_ 2=0_3=1_4=0	.217	.145	.063	1.494	.136
	dualorno:_1=0,1=1, 2=0, 3=0,4=0	.151	.084	.078	1.805	.072
	Sex_Female=0, Male=1	023	.077	012	299	.765
	ethgroup: _White, N=O, Native A=1, Other = 2	.113	.138	.033	.822	.411
_	miregion: UP=1,LP=0	210	.108	079	-1.956	.051
	High School GPA	.938	.078	.530	12.001	.000

Multiple linear regression analysis on # of credit hours earned after 1st semester of study at LSSU. Because the number of credit hours earned is closely related to LSSU GPA (and because first semester assessment is important to consider in terms of high school transitioning into postsecondary academics) the number of credit hours earned has meaning as a short-term outcome variable in this study. Table 45 and Table 46 provide results using the same six regression predictor variables on the number of first semester credit hours earned at LSSU.

The findings F(6, 438) = 25.115, p < .000 with an adjusted R^2 of .246 reveal that about 25% of the variation in the total Number of Credit Hours Earned First Semester of postsecondary study at LSSU could be explained by the predictors in this model.

Accordingly, I rejected the null hypothesis (H_03_3) for this model.

Table 45.

Multiple Linear Regression: Postsecondary Preparatory Programs (DE participation, AP participation), HS GPA, Sex, Race, and Region of Michigan Residence as Predictors for Total Number of First Semester Credits Earned at LSSU.

Model	R	Adjusted R Square	Std. Error of the Estimate
1	.506	.246	3.357

Table 46.

ANOVA for Regression Variables: (DE participation, AP Participation, HS GPA, Sex, Race, and Region of Michigan Residence as Predictors for Total Number of First Semester Credits Earned at LSSU.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1699.064	6	283.177	25.115	.000
	Residual	4938.532	438	11.275		
	Total	6637.596	444			

Table 47 shows that, of these six predictor variables, only High School GPA remained statistically significant as a positive predictor for the Total Number of Credit Hours Earned in the First Semester of study at LSSU (t = 10.047, p < .000), with a standardized beta level of .470.

Table 47.

Coefficient Analysis for Multiple Linear Regression: Postsecondary Preparatory Programs (DE participation, AP participation), HS GPA, Sex, Race, and Region of Michigan Residence as Predictors of Total Number of First Semester Credits Earned at LSSU.

Model		Unstandardized Coefficients	Standa Coeffi	Standardized Coefficients		Sig.
	_	В	Std. Error	Beta	_	
1	(Constant)	1.760	1.109		1.588	.113
	aporno:0=0,1=0, 2=0, 3=1,4=0	.471	.623	.034	.757	.450
	dualorno:1=0,1=1, 2 =0,3=0,4=0	.422	.359	.054	1.175	.240
	Sex: Female = 0, Male = 1	.263	.328	.034	.801	.424
	ethgroup: White, N=0, Native A = 1, Other = 2	365	.591	027	618	.537
	miregion: UP= 1, LP= 0	452	.461	042	980	.327
	High School GPA	3.368	.335	.470	10.047	.000

Question 4.

Does the LSSU graduation profile for first-time, full-time LSSU students who selected one of two postsecondary academic preparatory strategies while a high school student (Dual Enrollment or Advanced Placement) differ from the LSSU graduation profile for first-time, full-time LSSU students who did not select a postsecondary academic preparatory strategy while a high school student?

- H_o4₁: There is no difference in bachelor's degree earned status for first-year LSSU students who participated in a postsecondary academic preparatory program while in high school (DE or AP) when compared with non-participants.
- H_04_2 : There is no difference in the amount of time it takes to earn a bachelor's degree credential from LSSU by first-year LSSU students who participated in a
postsecondary academic preparatory program while in high school (DE or AP) when compared with non-participants.

Persistence toward bachelor's degree

attainment at LSSU. Academic performance in the first year of study at LSSU foreshadows the ultimate goal of degree attainment. All study subjects who were admitted full-time for the first time into LSSU before fall semester 2001 were counted and grouped by degree status. Table 48 reports the minimum five-year graduation percentages of study subjects in each of the three groups entering LSSU before fall semester 2001, who had earned a bachelor's degree by the end of spring semester 2003. As expected, more of the AP students received their degrees in this time period (67.6%), followed next by the DE students (47.5%) and lastly by control students (31.6%) who had not participated in a postsecondary preparatory program while in high school.

Table 48.

			Group preparation (0=selected controls, 1=dual only, 3=AP only)			Total
			None	Dual Only	AP only	
Degree Earned Yes or No	No	Count	106	64	12	182
		% within Group preparation (0=selected controls, 1=dual only, 3=AP only)	68.4%	52.1%	32.4%	57.8%
	Yes	Count	49	59	25	133
		% within Group preparation (0=selected controls, 1=dual only, 3=AP only)	31.6%	47.9%	67.6%	42.2%
Total		Count	155	123	37	315

Cross-Tabulation: Degree-Earned Status for All Groups Started FT Coursework Before Fall 2001: $N = 315^*$.

* Obtained from LSSU's Student Persistence File on LSSU's SIS Program

Table 49 shows the results of a one-way ANOVA. The three subject groups differed significantly on Earned Bachelor's Degree Status, F(2, 312) = 9.638, p < .000, $eta^2 = .070$. Accordingly, the null hypothesis for degree status (H_o4₁) was rejected in this model.

Table 49.

One-Way ANOVA: Degree Earned Status: All Groups: Set-Point Fall 2001: N = 315.

Degree Earned Status (Yes)		Sum of Squares	df	Mean Square	F	Sig.
* Group preparation (0=selected controls, 1=dual only, 3=AP only)	Between Groups	4.466	2	2.233	9.638	.000
	Within Groups	72.044	312	.232		
	Total	76.510	314			

* $eta^2 = .070$

To further assess and compare the results for this variable with unequal variances (L= 8.844, p < .000), the Dunnett's T3 measure was used to conduct a pair-wise comparison as reported in Table 50.

Table 50.

Post hoc (Dunnett's T3) for One-Way ANOVA: Degree Earned Status: All Groups: Set-Point Fall 2001: N = 315.

(I) Group preparation	(J) Group preparation	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
None	Dual Only	159 (*)	.058	.022	301	017
	AP only	359(*)	.086	.000	572	146
Dual Only	None	.159 (*)	.058	.022	.018	.300
	AP only	200	.090	.087	421	021
AP only	None	.359 (*)	.086	.000	.146	.572
	Dual Only	.200	.090	.087	.021	.421

* The mean difference is significant at the .05 level.

As expected, the Earned Bachelor's Degree Status was highest for the AP group, followed by the DE group, and finally by the control group of students. Mean differences between the control and AP groups, as well as between the control and DE groups were statistically significant at a .05 level. However, there was no statistical significance found when the DE group was compared with the AP group in this model. That is, the AP group was no more likely to graduate with a bachelor's degree from LSSU within the minimal set time of five years when compared to the DE group, and both were more likely to graduate in this time period than students in the control group who had no postsecondary preparatory programming while a high school student.

Table 51 describes more thoroughly by group those who received their bachelor's degree from LSSU. As noted, students in the DE group had smaller mean scores and a smaller standard deviation when the number of years of attendance before degree attainment was compared on the same measure for the control group in this study. In addition, the DE group also reported the smallest minimum score for years of attendance (3.00 years) when ranges were considered across all groups.

