Prerequisite Courses

Do students who transfer them in have lower performance on later courses than students who take them at SU?

Overview

Many students transfer in courses that serve as prerequisites for higher-level courses. For instance, hundreds of students receive transfer credit for Calculus II, which is a prerequisite for Calculus III.

Later course performance was compared between first-time, full-time undergraduates who transferred in prerequisites and first-time, full-time undergraduates who took the same prerequisites at SU. (See Appendix for details regarding methodology.)

Key Findings

For 89% of later courses, performance did not differ meaningfully between students who transferred in prerequisites and those who took the same prerequisites at SU.

There were, however, five out of 45 cases in which later course performance of students who transferred in a prerequisite was meaningfully lower than that of students who took the same prerequisite at SU:

Calculus II (MAT 296) ----- Calculus III (MAT 397)
Calculus I (MAT 295) ----- Structures I (ARC 211)
Calculus III (MAT 397) ----- Fluid Mechanics (MAE 341)
Spanish II (SPA 102) ----- Spanish III (SPA 201)
Anatomy & Physiology II (BIO 217) ----- Nutritional Biochemistry (NSD 456)

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Prerequisite and Later Courses Studied

Comparisons of performance were made for later courses for which at least 20 students transferred in a prerequisite and at least 20 students took the same prerequisite at SU.

For each prerequisite/later course pair, later course performance was compared between students who transferred in a prerequisite and a select group of students who took the same prerequisite at SU. Students who took the prerequisite at SU were selected for similiarity to students who transferred in the prerequisite on the following factors: gender, race/ethnicity, high school GPA, SAT score, first-year SU GPA, and academic level at the time of taking the later course (Freshman, Sophomore, Junior, Senior). The size of each select group (or *matched sample*) was the same as the number of students who transferred in the prerequisite.

Prerequisite Course	Later Course	Students per Group (TF, SU)
Intro. to Financial Accounting (ACC 151)	Intro to Managerial Acc (ACC 252)	132
Intro. to Financial Accounting (ACC 151)	Essentials of Finance (FIN 301)	25
Intro to Managerial Acc (ACC 252)	Cost Analysis & Control (ACC 363)	26
Intro to Managerial Acc (ACC 252)	Corporation Finance (FIN 256)	113
General Biology I (BIO 121)	General Biology II (BIO 123)	44
General Biology I (BIO 121)	Anatomy & Physiology II (BIO 217)	28
General Biology I (BIO 121)	Cell Biology (BIO 327)	34
Anatomy & Physiology I (BIO 216)	Nutritional Biochemistry (NSD 456)	22
Anatomy & Physiology I (BIO 216)	Nutritional Biochemistry II (NSD 466)	27
Anatomy & Physiology I (BIO 216)	Medical Nutr Therapy I (NSD 481)	31
Anatomy & Physiology I (BIO 216)	Medical Nutr Therapy I Lab (NSD 482)	28
Anatomy & Physiology I (BIO 216)	Physiology of Exercise (PPE 497)	38
Anatomy & Physiology II (BIO 217)	Nutritional Biochemistry (NSD 456)	24
Anatomy & Physiology II (BIO 217)	Nutritional Biochemistry II (NSD 466)	28
Anatomy & Physiology II (BIO 217)	Medical Nutr Therapy I (NSD 481)	31
Anatomy & Physiology II (BIO 217)	Medical Nutr Therapy I Lab (NSD 482)	28
Anatomy & Physiology II (BIO 217)	Physiology of Exercise (PPE 497)	34
General Chemistry Lecture I (CHE 106)	Cell Biology (BIO 327)	33
General Chemistry Lecture I (CHE 106)	General Chemistry Lecture II (CHE 116)	30
General Chemistry Lecture II (CHE 116)	Organic Chemistry I (CHE 275)	33
General Chemistry Laboratory II (CHE 117)	Organic Chemistry I Laboratory (CHE 276)	31
Intro. Statistics for Mngmt. (MAS 261)	Corporation Finance (FIN 256)	259
Intro. Statistics for Mngmt. (MAS 261)	Decision Tools for Mngmnt (MAS 362)	255
Intro. Statistics for Mngmt. (MAS 261)	Intro to SCM (SCM 265)	97
Prob & Stats for Lib Arts I (MAT 121)	Prob & Stats for Lib Arts II (MAT 122)	37
Elements of Modern Mathmtcs (MAT 183)	Decision Tools for Mngmnt (MAS 362)	45
Business Calculus (MAT 284)	Decision Tools for Mngmnt (MAS 362)	247
Calculus I (MAT 295)	Structures I (ARC 211)	44
Calculus I (MAT 295)	EE Fundamentals I (ELE 231)	55
Calculus I (MAT 295)	Calculus II (MAT 296)	135
Calculus I (MAT 295)	Statistical Methods II (PSY 252)	34
Calculus II (MAT 296)	Exp Mthds Chem & Bio Engrng (CEN 212)	21
Calculus II (MAT 296)	Physical Chemistry (CHE 346)	25
Calculus II (MAT 296)	Sustainability Civ & Env Systems (CIE 274)	46
Calculus II (MAT 296)	Statics (ECS 221)	184
Calculus II (MAT 296)	Dynamics (ECS 222)	129
Calculus II (MAT 296)	1st Course in Linear Algebra (MAT 331)	137
Calculus II (MAT 296)	Calculus III (MAT 397)	356
Calculus III (MAT 397)	Fluid Mechanics (MAE 341)	32
Intro Ordinary Diff Equations (MAT 414)	Dynmcs of Mech Systems (MAE 321)	25
Major Concepts of Physics I (PHY 101)	Structures I (ARC 211)	22
General Physics I (PHY 211)	General Physics II (PHY 212)	21
Spanish I (SPA 101)	Spanish II (SPA 102)	44
Spanish II (SPA 102)	Spanish III (SPA 201)	26
Studio 1: Academic Writing (WRT 105)	Studio 2: Critical Research (WRT 205)	269

