

Reports on Compass Testing at ISU 2002-2004

INTRODUCTION AND BACKGROUND

On May 8, 2002, an agreement was signed which, among other actions, supported the adoption of COMPASS for math placement at ISU. The agreement came at the recommendation of a task force appointed by the provost's office to examine math placement testing. The agreement was signed by the provost, chair of the Mathematics and Computer Science Department, assistant controller, interim dean of the College of Arts and Sciences, director of Lifelong Learning and associate vice president for Enrollment Services. The agreement stipulated that COMPASS be piloted in 2002-2003 and, if assessment supported the recommendation, be implemented during 2003-2004 for students during Sycamore Advantage and Knowing Sycamores.

The task force recommended the use of COMPASS following concerns from the College of Arts and Sciences that the placement test previously in use was not a nationally-evaluated exam, and by the M&CS Department that the test was not appropriate for placement into 010, 011 and 102, but was suitable for higher numbered courses. Further, there were campus-wide concerns about the pass rates for Math 102 and Math 111; the M&CS Department found that students were enrolling in Math 102 and Math 111 without sufficient preparation, especially in basic algebra skills. The task force recommended the adoption of COMPASS for several reasons: 1) it is a nationally recognized exam (developed by ACT, Inc.) that is being used by many institutions, including several Indiana institutions (IUPUI, IU East, IU Northwestern, and Ivy Tech State College); 2) ACT provides consultant services that include data analysis and support for scoring adjustment; 3) Ivy Tech State College has used COMPASS for

several years, their use of the exam is evaluated annually, and they have established cut-off scores that are reevaluated; and 4) institutions contacted that are using COMPASS (IUPUI , Georgia State University, McComb County Community College, MI) with testing requirements have expressed satisfaction and a willingness to share their experiences and best practices.

Preliminary Testing using COMPASS

Data collected during the Fall 2002 pilot was considered preliminary. The test was administered on the first day of classes to all students enrolled in Math 102 and Math 111. Students were not advised before the first day of class that they would be taking an test, nor were they advised that there would be any consequences to their participation. Students were given the results of the placement test, however they were not required to change courses if COMPASS placement suggested they were not enrolled in the appropriate course. Since the pilot was not conducted under ideal conditions, no binding recommendations could be made. However, the data collected for COMPASS placement along with the data collected on the SATM and ACTM scores for first-time freshmen indicated that a placement exam that would facilitate advising into Math 102 and Math 111 was clearly indicated.

Data supplied by OSPIRE provided the following baseline information about the math skills of incoming first-time freshmen for Fall 2002.

Total first-time freshmen 2,140	Score below 510	Score below 460
SATM (1,688 total)	68.7%	44.5%
	Below 19	
ACTM (435 total)	51.2%	
No scores (17 total)		

Incoming Freshmen Profile SATM ave.	ISU	National
Fall 2002	469	516
Fall 2003	474	not available

Only 23% of incoming freshmen enrolled in a math course in Fall 2002.

The COMPASS exam is divided into 4 subsections: Pre-Algebra, Algebra, College Algebra, and Trigonometry. The exam is not timed. Test questions are multiple choice. The test begins in the pre-algebra section and self-adjusts according to student answers. A student must receive a sufficient score in the first level to receive questions from the next level, and so on. Thus, if a student is unable to answer questions sufficiently in a given section, the exam stops and no questions are offered for more advanced sections. The College of Arts and Sciences, M&CS Department worked closely with Ivy Tech State College—Wabash Valley to adopt cut-off scores for the pilot test.

The College of Arts and Sciences dean's office conducted a preliminary analysis. Of 254 students who were administered COMPASS in Fall 2002, 38.7% did not place into the Algebra portion of COMPASS. COMPASS placement information would have advised these students to take Math 010 or 011 prior to enrollment in Math 102 or Math 111. Looking at COMPASS placement scores and SATM/ACTM scores, 45% of the students who took the placement exam should have enrolled in Math 011, but only 28 of those students actually did.