Table 51.

Descriptives: Student Persistence (Years of Attendance) for Earned Bachelor's Degree: All Groups*: Set-Point Fall 2001: N = 133.

	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean Lower Upper Bound Bound		Minimum	Maximum	
None	49	4.668	.759	.1087	4.450	4.886	3.50	7.00	
Dual Only	59	4.314	.651	.085	4.143	4.486	3.00	7.00	
AP only	25	4.470	.785	.157	4.146	4.794	3.50	6.50	
Total	133	4.475	.730	.063	4.349	4.601	3.00	7.00	

* Obtained from LSSU's Student Persistence File on LSSU's SIS Program

Results from a one-way ANOVA are reported in Table 52. There was a significant difference in "Years of Attendance" for students when one considered the length of time it took to earn an LSSU bachelor's degree among the three subject groups, F(2, 130) = 3.216, p = .043, $eta^2 = .094$. With these results, the null hypothesis for Years of Attendance (H₀4₂) was rejected in this model

Table 52.

One-Way ANOVA: Years of Attendance for Earned Bachelor's Degree: All Groups: Set-Point Fall 2001: N = 133.

Years of Attendance		Sum of Squares	df	Mean Square	F	Sig.
* Group preparation (0=selected controls, 1=dual only, 3=AP only)	Between Groups	3.324	2	1.662	3.216	.043
	Within Groups	66.659	130	.517		
	Total	69.982	132			

 $eta^{2} = .094$

The Levene's Test to assess variance between the groups under study revealed that the groups did not differ significantly on this measure (L = .862, p=.425). Therefore, a conservative Bonferroni's measure for equal variance was used in *post hoc* evaluation of "Years of Attendance" for the three groups in the study.

Table 53 reports a statistically significant difference (p = .037) between the DE group and the control group of degree earned study subjects who started first-time, fulltime LSSU course work from fall semester 1996 up to fall semester 2001. Although there were no statistically significant findings in the analysis for the AP group on this measure, findings for the DE group were remarkable. The results showed that among DE and control group students who earned an LSSU bachelor's degree, the DE group spent significantly less time in postsecondary educational programming to earn that bachelor's degree when compared to control group students. In this way, high school participation in Michigan's DE Program not only provided an academic "jump start" for eligible high school students transitioning into postsecondary academics, but demonstrated its sustained value long-term with an accelerated rate for bachelor's degree achievement for subjects who completed their first year of full-time academic study at LSSU starting the same year that they earned their high school diploma..

Table 53.

Post hoc (Bonferroni's) for One-Way ANOVA: Years of Attendance Prior to Earning a Bachelor's Degree At LSSU by Group: All Groups: Fall 1996 to Fall 2001: N = 133.

(J) Group preparation (0=selected controls, 1=dual only, 3=AP only)	Mean Difference (I-J)	Std. Error	Sig	95% Confidence Interval		
			-	Lower Bound	Upper Bound	
Dual Only	.353(*)	.139	.037	.015	.692	
AP only	.198	.176	.791	230	.626	
None	353(*)	.139	.037	692	015	
AP only	155	.171	1.000	572	.261	
None	198	.176	.791	626	.230	
Dual Only	.155	.171	1.000	261	.572	
	(J) Group preparation (0=selected controls, 1=dual only, 3=AP only) Dual Only AP only None AP only None Dual Only	(J) Group preparation (0=selected controls, 1=dual only, 3=AP only)Mean Difference ofference (I-J)Dual Only.353(*)AP only.198None353(*)AP only155None198Dual Only.155	(J) Group preparation (0=selected controls, 1=dual only, 3=APMean Difference ErrorDual Only.155.139AP only.198.176None353(*).139AP only.155.171None.198.176	(J) Group preparation (0=selected controls, 1=dual Mean only, 3=AP Difference Std. only) (I-J) Error Sig. Dual Only .353(*) .139 .037 AP only .198 .176 .791 None 353(*) .139 .037 AP only .155 .171 1.000 None 198 .176 .791 Dual Only .155 .171 1.000	(J) Group preparation (0=selected Mean only, 3=AP Difference Std. 95% Con only) (I-J) Error Sig. Inter Dual Only .353(*) .139 .037 .015 AP only .198 .176 .791 230 None 353(*) .139 .037 692 AP only .155 .171 1.000 572 None 198 .176 .791 626 Dual Only .155 .171 1.000 261	

* The mean difference is significant at the .05 level.

Conclusion

This chapter presented the results of the data obtained from the review of a sevenyear case study on academic performance for students who started their first year of fulltime university study at Lake Superior State University the same year they received their high school diploma. Both short- and long-term academic achievement indicators were examined for three distinct student groups: the small population of LSSU students who participated in AP coursework while in high school; the population of LSSU students who participated in DE coursework while in high school; and a randomly selected control group of students who did not participate in a postsecondary academic preparatory program while in high school. Statistical analyses were conducted to help define these three groups and to begin to examine two things: 1) the impact of high school participation in postsecondary preparatory programming on first-year postsecondary academic performance at LSSU; and 2) the impact of high school participation in postsecondary preparatory programming on academic persistence toward achieving a bachelor's degree from LSSU.

The data in this chapter provided a series of snapshots about academic performance at LSSU by first-year, full-time students. Together these snapshots widened the lens of understanding about the impact of high school participation in academic preparatory programs on postsecondary academic achievement at LSSU. In Chapter 5, the researcher will apply the literature review to frame the findings presented here, specifically in terms of policy issues. In addition, the researcher will use the study's four research questions to guide the discussion of these findings, as well as the recommendations for future research on the topic.

CHAPTER 5

DISCUSSION AND RECOMMENDATIONS

Summary Listing of Key Findings Identified in Chapter 4

A summary listing of the key findings from each section identified in Chapter 4 frames the presentation for Chapter 5. The summary listing is followed by a discussion section that focuses on each of the four research questions upon which this study was based. Educational policy implications presented in greater depth at the end of this chapter focus first on Lake Superior State University as the institution under study, then on Michigan colleges and universities with similar concerns about first-year "persistence" and "graduation completion" among its students. In addition, these findings have policy implications for Michigan's State Department of Education, and potentially for other educational programs in "rust belt" states in the US.

Question 1.

Does the pre-university student profile (Sex, Race, Region of Michigan Residence, High School GPA, High School Percentile Class Rank, ACT Composite Score) of firstyear LSSU students who selected one of two postsecondary academic preparatory strategies while a high school student (Dual Enrollment or Advanced Placement) differ from first-year LSSU students who did not select a postsecondary academic preparatory strategy while a high school student?

Study Findings: Pre-University Student Profile Factors

 Of the first-year, full-time Michigan students who entered LSSU between the fall of 1996 and the fall of 2002, each year 3 to 5% selected a

postsecondary preparatory strategy while in high school. The majority of students who selected a postsecondary preparatory strategy earned postsecondary credit hours while high school students under Michigan's DE Program (PA 160) selected DE (82.5%).