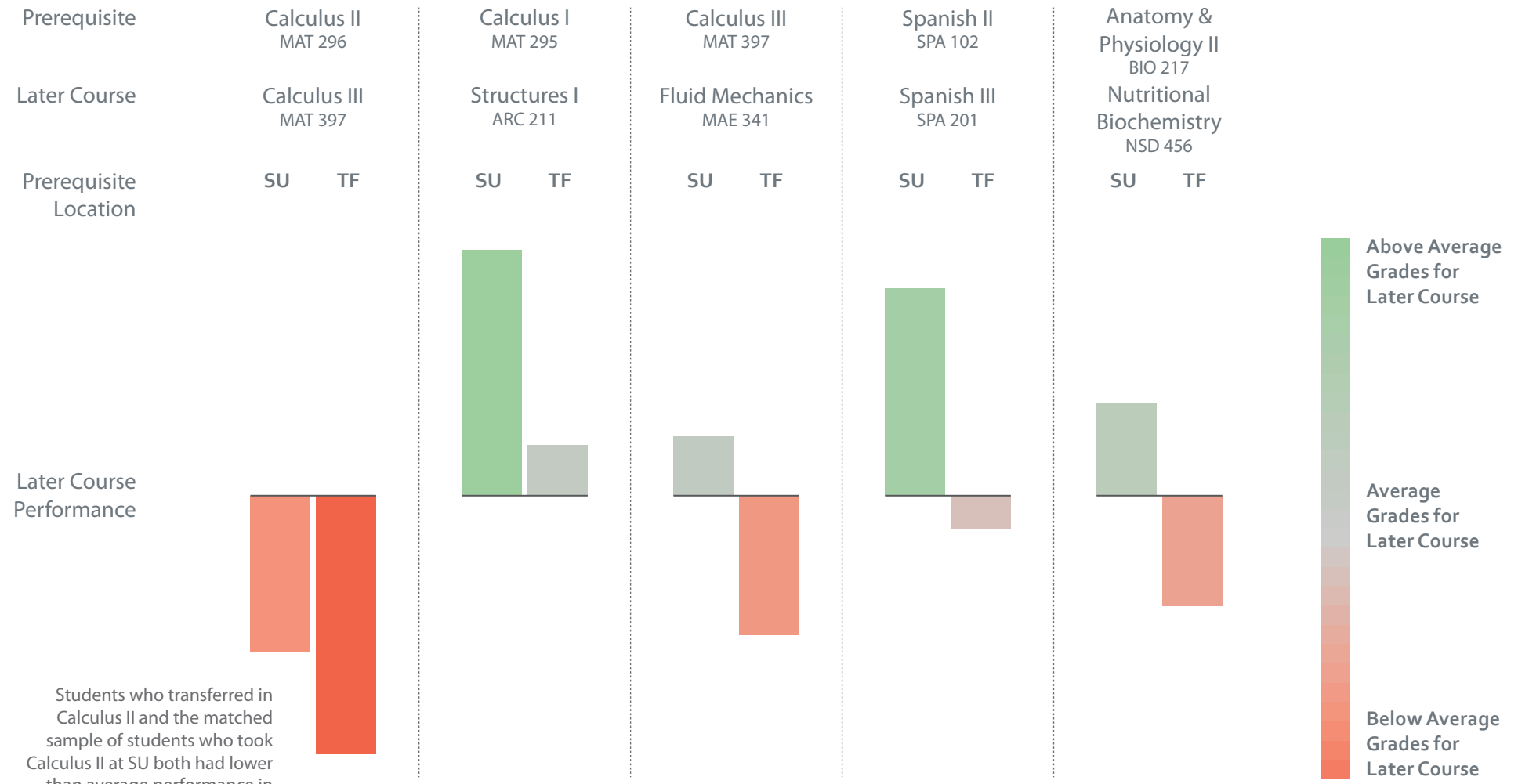
No meaningful difference in later course performance between students who transferred in the prerequisite and students who took the prerequisite at SU.