To evaluate the correlation between COMPASS placement and success in the course a student enrolled in, CAS analyzed information for 199 students who took COMPASS in Fall 2002 who were not in the School of Technology. These 199 students

enrolled in courses other than those recommended by COMPASS. 101 students were placed by COMPASS into 011. Of those students, 20 had SAT scores above 510 or ACT above 21 and were possibly misplaced by COMPASS. But of these 20 students, 8 received a D in 102 or 111, 2 received DP, 1 received a C, and 4 received Bs and As. The rest of the students did not maintain enrollment in a course. Thus, of the 20 students that might have been misplaced by COMPASS, 10 probably were not misplaced. COMPASS appears to have been a better indicator of student success in Math 102 or 111 than SATM/ACTM scores.

Students in the School of Technology were asked to take COMPASS during Sycamore Advantage. Although they were prepared to take the exam in advance, they were not told that the exam would have an effect on their math placement. The CAS analysis yielded the following preliminary conclusions.

Of the 32 students in the School of Technology who took COMPASS, 76.8% were placed by COMPASS into remedial courses.

Compass placement in	Math 010	011	102/111	115
32 total students	9	15	7	1

Of the 15 who placed in 011, only four had SATM/ACTM scores indicating COMPASS might have misplaced them (2 had ACTM scores of 19, 1 had an SATM of 530 and one a score of 610). All other students had an SATM or ACTM score that would have placed them into 011. Of the two students with ACTM of 19, one received a C in Math 111 and one failed. The student with 530 SATM dropped with a passing grade and the student with 610 received an A. Of the students who had taken ACT and were placed in Math 010 by COMPASS placement, only one student had an ACT score above 19, and that

student received an A in Math 111. While the sample was very small, the placement record of COMPASS seemed at least consistent with SATM/ACTM placement based on these data.

Adoption of COMPASS Testing

The M&CS Department was satisfied that COMPASS placement was helping to identify students at the lower end who did not possess sufficient basic math skills, especially in algebra, for Math 102. On March 11, 2003 the CAS proposed that COMPASS be instituted university-wide as the placement exam for lower level math courses. The proposal was presented to the CAS Academic Affairs Committee and the university Curriculum and Academic Affairs Committee and received endorsement by each committee. It was also presented at the University Academic Advising Committee, where extensive feedback and coordination information was developed. The final cut-off scores were also adjusted with input from UAAC, creating a category in which advisor discretion was inserted in cases where students could pass the pre-algebra but whose algebra skills might not be appropriate for Math 102.

UAAC especially participated in discussions surrounding possible exemptions from the exam. A study was done of the math placement testing done at Indiana universities. It was determined that most universities, including IU-Bloomington, require math placement testing and that the CAS proposal was not out of line with what was being done in the state (see Appendix __). The CAS agreed that transfer students who had completed a college-level math course would not be required to take the COMPASS exam. The M&CS Department sought and received approval to change the prerequisites for its lower level math courses to “an appropriate score on COMPASS.”

At the March 11, 2003 meeting, then Provost Steve Pontius agreed to continue math placement testing using COMPASS. Tom Sawyer, as director of Life Long Learning, was charged with paying for the site license and seeking agreements with Ivy Tech State College to facilitate students taking the COMPASS exam at Ivy Tech sites around the state prior to Sycamore Advantage. Richard Easton was charged with working with Yancy Phillips to coordinate the large-scale technology implementation for COMPASS. The Testing Office, M&CS Department, and Sycamore Advantage coordinators worked together to implement testing during the summer of 2003. Also during the March 11th meeting a preliminary assessment plan was agreed to in which OSPIRE would provide data to the M&CS Department, which would then provide a semester-by-semester report. It was agreed that the program would be evaluated after the first full year.

On May 1, 2003, an update meeting was attended by the following individuals: Richard Easton, Bob English, Melissa Hughes, Ann Rider, Tom Sawyer, and Karen Schmid. Tom Sawyer gave updates regarding potential agreements with Ivy Tech that would allow admitted students to take COMPASS prior to Sycamore Advantage. He also stated that Lifelong Learning would still be able to fund COMPASS testing.