- 2. Demographically, the proportion of male and female students was the same for the DE population group, the AP population group, and the randomly selected control group in this study. This distribution was also true for race, which indicated that at least in these study groups (AP, DE or control group) no one group was favored by one sex or one race.
- 3. Geographically, "Region of Michigan Residence" differed substantially across the three groups in this study. For first-year, full-time LSSU students, more than 75% of all three groups (DE, AP and control) came from Michigan's Lower Peninsula. For the population of DE first-year students who attended LSSU between 1996 and 2003, 92.2% were from Michigan's Lower Peninsula.
- 4. All three high school academic measures (High School GPA, ACT Composite Score and High School Percentile Rank) were significantly related to high school postsecondary preparatory status (AP and DE Programs), since these measures are closely related to one another. In support of the belief that grades carry more weight than tests in most cases (Astin, 1993), high school GPA consistently proved to be the strongest predictor of these three measures for both first-year GPA and bachelor's degree achievement at LSSU.

5. The greatest range of ACT Composite Scores came from the control group in this study (14 to 34). There was little dispersion for ACT Composite Scores within the AP group (23 to 32), while the DE group had ACT Composite Scores similar to the control group (ranging from 15 to 32). In relation to ACT student selectivity, some members in both the control group (N = 23) and the DE group (N=10) had an ACT composite scores below the ACT "open" selectivity level of 17.

Question 1 Discussion

As there had been no state or local studies to help define the subgroup of students who selected a postsecondary academic preparatory strategy while in high school, the intent of this question was to find out some basic information about the DE population at LSSU. The AP and DE first-year LSSU populations in this study successfully completed the first year of full-time study at LSSU the same year they graduated from high school. The control group was comprised of a randomly selected computer-generated group of students who did not participate in a postsecondary academic preparatory program while in high school.

Although a relatively small percentage of first-year, full-time LSSU students selected DE programming in high school to prepare them for academics at LSSU, the lack of research on this topic made it difficult to determine how these LSSU percentages compared with other Michigan universities. However, it is possible to look at the nature of LSSU to help explore some reasons that may have contributed to the small percentage of first-year students who entered LSSU

with postsecondary transfer credits earned through high school participation in DE or AP (LSSU Self-Study, 2000):

- LSSU is Michigan's smallest non-research state university,
- LSSU is located in Michigan's rural Upper Peninsula,
- LSSU is focused on teaching and primarily on bachelor's degree attainment,
- LSSU has a dual mission as a state university and a regional college; and
- LSSU has a wide ACT student selectivity level and is open to the regional student regardless of ACT score.

For these reasons, LSSU may appeal more to the current traditional high school graduate than to one who selects part-time postsecondary educational options while in high school. Many of LSSU's first-year students are graduates from high schools in rural school districts across Michigan's Lower Peninsula (LSSU Admissions Report, 2003). This pattern is especially true for those firstyear LSSU students who arrived on campus with AP and DE postsecondary credits earned while in high school (91% were from the Lower Peninsula). Philosophical, financial, and/or accessibility issues are some reasons given to explain why fewer AP programs are available in the smaller rural school districts in the state when compared to larger ones. Without in-house AP Programs, there are greater numbers of requests for options available through Michigan's DE Program (Michigan State Board of Education Report, 2003).

It must be noted that group membership in this study was determined through a self-selection process, which may have contributed to the lack of variation in the groups by sex or race. The equal representation of the three groups based on "preparatory strategy or not" should be qualified by a very limited number of other minority students in the study samples (less than 1%). The representation of Native American students in this group, though small, is encouraging given the fact that Native American first-year students do not traditionally begin full-time postsecondary academic programming the same year that they receive their high school diploma (LSSU Admission Report, 2003).

The scores on the pre-university academic performance factors used in this study are closely related to one another. Accordingly, only high school GPA was selected for the regression model in Question 3. Mean scores for High School GPA, Percentile Class Rank and ACT Composite Score were highest for those in the AP group. This finding was expected considering the nature of AP programming and its traditional association with "academically gifted and talented" high school students (The College Board, 2000). Most high school AP students have a long history of being provided educational enhancement opportunities by K-12 educators (Atwell & McLeod, 1994). Their status often overshadows the potential talents of other students in the district who do not have an "academic elitist identity" or the opportunities of educational enhancement associated with that identity.

The extent of variation between and within the three groups was evident in the range of composite scores for the ACT Test. Students in the randomly selected control group, who did not participate in a postsecondary academic preparatory program while in high school, had a mean ACT Composite Score of 21.39 (range of 14 to 34). These scores placed students in a wide range of selectivity, from below the "open selective" category to above the "highly

selective" level. In similar fashion, the DE group had a mean ACT composite score of 23.07 (range from 15 to 32) which crossed categories from below the "open selective" category to above the "highly selective" category. In contrast, the ACT composite scores for the small population of AP students were all tightly clustered around the "highly selective" mean score of 27.11 (range of 23 to 32).

Question 2

Does the first-year academic university profile (First Semester LSSU GPA, Second Semester LSSU GPA, Number of Enrolled Credit Hours First Semester, Number of Earned Credit Hours First Semester and Number of Degree MajoChanges) for LSSU students who selected one of two postsecondary academic preparatory strategies while a high school student (Dual Enrollment or Advanced Placement) differ from the first-year academic university profile for LSSU students who did not select a postsecondary academic preparatory strategy while a high school student?

Study Findings: First-year LSSU Student Academic Behaviors

 Students who participated in postsecondary preparatory programming as a high school student performed better on all LSSU academic outcome measures in this study, when compared to non-participating students (controls). High School GPA was positively correlated to the first-year, full-time student at LSSU. Both First and SecondSemester LSSU GPA varied significantly by postsecondary preparatory program status with a marked decrease for all study subjects from first to second semester. The greatest GPA decrease from first semester to second semester at LSSU

was with the AP study subjects (net decrease of .267). However, even with this decrease, an analysis of rank order for the three groups on all GPA measures was consistent with the AP group demonstrating the highest mean GPAs, followed by the DE group's mean GPA and then lastly by the control group's GPAs.

- 2. The number of "Enrolled" first-semester credit hours for the DE group did not differ greatly by group in this study (15 credit hours) although the number of "Earned" first-semester credit hours did vary by group. In rank order, AP students earned the most LSSU first-semester credit hours at 14.6 followed by the DE group with 13.73. Of the three groups, the control group earned the least number of credit hours in their first semester at LSSU (12.03 credit hours). The change from enrolled credits to earned credits for the control group was comparable to dropping on average one 3-credit hour enrolled course per student.
- 3. There was no significant difference between groups on "Number Degree Major Changes" made by students in the first year of full-time study at LSSU. Because this measure is heavily qualitative in its nature, further research needs to be conducted in an effort to provide meaning to this variable before it can be effectively used as a predictor or outcome variable.
- When compared with the control group in this study, the DE group consistently demonstrated substantial positive differences on all three outcome measures under review: 1) First Semester LSSU GPA; 2) Second

Semester LSSU GPA; and 3) the Number of Credit Hours Earned after the first semester of full-time study at LSSU.

Question 2 Discussion

Grade point average continues to serve as the standard for academic achievement and persistence in the first year of postsecondary study (Pascarella & Terenzini, 2005). It is commonly accepted as a reflection of academic success by internal and external stakeholders alike. As a measure, GPA has been successfully used as both an outcome tool and as a predictor for achievement in both high school and postsecondary academics (Adelman, 1999; Astin, 1993; Atwell & McLeod, 1994; Henderson & Masten, 1959; Kanoy, Wester, & Latta 2002; Pascarella & Terenzini, 1991).