Meaningfully lower later course performance of students who transferred in the prerequisite compared to students who took the prerequisite at SU.

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Later Courses with Meaningfully Different Performance

Students Who Transferred In Prerequisites v. Matched Samples of Students Who Took Prerequisites at SU



Students who transferred in Calculus II and the matched sample of students who took Calculus II at SU both had lower than average performance in Calculus III. Students who transferred in Calculus II were significantly *farther* below average in their Calculus III performance than the matched students who took Calculus II at SU.

Meaningful difference was determined by comparing later course performance using *t*-tests. The courses Calculus III, Structures I, and Fluid Mechanics had statistically significantly different performance (*p*-values < .05), while the courses Spanish III and Nutritional Biochemistry had marginally statistically significantly different performance (*p*-values > .05 and < .06).

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Locations of Transferred Prerequisite Courses

Prerequisite	Calculus II MAT 296	Calculus I MAT 295	Calculus III MAT 397	Spanish II SPA 102	Anatomy & Physiology II BIO 217
Later Course	Calculus III MAT 397	Structures I ARC 211	Fluid Mechanics MAE 341	Spanish III SPA 201	Nutritional Biochemistry NSD 456
Locations of Transferred Prerequisite	Onondaga Comm Coll (21) County College of Morris (11) Hunter College (CUNY) (11) Univ of Connecticut (10) Westchester Comm Coll (9) Nassau Comm Coll (8) Brooklyn College (CUNY) (7) Hudson Valley Comm Coll (6) Mohawk Valley Comm Coll (6) Monroe Comm Coll (6) SUNY Buffalo (6) Univ of the Sacred Heart (6) Bucks Cnty Comm Coll (5) Corning Comm Coll (5) Mass Bay Comm Coll (5) Salem St Coll (5) SUNY Albany (5) SUNY Stony Brook (5) Tompkins-Cortland Comm Coll (5) Univ of New Hampshire (5) Bergen Comm Coll (4) Dowling College (4) Laguardia Comm Coll (CUNY) (4) Manhattanville Coll (4) Middlesex Comm Coll (4) Middlesex County Coll (4) Montclair State Univ (4) Orange Cnty Comm Coll (4) SUNY Binghamton (4) Other (173)	Univ of the Sacred Heart (8) Genesee Comm Coll (3) TE Liaison (3) Fulton-Montgomery Comm Coll (2) Pennsylvania St Univ (2) Univ of Pittsburgh (2) Broome Comm Coll (1) City College (CUNY) (1) Corning Comm Coll (1) Cuyahoga Comm Coll (1) Dean College (1) Erie Comm Coll (1) Lord Fairfax Comm Coll (1) Mission College (1) Monroe Comm Coll (1) Nassau Comm Coll (1) New Hampshire Tech Coll Mnchst (1) Paul Smith's Coll (1) Phoenix College (1) Rhode Island Coll (1) Sacred Heart Univ (1) Southern Illinois U Edwardsvle (1) St Ambrose Univ (1) St Anselm College (1) SUNY Albany (1) Tompkins-Cortland Comm Coll (1) Univ of Connecticut (1) Univ of Southern Maine (1) Westchester Comm Coll (1) William Paterson Univ of NJ (1)	Onondaga Comm Coll (7) City College (CUNY) (2) Hudson Valley Comm Coll (2) Univ of Connecticut (2) Westchester Comm Coll (2) Broome Comm Coll (1) Comm Coll Allegheny Co Allegny (1) Florida Atlantic Univ (1) Mercer Cnty Comm Coll (1) Merrimack College (1) Monroe Comm Coll (1) Nassau Comm Coll (1) Orange Cnty Comm Coll (1) Rutgers-St Univ NJ New Brunswk (1) Salem St Coll (1) Southern Connecticut St Univ (1) SUNY Buffalo (1) Trinity College-Hartford (1) Univ of Louisiana at Lafayette (1) Univ of N Dakota (1) Univ of Nevada-Reno (1) Univ of New Hampshire (1)	SUNY Albany (7) SUNY Oswego (2) Camden County Coll (1) Clinton C C-Plattsburgh (1) County College of Morris (1) Des Moines Area Comm Coll (1) International University (1) Lehigh Carbon Comm Coll (1) Manatee Comm Coll (1) Massasoit Comm Coll (1) Miami-Dade Comm Coll (1) Mohawk Valley Comm Coll (1) Niagara University (1) Rhode Island Coll (1) Seton Hall Univ (1) Southwestern Oregon Comm Coll (1) Univ of Colorado-Boulder (1) Univ of Minnesota-Twin Cities (1) Univ of New Haven (1)	Cayuga County Comm Coll (11) Borough of Manhattan C C CUNY (1) Brookdale Comm Coll (1) Brooklyn College (CUNY) (1) Finger Lakes Comm Coll (1) Lone Star College Sysem (1) Manor Jr College (1) Maria Coll of Albany (1) Mercer Cnty Comm Coll (1) Onondaga Comm Coll (1) Prairie St Coll (1) Raritan Valley Comm Coll (1) Rockland Comm Coll (1) Univ of Phoenix (1)

Appendix

Methodology

Identifying Prerequisite and Later Course Pairs

Pairs of prerequisites and later courses were analyzed if at least 20 first-time, full-time undergraduate students transferred in the prerequisite and at least 20 first-time, full-time undergraduate students took the prerequisite at SU. Students were from first-time, full-time cohorts 2005-2011.

Calculating Later Course Performance

Performance on later courses was represented by *z*-scores calculated by standardizing grades across all sections of each course taught by the same professor.

Matching Students for Comparison

Students who transfer in prerequisites may be different than students who take prerequisites at SU in ways that affect their likelihood of taking prerequisites elsewhere and their academic performance. To reduce such differences, for each prerequisite/later course pair, propensity score matching was used to match students who transferred in the prerequisite to students who took the prerequisite at SU. Students were matched for similiarity on the following factors: gender, race/ethnicity, high school GPA, SAT score, first-year SU GPA, and academic level at the time of taking the later course (Freshman, Sophomore, Junior, Senior). The size of each matched sample was the same as the number of students who transferred in the prerequisite.

Comparing Later Course Performance

For each prerequisite/later course pair, *t*-tests compared later course performance between students who transferred in the prerequisite and students who took the prerequisite at SU. *p*-values were referenced to determine if any differences were meaningful.