Testing during Academic Year 2003-2004

COMPASS testing was instituted for all incoming freshmen in Fall 2003. Extensive planning went into preparation for the testing period. Bob Guell and Richard Easton coordinated brush-up sessions for students who had not taken a math course recently. Guell also did research on the available practice tests. A practice test was developed based on a similar model at McComb County Community College. Guell

developed a web page for First-Year Experience with extensive information for students regarding COMPASS testing. Ann Rider and Jake Jakaitis developed student and advisor FAQs sheets with information about the new requirement. Those FAQs sheets were made available to advisors and students in paper form, and were put on the General Education web site. Jakaitis and Rider also worked closely with the Testing Office and IT to import test scores from COMPASS software into BANNER. They worked with Barbara Stafford to import COMPASS score information into DARs, and develop appropriate advisement information in DARs.

The majority of students tested for Fall 2003 were tested during Sycamore Advantage. Technical problems prohibited testing on two days, requiring students to test during Knowing Sycamores or at the Ivy Tech-Wabash Valley site. Ivy Tech—Wabash Valley proved very helpful and cooperative. On the two days during which COMPASS could not be administered because of technical problems, they shared paper copies of the exam so that ISU testing could proceed. Ricky Streight has indicated that Ivy Tech has no intention of abandoning COMPASS, and he knows of no plans to do so in the future. This year Ivy Tech adjusted its cut-off scores based on a review by ACT. The cut-off score have been increased (Appendix ____).

Assessment

Following the assessment plan, OSPIRE delivered data to the M&CS Department in January 2004. However, the Department had concerns about the data that were supplied. They asked for a new configuration and received the data at the beginning of March. As a surprise to everyone involved, OSPIRE data revealed that only 23 students who were tested in Fall 2003 had enrolled in Math 102. The Department felt that this

was an insufficient pool for analysis at that time. It proposed to submit a report at the end of Spring 2004 using data for two semesters. The following sections of this report contain analysis by the M&CS Department using that data and the Department's recommendations.

Department of Mathematics and Computer Science

Compass Testing Assessment Report

DATA AND ANALYSIS PROCEDURES

The tables given in the next section were compiled from three data bases. The first data base, Comp0304, was provided by OSPIRE and consists of the ten-day rosters for all sections of Math 010, 011, 102, 111, 112, 115, 122, and 131 for academic year 2003-2004 with the grade earned (NG being listed for those who had no grade for the course in their BANNER file), highest COMPASS scores from BANNER for those who had taken COMPASS, and SAT Math and ACT Math scores for each student. The second data base, JuneAugustData, was compiled by the Department of Mathematics and Computer Science from the paper copies of the COMPASS scores of each student who took COMPASS between June and August 2003. It contains student 991 numbers, COMPASS scores, and also the Pre-Algebra Test sub-scores (there are three of these). A number of students took COMPASS multiple times during this period. In each such case only the best overall result is listed in JuneAugustData, this being determined by the following procedure: if one attempt resulted in a higher score on the Trigonometry Test (MCP4) than the other attempts, the scores from that attempt are given. If all of the attempts resulted in the same trigonometry score, then the attempt with the highest College Algebra Test score (MCP3) is given. If all attempts resulted in the same trigonometry and college algebra scores, then the attempt with the highest Algebra Test score (MCP2) is given. If all attempts yielded the same algebra, college algebra, and trigonometry scores, then the attempt with the highest Pre-Algebra score is given, and if all four of these scores are the same in all attempts, then the attempt with the highest pre-algebra sub-scores is given. Note that this process yields a different list of scores for some students than would result from simply choosing the highest pre-algebra, algebra,

college algebra, and trigonometry scores from the various attempts. But given that the COMPASS software, not the student, decides at which point to end each test and go on to the next test and does not allow the student to return to any of the previous tests, the test scores should not be analyzed separately. The third data base, EnrollmentFall04, consists of the student 991 numbers and course number for all students on the ten-day rosters of Math 010, 011, 102, 111, 112, 115, 122, and 131 for the current semester and was compiled by the Math Department.

All of the tables in the next section were compiled using the Unix/Linux version of Maple 9.5 (a powerful mathematics software package) by Nora Hopkins after converting the Excel versions of the data bases to text files. Since the Maple functions used require numerical data, grades were converted to numerical values and names were removed from the data bases before the analysis was begun. A grade of S was given a value slightly higher than that assigned to a C and all grades indicating that the student did not receive credit for the course (including NG) were treated as equivalent to a grade of F.