As with high school GPA, first-semester LSSU GPA and second-semester LSSU GPA varied significantly by group in this study. As expected, postsecondary GPA for all students decreased from first to second semester, which reflected an adjustment period common at the midpoint in the first year of study (McCormick, 1997). Interestingly, the second-semester LSSU GPA for the DE group showed less of a decline in mean score (-.145) when compared with the control group (-.169) and the AP group (-.267). This finding supports the belief that previous exposure through DE programming may help students view postsecondary environment more clearly, which would result in less student mid-semester adjustments on average when compared to other subject groups in the study.

According to Stage and Hossler (2004), judging student success and persistence in postsecondary educational programming requires more than an analysis of GPA and student perceptions. It requires an examination of student behaviors demonstrated early in educational programming that reflects the academic interest for the student involved. Student behaviors serve as a reflection of how the student engages in the culture of postsecondary academics (Astin, 1993). In this study, the researcher examined the number of credit hours a student enrolled in to take during the first semester of educational programming, as well as the actual number of credit hours the student earned that first semester of fulltime postsecondary academic study. The number of times the student changed his/her degree major in the first year of postsecondary academic programming was alsoexamined the belief that more degree major changes may reflect less student focus and commitment.

Based on the literature, it would appear that the student who frequently changed his/her degree major at LSSU may have more difficulty with persistence as evidenced by the additional time it would take for bachelor's degree attainment (Bouffard, Boisvert, Vezeau, & Larouche, 1995). Also, there was an expectation that more student changes of the academic major would occur in the second semester of the first year of postsecondary study, based on earlier research in this area by Meulemann (1992). True to Meulemann's findings, over the seven years of this study, about 65% of all the degree major changes that were made in the first year occurred in the second semester of academic programming. Overall, there was no significant difference between the three groups in this study when

looking at the "Number of Degree Major Changes" in the first year of postsecondary academics at LSSU. However, it must be noted that fewer DE students came into academic programming at LSSU (17.2%) with an undeclared major when compared with the control group in this study (30.39%). Because this measure has strong qualitative underpinnings (more changes cannot be considered better or worse until the types of changes are considered), this variable could not be fully explored in this study.

Enrolled and Earned Credit Hours for each student group was another interesting measure of student academic involvement in postsecondary academics. This analysis revealed that each of the three student groups enrolled for about the same number of credit hours in anticipation of their first semester of full-time academic study at LSSU (a mean of 15 credit hours). Although "Enrolled Credit Hours" for first-semester study at LSSU did not vary significantly across groups, Credits Earned from First-semester study at LSSU did vary significantly.

The control group made the academic decision to drop about three of their enrolled credit hour load (about one 3-hour class) on average over the course of the first-semester. The control group earned, on average, 12.03 credit hours in the first semester of full-time study at LSSU. During this same period of time, the DE group dropped, on average, about half that number of enrolled credit hours (1.27 credit hours), ending with a mean total of 13.7 credit hours earned for the first semester of full-time study. The AP student group dropped, on average, .73 credits, bringing them to a mean total of 14.63 credit hours earned in their first semester at LSSU. This finding supports claims in the literature that post-

secondary anticipatory socialization experiences can provide high school students with a stronger, more realistic set of expectations that will guide them in academic decision-making when they become fully immersed in the context of postsecondary academics (McCormick, 1997).

Question 3.

Does participation in Dual Enrollment programming, participation in Advanced Placement programming, High School GPA, Race, Sex, and Region of Michigan Residence, individually or additively combine to predict academic performance for students in the first year of bachelor's degree focused postsecondary education at LSSU?

Study Findings: Predictors of First-year Student Performance at LSSU.

- Pre-university student profile factors (DE participation, AP participation, HS GPA, Sex, Race and Region of Michigan Residence) as independent variables helped to explain about 34% of the variance in the First Semester LSSU GPA model and about 33% of the variance in the Second Semester LSSU GPA model.
- 2. When looking at the Number of Credit Hours Earned First Semester at LSSU as another outcome measure, the same six predictor variables accounted for a significant variance in the model, but High School GPA with its positive association was the only statistically significant predictor (p < .05).

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3. As an individual predictor, high school participation in dual enrollment programming was found to be significantly and positively related to First Semester LSSU GPA (p = .032). It was marginally significant in the regression model for Second Semester LSSU GPA (p = .072), and not significant in predicting the Number of Credit Hours Earned in the First Semester of full-time study at LSSU (p = .240).

Question 3 Discussion

The first year of college has become a much higher priority today than it was in the 1960s when Nevitt Sanford wrote on the importance of challenge and support for promoting academic success among first-year college students (Upcraft, Gardner, Barefoot, & Associates, 2005). The transition from high school academics to postsecondary study is not always a smooth road, but one that can be paved through appropriate utilization of resources that promote a student's academic capital (Berger, 2004). Policies regarding educational programming efforts need to be developed based on solid research so that educational decisions have a strong evidence base. In addition, all evidence does not hold equal weight. Though academic measures (e.g., LSSU GPA) and academic achievements (e.g., graduation rates) tell only a limited portion of the postsecondary student success story (Upcraft, Gardner, Barefoot, & Associates, 2005), the portion that these measures tell fit the policy requirements of many internal and external stakeholders interested in promoting educational success.

There were six predictor variables selected for study of this question (Sex, Race, Region of Michigan Residence, HS GPA, AP participation status, and DE

participation status) using three regression models. Overall, high school GPA served as the best predictor in all the models used to answer Question 3. This factor served as a slightly better predictor for the student's First Semester LSSU GPA (beta of .537) when compared to the student's Second Semester LSSU GPA (beta of .530). Both semester LSSU GPA models showed that the selected preuniversity profile variables accounted for about 33% to 34% predictability in the models (adjusted R^2 scores were .341 and .330), with most being accounted for by the HS GPA predictor.

As mentioned earlier, HS GPA has a strong research foundation that supports its role as a predictor for a student's future academic performance (Adelman, 1999; Astin, 1993; Atwell & McLeod, 1994; Henderson & Masten, 1959; Kanoy, Wester, & Latta 2002; Pascarella & Terenzini, 1991). What is not so well documented in the literature is the role that postsecondary academic preparatory programming plays in this predictive process. In attempts to determine if high school participation in either AP or DE programming ranked as predictors for the three outcome measures, both variables were included as separate predictor variables in the three regression models.

For First Semester LSSU GPA, AP participation was more significant in the model (p=.009) when compared with the significance for DE participation (p=.032), although the standardized regression coefficients (betas) for both were comparable in strength (AP accounted for 11% and DE accounted for 9% of the variability in that model). As postsecondary academic transition programs, it is not surprising that participation in either of these postsecondary preparatory

programs would impact a student's first semester postsecondary achievement. Given the nature of AP programming where participants are "selected" and treated as academic elites in their high school settings, these nurtured and supported students demonstrate the success they have been groomed for since high school (and in some cases even earlier), which helps to account for their stronger show on the LSSU GPA First Semester (Bailey, Hughes, & Karp, 2002). Of particular interest is that a more open membership academic preparatory program like DE is as important as AP in predicting First Semester LSSU GPA in this model, providing hope for those "non-honors" high school students who have academic potential that has yet to be fully realized.

In looking at these same predictors for Second Semester LSSU GPA, neither high school postsecondary academic preparatory program was found to be a statistically significant predictor in the model. The DE group did a better job of holding its ground from first semester to second semester of first-year, full-time study at LSSU (the AP significance level was reported as p = .136 compared with the DE significance level which was reported as p = .072). This finding provides an unexpected snapshot related to the first-year experience, and one that should be considered for future study.

Finally, previous participation in AP (p = .450) or DE (p = .240) was not found to be significantly related to the number of credit hours earned in the first semester of full-time study at LSSU. The strength of HS GPA as a predictor in this model accounted for less of the variance when compared to previous regression models used to answer Question 3. This finding implies that, as an

outcome measure, "Number of Earned Credit Hours First Semester" has more variability then the six predictors used in the model accounted for, encouraging further study focused on identifying other potential predictors for analysis of this variable.

Looking for the variables that optimize a student's academic capital are a worthy quest, especially if educators and administrators can support and nurture student participation in those activities that optimize the student's academic capital early in postsecondary educational programming. To effectively support these efforts, we must have a strong literature foundation on which to base our support and nurturance, and this can only be accomplished by supporting continuing research efforts that look at both the short-term and long-term impact associated with nontraditional academic preparatory programming.

Question 4

Does the LSSU graduation profile for first-time full-time LSSU students who selected one of two postsecondary academic preparatory strategies while a high school student (Dual Enrollment or Advanced Placement) differ from the first-year, full-time LSSU students who did not select one of two postsecondary academic preparatory strategies while a high school student. Study Findings: LSSU Student Persistence and the Graduation Profile

 First-year students admitted to LSSU beginning the fall of 1996 up to the fall 2001, who participated in a postsecondary preparatory program while in high school (AP programming or DE programming), received an LSSU bachelor's degree at higher rates than did LSSU first-year students

admitted during the same period of time, who did not participate in a postsecondary preparatory academic program while in high school.

Of all first-year students admitted to LSSU beginning the fall of 1996 up to the fall of 2001, who received an LSSU bachelor's degree credential, the DE group, on average, earned their bachelor's degree in less time when compared to both the control group and the AP group in this study.

Question 4 Discussion

The goal of achieving a bachelor's degree credential occurred at higher rates for the small population of AP students in this study (67.6%) and for the DE population group (47.5%), when compared with the control group students (31.6%) for the same period of time. More impressively, at a time when the state of Michigan is pushing to graduate more postsecondary students in Michigan more quickly (Cherry, 2004), the fact that the DE student group earned their bachelor's degree sooner than the AP or control groups needs to be acknowledged and studied further.

Another interesting finding from Question 4 focused on student retention in first-year, postsecondary study. Although there were only a few AP students in this institutional case study (N=38), all successfully completed their first year of academic study at LSSU. For the 192 students identified from the records with DE transfer credit hours, 180 completed their first year at LSSU (93.75% retention rate). In contrast, the randomly selected control sample which begun with 250 students, had a total of 227 who successfully completed the first year at LSSU (90.8% retention rate). A follow-up review of individual student files

revealed that of the 35 first-year non-completers, all twelve DE students requested an official LSSU transcript be sent to another institution within the first full year of study. This finding compared with 9 of the 23 non-completers in the control group who made the same request, leaving the status of the remaining fourteen control group students in question as to their postsecondary activities in the first full year after high school graduation. The findings from Question 4 support the belief that academically guided curricular "front loading" for eligible high school students through formal academic programming efforts: 1) eases the academic transition from high school into full-time postsecondary study, 2) supports academic persistence through the first year of postsecondary study, and 3) positively impacts long-term student achievement aimed at earning a bachelor's degree.

Overall, this research study, which was aimed at answering four research questions about the educational impact of high school participation in dual enrollment later in the student's postsecondary educational career at LSSU, provided educational policy implications at four distinct levels: 1) for LSSU as the institution where the study was conducted; 2) for other institutions of higher education in Michigan; 3) for the State of Michigan and its State Board of Education; and 4) for similar institutions of higher education across the US.

Educational Policy Implications

For Lake Superior State University

Research obtained from this case study analysis effectively demonstrated that DE participation made a significantly positive difference for those students who earned a bachelor's degree from LSSU during this 7-year period of study. In the short term, first-year, full-time academic performance at LSSU was found to be stronger for the DE group when compared with the control group. This leads one to question how DE participation assisted the first-year student in his/her persistence through the first year of transition into full-time postsecondary academics. Long term, these same DE participants graduated at higher five-year graduation rates when compared with control group subjects, and took less time to accomplish that task when compared with both control and AP student groups. These research findings support LSSU's educational policy decision to electively participate in Michigan's Dual Enrollment Program to the benefit of its students and the educational community.

Lake Superior State University was the right place to conduct this primal study seeking information about the impact that high school participation in dual enrollment has later in the student's postsecondary academic career because LSSU: 1) is the smallest of Michigan's 15 state institutions of higher education; 2) has two state-mandated missions to serve both regional college and state university educational needs operating under a K-16 philosophy of educational service; 3) has a broad student base that represents greater level of academic performance (as measured by ACT composite scores that ranged from 15-32 points in the DE group); 4) has been fully involved in accepting postsecondary academic credits earned under PA 160 since the start of the program in

1996; and 5) has an administrative student data management system that has remained the same for the entire 7-year period of the study.

Though LSSU policy and practice for accepting earned dual enrollment postsecondary credit hours from recently graduated Michigan high school students is justified with this study, it is recommended that additional research be conducted to examine LSSU's educational practices regarding its role as a regional provider for eligible high school students who wish to earn postsecondary academic credits at LSSU under PA 160. This second-level study would assist LSSU in examining how it may be able to use PA 160 to better meet its regional college charge, while gaining a better understanding for the strength of its local partnerships with regional secondary educational institutions.

For Other State Universities in Michigan

Based on the findings presented in this study at LSSU, other state institutions of higher education in Michigan need to reflect on their individual policies and practices related to dual enrollment participation at their institutions. Since the State of Michigan's Lt. Governor's Commission Report on Higher Education and Economic Growth in Michigan called for a 10% high school participation rate statewide over the next few years (Cherry, 2004), all of Michigan's public institutions of higher education should be called on to study the impact of PA 160 participation (or lack of participation) on their student populations since 1996. The data sets obtained from other state colleges and universities would assist state policy advisors in determining how best to support the Commission's recommendations for DE participation statewide. In addition to looking at the role community colleges may play in these efforts, there may be some state

universities best suited to meet high school DE programming needs based on a variety of institutional factors (e.g., geographic disparities for access to educational enhancement services, university performance in student retention and graduation rates, and the like). *For Michigan's State Board of Education*

As Michigan's lead agency for K-16 education, it is important that the Michigan Department of Education have meaningful data available that addresses dual enrollment participation across the state. Other than student head counts used to shift secondary foundation grant money to pay postsecondary educational programming associated with DE participation, there have been no state-sponsored data collection and analysis efforts to assess the impact of DE participation, since its implementation in 1996. The people in the State of Michigan (who have supported this program with their tax dollars from the beginning) deserve to know about the costs and benefits associated with this statesupported academic postsecondary preparatory strategy. In addition, it is important to discover where DE participation has demonstrated educational differences, and how these differences translate into educational improvement in the state.

It is important that all the recommendations in the State of Michigan's Lt. Governor's Commission Report on Higher Education and Economic Growth in Michigan (Cherry, 2004) calling for an increase in DE participation statewide, be evidence-based. Once DE practice and outcome data sets become available at the state level, annual reports to educational administrators in secondary and postsecondary institutions would foster a shared understanding about dual enrollment programming in Michigan. Findings could be compared and contrasted over time, and viewed contextually within educational and fiscal frames for Michigan, the region and the nation. Information obtained at this

level would assist Michigan educational policy advisors to determine best strategies to meet the educational needs for young adults in our state, providing the evidence for Michigan's educational policy and practice to evolve as the state's educational needs evolve.