The first issue that arose was that the Compass scores listed for students occurring in both of the first two data bases did not agree in a substantial number of cases. For some students this was because they had taken COMPASS after August 2003 and had improved their performance. In those cases the discrepancy remains in the two data bases. For three of the listings in Comp0304 the discrepancy was due to OSPIRE choosing the highest test score from all of the attempts made for each of the four test scores rather than the procedure used by the Math Department outlined above. In those cases, the COMPASS scores were changed in Comp0304 according to the Math

Department procedure. But by far, the largest number of discrepancies were due to the fact that the Testing Office entered students' COMPASS scores into Banner **by hand** until June of 2004 and did so incorrectly (in some cases not at all) for 39 of the student records in Comp0304 which we determined by consulting the paper copies of the COMPASS test results for these students. These records were corrected in Comp0304 before the analysis given in the next section was done. Thus of the 892 records in Comp0304, 42 were in error and were changed, an error rate of 4.71%, certainly enough to significantly change the outcome of this study. The necessity of checking all of the COMPASS scores in Comp0304 is the principal reason this report has been delayed getting out of the Math Department.

The Mathematics Department wants to take this opportunity to thank Arvana Edwards for her careful work in compiling the data for JuneAugustData and Enrollment Fall 04. This study could not have been done without her help.

EXPLANATION OF TABLES

Table A defines the eight COMPASS categories that students were placed into for purposes of advising. In it PA stands for the Pre-Algebra Test score (MCP1 in Banner), A stands for the Algebra Test score (MCP2), CA for the College-Algebra Test score (MCP3), and T for the Trigonometry Test score (MCP4).

Compass Categories	MCP1	MCP2	MCP3	MCP4
1	$0 < PA = 43$	$A = 0$	$CA = 0$	$T = 0$
2	$44 = PA = 100$	$A = 0$	$CA = 0$	$T = 0$
3		$0 < A = 40$	$CA = 0$	$T = 0$
4		$41 = A = 65$	$CA = 0$	$T = 0$
5		$66 = A = 100$	$CA = 0$	$T = 0$
6			$0 < CA = 48$	$T = 0$
7			$49 = CA = 100$	$T = 0$
8				$T > 0$

Table A
COMPASS Categories

1302 students took COMPASS between June and August of 2003. Table B gives a breakdown according to Compass Category of those 1302 students and how many in each category enrolled in a mathematics course (from 010, 011, 102, 111, 112, 115, 122, 131) in Fall '03 or Spring '04.

Compass Category	Enrolled	Not Enrolled	Total
1	108	136	244
2	99	91	190
3	146	152	298
4	159	138	297
5	0	0	0
6	41	37	78
7	2	0	2
8	102	91	193
TOTALS	657	645	1302

Table B
First Course Enrollment 2003-2004

From this it is clear that 49.5% of the freshman class who took COMPASS June-August 2003 did not enroll in any mathematics class their first year at ISU. Table C gives the status of that 49.5% in Fall 04.

Compass Category	Enrolled First Course Fall 04	Yet to Enroll
1	24	112
2	24	67
3	40	112
4	48	90
5	0	0
6	9	28
7	0	0
8	22	69
TOTALS	167	478

Table C
First Course Enrollment Fall 04

Thus, in the middle of their second year 36.7% of this group had yet to enroll in a mathematics class and this group is concentrated among those least prepared to be successful in meeting their Quantitative Literacy requirement by the 62 hour deadline. Moreover, fewer than 50 people total have passed the Quantitative Literacy Exception Test to date, suggesting that few of the 478 people who have yet to sign up for a mathematics class have satisfied the Quantitative Literacy requirement by testing out of it. Further, the data sample on which this report is based is still considered to be statistically small since so few students both took COMPASS and enrolled in a math course during the sample period.

Table D gives the advice given to students based on their COMPASS test scores. Note that those in COMPASS Categories 1 and 2 are told that they must complete at least one remedial mathematics course (numbered below 100) before attempting the mathematics course required by their major or to meet the Basic Studies requirement.

Compass Category	Compass Advising
1	Must take Math 010 and Math 011 before taking a higher numbered course
2	Must take Math 011 before taking a higher numbered course
3	May need to take Math 011 before taking a higher numbered course
4	Ready for Math 102 or 111, but no higher numbered course
5	Ready for Math 112 or 115, but no higher numbered course
6	Ready for Math 112 or 115, but no higher numbered course
7	Ready for Math 131
8	Ready for Math 131

Table D

Table E is a breakdown by COMPASS Category of the first course the students in COMP0304 (who had COMPASS scores) took in academic year '03-04.