For State Boards of Education Outside of Michigan

A commonly accepted fact in the US today is that dual enrollment programming is a mechanism that increases student accessibility to postsecondary academic programming (Davies, Williams, & Webb, 1997). This finding has implications for all forms of public education in and out of the state of Michigan. Because all 50 states have statutes to provide for dual enrollment programming as a postsecondary preparatory educational option, there has been greater interest in looking at how other states are working to optimize these educational services for the young adults they serve.

Regionally speaking, the State Departments of Education in the "rust belt" states of the US share commonalities with Michigan that influence state-supported educational services such as dual enrollment. For this reason, state boards of education outside of Michigan may wish to examine findings from this research study at LSSU as they look to develop educational impact studies of their own. In addition, specific postsecondary institutions located in other states that are similar in size and scope to LSSU may be interested in looking at the findings from this study as they work to improve their own DE policies and practice directives.

Conclusion

Public outcry for accountability continues to be heard nationally and statewide in many public areas of service in the US, including education. For well-intended

educational programs to continue to survive in the present economic climate, it is important that internal and external stakeholders share a common understanding of educational program options that include such things as goals, benefits, costs, and outcomes. With the enactment of PA 160, Michigan implemented an educational effort aimed at enhancing academic programming for eligible high school students who wanted to prepare academically for college prior to achieving their high school diploma. This tax-supported, "jump start," part-time, school-of-choice option known as Dual Enrollment, has not been evaluated in Michigan since its start in 1996, leaving a gap that needs to be filled on a variety of levels.

The purpose of this particular research was to examine dual enrollment programming as a case study in efforts to conduct a policy analysis of Dual Enrollment Programming in Michigan. All first-year, full-time LSSU students in this study were Michigan residents who graduated from high school the same year they started their first year of full-time postsecondary academic study at Lake Superior State University. In addition, all study participants completed their first year at LSSU with two full-time consecutive semesters and were evaluated academically using their LSSU grade point averages.

Though these factors told us something about what DE participants at LSSU shared with other first-year, full-time students during the same period of study at LSSU, we did not know how (or if) this student cohort differed academically, or how high school participation under PA 160, influenced their academic performance in their first year of postsecondary academics. What this study did accomplish was to broaden our understanding of the impact of DE participation on first-year, full-time postsecondary

study at one small rural state institution of higher education in Michigan. Further studies need to be conducted on different aspects of DE programming so that our knowledge base can continue to expand beyond the walls of Lake Superior State University.

Recommendations

The current study produced some significant findings for a small group of firstyear, full-time postsecondary students at LSSU who participated in Dual Enrollment as one of two postsecondary preparatory strategies used by high school students in Michigan. Both the short-term and long-term findings from this isolated case study suggests that there is merit in encouraging continued local, regional and state research studies of dual enrollment programming across Michigan. These efforts will strengthen the recommendation made in the Michigan Lt. Governor's Commission Report on Higher Education and Economic Growth (Cherry, 2004 p. 19) which stated that by 2015, 50% of the state's high school students will earn college credit as an enhancement to their high school curriculum.

First, it is essential that Michigan's Department of Education develop a solid data base related to dual enrollment programming in Michigan, tracking high school participants and their postsecondary educational progress over time. A solid research foundation is required if advisors are expected to develop sound institutional policy and practice decisions. Once the Department of Education has DE participation outcome data available, dissemination of this data to secondary and postsecondary educational administrators across the state will work to establish a common understanding about DE

and its impact on participating students, state educational institutions and Michigan as a whole.

Secondly, the state should conduct an extensive legislative content analysis of PA 160 (and its amendments) within the context of the current political, educational and fiscal environments in Michigan. Complementing the content analysis of this public act, a practice analysis is needed to determine how PA 160 is being implemented across the state. Finally, there should be a support analysis conducted to determine whether the initial eligibility requirements, funding mechanisms and postsecondary counseling support services are continuing to meet the needs today as they did at the start of PA 160 in 1996.

Another study recommendation focuses on the need to examine first-year, postsecondary "non-completers" more closely at all institutions across Michigan. Firstyear attrition represents a large part of all institutional departure across the country (Tinto, 1993). There is value, therefore, in studying full-time and part-time students who engage in postsecondary academics (by enrolling in postsecondary education programming and working through the process of their acceptance into the institution only to leave before finishing their first year of postsecondary study). Anticipatory socialization, which is a strong component of Michigan's DE Program, may have an important role to play in persistence for students who prematurely exit postsecondary educational programming in our state. Michigan is the only state in the US with a Dual Enrollment statute that mandates postsecondary counseling for all eligible high school student participants. Postsecondary counseling and guidance has been recognized as a valuable student engagement variable in the student persistence literature (Amenkienan,

2000; Astin, 1993; Midcap, 2003; Tinto, 1993), but has yet to be fully assessed in this context for DE students in Michigan.

Finally, it is suggested that Lake Superior State University continue to actively participate in Michigan's Dual Enrollment Program, serving as both a provider and recipient of DE postsecondary transfer credits. As an institution, it is important that LSSU continue to study the short-term and long-term impact of its DE student participants, focusing more closely on expanding its efforts as a provider of dual enrollment postsecondary credits to eligible high school students in the region. In addition, the University needs to consider DE as a recruitment strategy while it looks to bolster its regional community college role. This recommendation calls for a greater cooperation and collaboration among all the educational institutions in the area, focusing first on our common commitment to optimize the academic capital for all the students we serve.

APPENDIX

PUBLIC ACT NO. 160 H.B. No. 4643 EDUCATION – POSTSECONDARY ENROLLMENT OPTIONS ACTS – CREATION

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Appendix

1996 Mich. Legis. Serv. P.A. 160 (H.B. 4643) (WEST)

MICHIGAN 1996 LEGISLATIVE SERVICE Eight-Eighth Legislature, Regular Session Copr. @ West 1996. All rights reserved.

PUBLIC ACT NO. 160 H.B. No. 4643 EDUCATION – POSTSECONDARY ENROLLMENT OPTIONS ACTS – CREATION

AN ACT to establish a postsecondary enrollment options program for certain students enrolled in Michigan schools' to prescribe certain duties of public schools; to prescribe certain powers and duties of certain state departments, officials, and agencies; and to repeal acts and parts of acts.

The People of the State of Michigan enact:

M.C.L.A. § 388.511

Sec. 1. This act shall be known and may be cited as the "postsecondary enrollment options act."

M.C.L.A. § 388.512

Sec. 2. The purpose of this act is to provide a wider variety of options to high school pupils by encouraging and enabling qualified pupils to enroll in courses or programs in eligible postsecondary institutions.

M.C.L.A. § 388.513

Sec. 3. As used in this act:

- (a) "Community college" means a community college established under the community college act of 1966, Act No. 331 of the Public Acts of 1966, being sections 389.1 to 389.195 of the Michigan Compiled Laws, or under part 25 of the revised school code, Act No. 451 of the Public Acts of 1976, being sections 380.1601 to 380.1607 of the Michigan Compiled Laws, or a federal tribally controlled community college located in this state that is recognized under the tribally controlled community college assistance act of 1978, Public Law 95-471, and is determined by the department to meet the requirements for accreditation by a recognized regional accrediting body.
- (b) "Department" means the department of education.
- (c) "Eligible charges" means tuition and mandatory course fees, material fees, and registration fees required by an eligible institution for enrollment in an eligible course. Eligible charges also include any late fees charged by an eligible postsecondary institution due to the school district's failure to make a required payment according to the timetable prescribed under this act. Eligible charges do not include transportation or parking costs or activity fees.
- (d) "Eligible course" means a course offered by an eligible postsecondary institution that is not offered by the school district in which the eligible student is enrolled, or that is offered by the school district but is determined by the board of the school district tonot

be available to the eligible student because of a scheduling conflict beyond the eligible student's control; that is an academic course not ordinarily taken as an activity course; that is a course that the postsecondary institution normally applies toward satisfaction of degree requirements; that is not a hobby craft or recreational course; and that is in a subject area other than physical education, theology, divinity, or religious education. However, for an eligible student who has not successfully completed the requirements for a state endorsement in all subject areas under section 1279 of Act No. 451 of the Public Acts of 1976, being section 380.1279 of the Michigan Compiled Laws, an eligible course is limited to a course in a subject area for which he or she has successfully completed the requirements for a state endorsement, a course in computer science or foreign language not offered by the school district, or a course in fine arts as permitted by the school district.

- (e) Eligible postsecondary institution" means a state university, community college, or independent nonprofit degree-granting college or university that is located in this state and that chooses to comply with this act.
- (f) "Eligible student" means, except as otherwise provided in this subdivision, a student enrolled in at least 1 high school class in at least grade 11 in a school district in this state, except a foreign exchange pupil enrolled in a school district under a cultural exchange program, who has successfully completed the requirements for a state endorsement in all subject areas under section 1279 of Act No. 451 of the Public Acts of 1976. However, for a student enrolled in a school district in grade 12 who has not successfully completed the requirements for a state endorsement in all subject areas under section 1279 of Act No. 451 of the Public Acts of 1976. However, for a student enrolled in a school district in grade 12 who has not successfully completed the requirements for a state endorsement in all subject areas under that section, the students is an eligible student only for the limited purpose of enro9lling in 1 or more eligible courses under this act in a subject area for which he or she has successfully completed the requirements for a state endorsement, in computer science or foreign language not offered by the school district, or in fine arts as permitted by the school district.
- (g) "Intermediate school district" means that term as defined in section 4 of Act No. 451 of the Public Acts of 1976, being section 380.4 of the Michigan Compiled Laws.
- (h) "School district" means that term as defined in section 6 of Act No. 451 of the Public Acts of 1976, being section 380.6 of the Michigan Compiled Laws, a local act school district as defined in section 5 of Act No. 451 of the Public Acts of 1976, being section 380.5 of the Michigan Compiled Laws, or a public school academy organized under part 6a or 6b of Act No.451 of the Public Acts of 1976, being sections 380.501 to 380.507 and 380.511 to 380.518 of the Michigan Compiled Laws.
- (h) "State university" means a state institution of higher education described in section 4, 5, or 6 of article VIII of the state constitution of 1963.

M.C.L.A. § 388.514

Sec. 4.

- (1) The school district in which an eligible student is enrolled shall provide to the eligible student a letter signed by the student's principal indicating the student's eligibility under this act.
- (2) An eligible student may apply to an eligible postsecondary institution to enroll in 1 or more eligible courses offered by that eligible postsecondary institution and, if accepted, may enroll in 1 or more of those courses.
- (3) Within a reasonable time after registration, the eligible postsecondary institution shall send written notice to the eligible student and his or her school district. The notice shall indicate the course or courses and hours of enrollment of that eligible student. The eligible postsecondary institution shall notify the eligible student about tuition, fees, book, materials, and other related charges, as determined by the postsecondary institution, and shall notify the eligible student of the eligible charges that will be billed to the school district under subsection (4).
- (4) Unless otherwise agreed between the eligible postsecondary institution and the school district, after the expiration of the institution's drop/add period for the course, an eligible postsecondary institution shall send a bill to the eligible student's school district detailing the eligible charges for each eligible course in which the student is enrolled under this act.
- Upon receiving the bill under subsection (4), the school district shall cause to be paid to (5) the eligible postsecondary institution on behalf of the eligible student an amount equal to the lesser of the amount of the eligible charges or the pro-rated percentage of the state portion of the foundation allowance paid on behalf of that particular eligible student under section 20 of the state school aid act of 1979, Act No. 94 of the Public Acts of 1979, being section 388.1620 of the Michigan Compiled Laws, with the proration based on the proportion of the school year that the eligible student attends the postsecondary institution. A school district may pay more money to an eligible postsecondary institution on behalf of an eligible student than is required under this act, and may use local school operating revenue for that purpose. The eligible student is responsible for payment of the remainder of the costs associated with his or her postsecondary enrollment that exceeds the amount the school district is required to pay under this act and that are not paid by the school district. As used in this subsection, "local school operating revenue" means that term as defined in section 20 of Act No. 94 of the Public Acts of 1979.
- (6) An eligible postsecondary institution shall not charge a late fee to an eligible student or a school district for a payment that is made in compliance with the timetable prescribed under this act even if the payment would otherwise be considered late by the postsecondary institution.
- (7) A school district may require an eligible student to provide, on a form supplied by the school district, reasonable verification that the eligible student is regularly attending a postsecondary course.
- (8) If an eligible student enrolled in an eligible course under this act does not complete the eligible course, and if the school district has paid money for the course on behalf of the student, the postsecondary institution shall forward to the school district any funds that are refundable due to non-completion of the course. The school district shall then forward to the student any refunded money in excess of the amount paid by the school district for the course on behalf of the student.
- (9) A school district shall make available to an eligible student enrolled in the school district copies of all correspondence in the possession of the school district regarding the eligible student's participation in postsecondary enrollment under this act. Correspondence described in this subsection shall be kept by the school district for at least 1 year.
- (10) If a school district pays for books for an eligible student for a postsecondary course under this section, the books are the property of the school district and shall be turned over to the school district after the eligible student completes the course.
- (11) This section does not apply to any postsecondary courses in which an eligible student is enrolled in addition to being enrolled full-time in that eligible student's school district; to a postsecondary course an eligible student is retaking after failing to achieve a satisfactory grade; or to a course contrary to the eligibility provisions of this act. In determining full-time enrollment in a school district under this act or full-time equated membership under Act No. 94 of the Public Acts of 1979, being sections 388.1601 to 388.1772 of the Michigan Compiled Laws for pupils enrolled in a postsecondary institution under this act, the pupil's enrollment in both the school district and the postsecondary institution shall be counted as enrollment in the school district and a pupil shall not be considered to be enrolled in a school district less than full-timely solely because of the effect of the pupil's postsecondary enrollment, including necessary travel time, on the number of class hours provided by the school district to the pupil.
- (12) This act does not require a school district to pay or otherwise provide financial support for transportation or parking costs necessary for an eligible student to participate in

postsecondary enrollment under this act. A school district is not liable for any injury incurred by an eligible student that is related to transportation necessary for the eligible student to participate in postsecondary enrollment under this act.

M.C.L.A. § 388.515

Sec. 5. An eligible student enrolled in a postsecondary institution under this act shall not participate in intercollegiate athletics at the postsecondary institution while he or she is enrolled under this act. An eligible student who violates this subsection forfeits his or her eligibility under this act.