Compass Category	Math 010	Math 011	Math 102 or 111	Math 112 or 115	Math 122 or 131
1	65	24	30	1	0
2	0	80	28	0	0
3	2	85	72	4	0
4	0	2	163	11	2
5	0	0	0	0	0
6	0	0	29	15	1
7	0	0	0	2	0
8	0	1	41	37	37

Table E
Compass Category vs. Enrollment
in First Course

Table F uses Table E to indicate the percentage of those in each category who enrolled in a course that COMPASS indicated was appropriate for them.

Compass Category	Compliance
1	54.2%
2	74.1% ⁽⁰⁾
3	96.3% ⁽¹⁾
4	91.6% ⁽²⁾
5	ξ ⁽³⁾
6	97.8% ⁽⁴⁾
7	100% ⁽⁵⁾
8	99.1% ⁽⁶⁾

Table F
% Compliance with Compass Advisement

- (0) Enrolled in Math 011
- (1) Enrolled in Math 011, 102 or 111
- (2) Enrolled in Math 102 or 111
- (3) None in category
- (4) Enrolled in Math 102 or 111 or 112 or 115
- (5) Enrolled in Math 102 or higher
- (6) Enrolled in Math 102 or higher

Table G contains results for students who waited until Fall 04 to enroll in their first mathematics course (where the Compass Category is determined from JuneAugustData).

Compass Category	Math 010	Math 011	Math 102 or 111	Math 112 or 115	Math 122 or 131
1	1	6	17	0	0
2	0	6	17	1	0
3	0	5	32	3	0
4	0	0	44	3	2
5	0	0	0	0	0
6	0	0	9	0	0
7	0	0	0	0	0
8	0	0	18	3	1

Table G
Compass Category vs. Enrollment
in First Course Fall 04

The data indicate that students in the lowest two COMPASS categories tend not to enroll in the appropriate course. Only a small percentage of students who have not taken the remedial course recommended by COMPASS are nonetheless successful in non-remedial courses.

Table H gives the success, marginal success, and non-success breakdown vs. COMPASS Category for those students in COMP0304 whose first mathematics course was Math 102 or a higher level course (and who had taken COMPASS) and Table I gives the same data for the remedial courses Math 010 and Math 011. Here “Non-success” means that the student either failed the course or dropped it some time after the ten-day report, i.e. received no credit for the course. “Marginal Success” means the student received either a D or a D+ for the course. “Success” means the student either received an S or a grade of C or higher. There are no marginally successful students in Table I since the only possible grades for Math 010 and 011 are S and U.

Compass Category	Non-success (no credit)	Marginal Success (D, D+)	Success (C or higher)	Total
1	16	6	9	31
2	9	6	13	28
3	25	17	34	76
4	41	29	106	176
5	0	0	0	0
6	9	5	31	45
7	0	1	1	2
8	9	10	96	115

Table H
Compass Score vs. Success in
Non-Remedial First Courses (# = 100)

Compass Category	Non-success (no credit)	Marginal Success (D, D+)	Success (C or higher)	Total
1	32	0	57	89
2	16	0	64	80
3	19	0	68	87
4	1	0	1	2
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	1	1

Table I
Compass Score vs. Success in
Remedial First Courses (# < 100)

Using the data from Tables H and I and converting to percentages gives Table J. Here A = 0 are COMPASS Categories 1 and 2 combined and A > 0 are the other categories combined. Also, non-remedial refers to courses numbered 102 and higher and remedial refers to Math 010 and 011 combined:

Compass Category	Type of Course	Success Rates (C or above)	Nonsuccess Rates (no credit)
A = 0	remedial	71.6%	28.4%
A = 0	non-remedial	37.3%	42.4%
A > 0	non-remedial	64.7%	20.3%

Table J
Success Rates vs. Compass Score
And Type of Course

Finally, we can compare success of those whose first course in academic year '03-04 was one that COMPASS indicated they were ready for to that of those who had not taken COMPASS (again using the corrected Comp0304 database). Those not having COMPASS scores would include non-freshmen who had waited to take a math course, as so many of the '03-04 freshmen are doing, those who are repeating a math course, those

who are proceeding through a mathematics sequence, and those freshmen who did not take COMPASS. Table K gives the numbers for those who did not take COMPASS and Table L for those who enrolled in a course for which COMPASS indicated they were prepared. Table M gives a comparison in terms of percentages for Math 102 and Math 111.