M.C.L.A. § 388.516

Sec. 6. An eligible postsecondary institution may give priority to its postsecondary students when enrolling eligible students in postsecondary courses under this act for high school credit only. Once an eligible student has been enrolled in a postsecondary course under this act, the postsecondary institution shall not displace the eligible student with another student.

M.C.L.A. § 388.517

Sec. 7.

- (1) An eligible student may enroll in, and receive payment by the school district under section 4(5) [FN1] of all or part of eligible charges for, an eligible course under this act for high school credit or postsecondary credit, or both. At the time an eligible student enrolls in a postsecondary course under this act, he or she shall designate whether the course is for high school or postsecondary credit, or both, and shall notify both his or her high school and the postsecondary institution of that designation. An eligible student taking more than 1 postsecondary course under this act may make different credit designations under this subsection for different courses. An eligible student shall not audit a postsecondary course in which he or she is enrolled under this act.
- (2) A school district shall grant academic credit to an eligible student enrolled in an eligible course for high school credit under this act if he or she successfully completes the course, as determined by the eligible postsecondary institution. The amount of high school credit granted by a school district for a postsecondary course completed under this act shall be determined by the school district.
- (3) The high school credits granted to an eligible student under this act shall be counted toward the graduation requirement and subject area requirements of the school district. Evidence of successful completion of each course and high school credits granted shall be included in the eligible student's high school record. Subject to section 438 of subpart 2 of part C of the general education provisions act, title IV of Publid Law 60-247, 20 U.S.C. 1232g, commonly referred to as the family educational rights and privacy act of 1974, an eligible postsecondary institution shall provide the school district with a copy of the eligible student's grade in each course taken for high school credit under this act. Upon the request of an eligible student, his or her high school record and transcript shall also include evidence of successful completion and postsecondary credits granted for a course taken for postsecondary credit under this act. In either case, the eligible student's high school record and transcript shall an eligible postsecondary institution and identify the postsecondary institution.
- (4) If a student enrolls in an eligible postsecondary institution after leaving high school, the eligible postsecondary institution, in accordance with institutional policy, shall award postsecondary credit for postsecondary courses successfully completed by that student for high school credit under this act at that eligible postsecondary institution. An eligible

postsecondary institution shall not charge a student for credit awarded under this subsection.

[FN1] Section 366.514 (5)

M.C.L.A. § 388.518

Sec. 8. This act does not restrict the ability of an eligible student or any other pupil to enroll in any postsecondary institution without tuition and fee support under this act.

M.C.L.A. § 388.519

Sec. 9.

- (1) Each school district shall provide information to all high school students on the postsecondary enrollment options under this act, including enrollment eligibility; the institutions and types of courses that are eligible for participation; the decision-making process for granting academic credits; an explanation of eligible charges that will be paid by the school district and of financial arrangements for eligible charges and for paying costs not paid for by the school district: eligibility for payment of all or part of eligible charges by the school district under this act; an explanation that, if the student qualifies for payment of all or part of eligible charges by the school district under this act, the school district will pay that support directly to the postsecondary institution upon being billed by the postsecondary institution and that the student is not responsible for that payment but is responsible for payment of costs not paid for under this act; available support services; the need to arrange an appropriate schedule; consequences of failing or not completing a postsecondary course in which the eligible student enrolls; the effect of enrolling in a postsecondary course on the eligible student's ability to complete the required high school graduation requirements: an explanation of how the parent or legal guardian of a student in at least grade 10 may request that the student be allowed to take a test or assessment used for a state endorsement early in order to qualify to be an eligible student; and the academic and social responsibilities that must be assumed by the eligible student and his or her parent or quardian.
- (2) To the extent possible, a school district shall provide counseling services to an eligible student and his or her parent or guardian before the eligible student enrolls in postsecondary courses under this act to ensure that the eligible student and his or her parent or guardian are fully aware of the benefits, risks, and possible consequences of enrolling in a postsecondary course. The person providing the counseling shall encourage the eligible student and his or her parent or guardian to also use available counseling services at the eligible postsecondary institutions before the quarter or semester of enrollment to ensure that anticipated plans are appropriate. A school district may provide the counseling required under this section in a group meeting if additional personalized counseling is also made available.
- (3) Before enrolling in an eligible course at an eligible postsecondary institution under this act, an eligible student and his or her parent or guardian shall file with the eligible postsecondary institution a signed form provided by the eligible student's school district stating that the student is an eligible student and has received the information and counseling specified in subsections (1) and (2) and that the student understands the responsibilities that must be assumed in enrolling in the course. Upon request, the department shall provide technical assistance to a school district and to an eligible postsecondary institution in developing appropriate forms and counseling guidelines for purposes of this section.

M.C.L.A. § 388.520

Sec. 10. By May 1, 1996, and by March 1 of each succeeding year, a school district shall provide general information about the postsecondary enrollment options under this act to all pupils in graced 8 or higher.

M.C.L.A. § 388.521

Sec. 11.

- (1) Each intermediate school district annually shall collect from each of its constituent school districts and provide to the department at the same time that it submits the annual comprehensive financial report required under section 18 of the state school aid act of 1979, Act No. 94 of the public Acts of 1979, being section 388.1618 of the Michigan Compiled Laws, information for the immediately preceding school year on all of the following:
 - (a) The amount of money expended by the school district for payments required under this act.
 - (b) The number of eligible students who were enrolled in the school district and the number of those eligible students who enrolled in 1 or more postsecondary courses and received payment of all or part of eligible charges under this act, both in the aggregate and by grade level.
 - (c) The percentage of the school district's enrollment represented by the eligible students described in subdivision (b), both in the aggregate and by grade level.
 - (d) The total number of postsecondary courses for which the school district made payment under this act, the number of those courses for which postsecondary credit was granted, the number of those courses for which high school credit was granted, and the number of those courses that were not completed by the eligible student.
- (2) Not later than March 1 of each year, the department shall prepare and submit to the house and senate fiscal agencies and the department of management and budget a summary annual report on the information received under subsection (1).

M.C.L.A. § 388.522

Sec. 12

- (1). The department may promulgate rules it considers necessary to implement this act. Rules shall be promulgated under the administrative procedures act of 1969, Act No. 306 of the Public Acts of 1969, being sections 24.201 to 24.328 of the Michigan Compiled Laws.
- (2) If the Michigan supreme court rules that sections 45 and 46 of the administrative procedures act of 1969, Act No. 306 of the Public Acts of 1969, being sections 24.245 and 24.246 of the Michigan Compiled Laws, are unconstitutional and a statute requiring legislative review of administrative rules is not enacted within 90 days after the Michigan supreme court ruling, the department may not promulgate rules under this section.

<< Repealed: MI ST 388.511, 388.512, 388.513, 388, 514, 388.515, 388.516, 388.517, 388.518, 388.519, 388.520, 388.521, 388.522, 388.523, 388.524 >>

M.C.L.A. § 388.523

Sec. 13

- (1) This act shall take effect April 1, 1996. Payment of all or part of eligible charges under this act for postsecondary courses shall being in the state fiscal year beginning on October 1, 1996.
- (2) This act is repealed effective June 30, 2001.

M.C.L.A. § 388.524

Sec. 14. This act shall not take effect unless all of the following bills of the 88th Legislature are enacted into law:

(a) House Bill No. 4640

(b) House Bill No. 4642.

This act is ordered to take immediate effect.

Approved April 4, 1996.

Filed April 8, 1996.

MI LEGIS 160 (1996) END OF DOCUMENT

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