Course Number	Non-success (no credit)	Marginal Success (D, D+)	Success (C or higher)	Total
010	5	0	11	16
011	24	0	33	57
102	308	186	545	1039
111	242	70	133	445
112 or 115	103	38	104	245
122 or 131	53	12	77	142

Table K
Success for Those Who Did Not Have Compass

Course Number	Non-success (no credit)	Marginal Success (D, D+)	Success (C or higher)	Total
010	19	0	48	67
011	36	0	132	168
102	32	27	116	175
111	40	24	66	130
112 or 115	4	4	46	54
122 or 131	3	7	27	37

Table L
Success in First Course for Those Who Took Compass
And Enrolled in Courses for Which Compass
Indicated They Were Ready

Course	Non-Success (no credit)		Marginal Success (D, D+)		Success (C or higher)	
	Compass	No Compass	Compass	No Compass	Compass	No Compass
102	18.29%	29.64%	15.43%	17.90%	66.23%	52.45%
111	30.77%	54.38%	18.46%	15.73%	50.77%	29.89%

Table M
Comparison of Tables K and L
for Math 102 and Math 111

If we assume that the students in Comp0304 who have no COMPASS scores are a representative sample of what happened before COMPASS testing was instituted, then we will see an additional 11.31% pass Math 102 and an additional 23.61% passing Math 111 if the COMPASS placement advice is followed. Of course, this does not factor in whether those in COMPASS Categories 1 and 2 are more successful in Math 102 and Math 111 after taking the remedial class(es) that COMPASS indicated should be taken before taking Math 102 or Math 111. However, again using Comp0304 we get the following data on success in Math 102 and 111 for those in COMPASS Category 2 who took Math 011 in Fall '03 and passed and then enrolled in Math 102 or 111 in Spring 04.

Course	Non-success (no credit)	Marginal Success (D, D+)	Success (C or higher)	Total
102	5	6	13	24
111	13	6	17	36

Table N
Success after Taking Math 011 for Category 2

The number of people in each row of Table N is too small to make the statistics reliable, but they are suggestive, particularly when converted to percentages:

Course	Non-success (no credit)	Marginal Success (D, D+)	Success (C or higher)
102	20.83%	25.00%	54.17%
111	36.11%	16.67%	47.22%

Table O
Table N Converted to Percentages

We again see a higher percentage of this group passing Math 102 and Math 111 than those who did not take COMPASS, 8.81% for Math 102 and 18.27% for Math 111. We can conclude (tentatively) that the group COMPASS identifies as needing Math 011 is in fact helped by taking it before attempting Math 102 or 111.

We cannot yet make the same conclusion about Math 010 since we do not yet have a group who have successfully taken Math 010, 011 and completed 102 or 111 who have COMPASS scores. Unfortunately there are only 11 people currently enrolled in either Math 102 or 111 who were advised by COMPASS to take both Math 010 and 011 and have successfully done so. Therefore, it will be May 2005 before we will be able to address this question.

We undertook preliminary analysis of SAT Math score in comparison to Compass to establish if the SAT Math score is as good a predictor of success as COMPASS. This was done using linear correlations of grade and COMPASS score and grade and SAT Math score. The linear correlation between grade and COMPASS score is higher than the correlation between SAT Math scores and grade for all of the non-remedial courses considered in this study, indicating that COMPASS is in fact a better predictor. To address whether the SAT Math score is better than COMPASS at determining which students need remediation we must again rely on data using a small number of students,

so the results are tentative: 17 students whose SAT indicated the need for remediation ($SATM < 430$) but whose COMPASS score indicated did not need remediation ($A > 0$) enrolled in Math 102, of whom 14 passed the course, giving a passing rate of 82.35%. 19 students whose SAT score indicated no need for remediation ($SATM = 430$) but whose COMPASS score did indicate a need for remediation ($A = 0$) enrolled in Math 012, 12 of whom passed the course, giving a passing rate of 63.16%. The 19.19% difference in passing rates suggests that COMPASS is better than the SAT Math score at picking out those who would benefit from remediation.

Finally, we attempted to assess whether the Core 40 requirement for entrance to the University would eliminate the need for remedial mathematics classes in the future. Unfortunately, 76.52% of those in COMPASS Category 1 (those most in need of remediation) who came from an Indiana high school had either a Core 40 or Academic Honors or College Prep high school diploma. Moreover 10.51% of those in COMPASS Category 1 came from outside Indiana. This data would indicate that ISU will almost certainly continue to have significant numbers of students needing remediation for several years to come.

CONCLUSIONS AND RECOMMENDATIONS

The M&CS Department strongly recommends that ISU continue to use COMPASS as a placement tool for mathematics courses. The data given in Tables J and M make a strong case that COMPASS works to place students into courses in which they can be successful and that COMPASS works significantly better at placing students appropriately than the previously used placement criteria. Further, the Department notes that though the average SATM scores of entering freshmen at ISU are increasing (from 469 in 2002 to 474 in 2003), they are still significantly below the national average (516 in 2002). Only accurate testing and advising will help us reach the students who need remediation in order to be successful at ISU.

The data presented in the previous section allow us to draw other important conclusions. A significant number of students did not enroll in a mathematics class during their first year at ISU, particularly the students most at-risk. Mathematical skills deteriorate when they are not used; those students who wait more than one semester following entrance to the University to enroll in a mathematics class are likely to have less success than they would otherwise. Moreover, appropriate mathematical skills are necessary and frequently required for many science and social science courses. Students who delay enrolling in the appropriate mathematics courses are likely to be delayed in meeting other General Education requirements.

Based on the analyses of the preceding section, the M&CS Department makes the following recommendations to ensure effective use of COMPASS.

Recommendation 1: The percentage of students who do not enroll in the recommended course or who do not enroll in a math course within the first year needs to be addressed. One strategy would be to charge UAAC with presenting a plan by the end of this semester to decrease the average number of semesters between entrance to the University and enrollment in the first mathematics course. The plan should include tracking the advice given to students during advising as well as whether students follow the advice given.

Recommendation 2: There is also a concern that a period greater than one year between when the student takes COMPASS and the first enrollment in a math course would compromise the accuracy of the COMPASS placement. Thus, it is recommended that students take the exam prior to the semester in which the student plans to enroll in a math course. This would require students to take COMPASS prior to the advisement and registration period of the preceding semester. Such an approach might preclude the necessity of testing all incoming students during Sycamore Advantage. However, the goal should still be that all freshmen be tested and enrolled in a math course by their third semester.

Recommendation 3: This study should be repeated in May 2005. At that time enough data should be available to allow determination of any needed adjustments in the cutoff scores used. At least two departments in CAS are evaluating the use of COMPASS for placement in their introductory major courses as well. We recommend

that these departments be asked to continue their assessment and provide analysis by May 2005 as well.

Table O suggests that Math 011 is the correct remediation for a part of the student population that COMPASS has identified as needing remediation. We cannot yet make the same determination for Math 010 at this time. We recommend attention that there be significant attention to the articulation between Math 010 and Math 011 and the first 100-level math course.

Recommendation 4: Those in COMPASS Category 1 may need more help to be successful than simply placing them in the appropriate remedial course. Therefore, we recommend piloting organized mathematics study groups with peer mentoring through the first non-remedial mathematics class for this cohort of students and evaluating whether such study groups improve passing rates for this group.

The data show that a significant number of those who followed the advice given by COMPASS nonetheless failed the mathematics course in which they enrolled. No one should be surprised: challenging courses require more for success than adequate preparation coming into the course. What may be more disconcerting is that some of those who enrolled in a course COMPASS indicated they were not ready for were nonetheless successful. In this COMPASS is like all medical tests, which sometimes give the wrong results for individuals, but which are used because they give the correct diagnosis often enough to be useful. Moreover as new medical tests are devised which are correct more often than the old ones, the old tests are no longer used. The same

should be true for placement in mathematics courses. Thus, the continued evaluation of COMPASS as a placement tool is supported by the department.