

**Improving student learning and student retention at the undergraduate level
Application Cover Sheet**

Maximum funding for any single grant: \$50,000.

Proposal must be limited to two pages plus a budget page, in addition to the cover sheet.

DIRECTIONS:

1. Complete cover sheet
2. Attach 2 page proposal summary
3. Attach 1 page budget
4. Submit your proposal electronically to your college office for approval. College offices will submit recommended college proposals to the Provost office **no later than June 23, 2006 for FY'07 funding.**

Name **Johan Hattingh** Date **19 June 2006**

Department and College Affiliation **Mathematics & Statistics**

Phone **1-2253** Email **jhhattingh@gsu.edu**

Collaborators (other departments, if any):

Title of Your Proposal **Developing Core Mathematical Competencies in All Students**

Theme of Your Proposal (Support for students; Fostering connections; Enhancing advisement;
Other innovations): **Support for Students**

College rating (approved; not approved) **APPROVED**

Summary of the project

Six years ago, the Department of Mathematics & Statistics had a big problem – the three courses most often used in Area A (MATH 1111, 1113, and 2211) had a combined DWF rate of over 45%, and of those students who did not withdraw only 71.84% passed with an A, B, or C. Since that time, the Department has initiated a variety of strategies to lower this DWF rate and increase the success rate (ABC rate) of retained students by:

1. introducing MATH 1101 – this course provides a more application oriented approach to basic algebraic ideas for students not planning on majoring in the sciences;
2. starting supplemental instruction sessions – these sessions support the efforts of the Mathematics Assistance Complex (MAC) by providing students in these core courses dedicated assistance from an instructor and providing them with the opportunities to work together to develop their understandings;
3. implementing a placement test as well as other pre-requisite checking;
4. using course coordinators to help provide a more uniform delivery of content and assessment across sections of the same course; and
5. redesigning the delivery of MATH 1111 and 1113 to a 50-50 mix of two pedagogies whereby a student is with an instructor 50% of the class time and in a classroom laboratory environment the other 50%. In both scenarios the learning environment is designed to be student-centered and not instructor-led.

The initial impact of the first two initiatives was seen almost immediately as DWF rates decreased and ABC rates increased among completers in all areas except 1113 (See Table 1, specifically AY 2002.). Fall 2001 was also the first semester that the mathematics placement test was given, but its results were not enforced until Fall 2003, and so its impact on DWF or ABC rates is difficult to measure until that time. The most remarkable change, however, is the overall improvement of 1111 students from AY 01 through AY 06: the DWF rate has decreased 14% and the success rate of retained students has increased 10%. As can also be seen in Table 1, there is still a strong need for improvement in MATH 2211, and to a slightly lesser degree, MATH 1113.

Over the course of the last six years, the high enrollment courses have shifted from MATH 1111 and 1113 to MATH 1070 and 1101, and as enrollments have shifted, so has the demand on the Mathematics Assistance Complex (MAC). As can be seen in Table 2, the MAC is now predominantly servicing MATH 1101, 1070, and 2211. The near doubling of the 1101 students is a direct result of the newly required Excel project (this was done to conform with the Board of Regents Learning Outcomes for the class).

Purpose of the project

The purpose of our project is to further support the peer tutorial aspects the department has in place and to provide support for more coordination in our core courses. The project is comprised of two primary components: support of the efforts of the MAC by improving the technology component of the facility (this will have a direct bearing on the performance of students in MATH 1101 and 1070) as well as providing funding for additional tutors (in the form of GLAs, 2 per semester).

Our efforts in coordinating multiple sections of courses has met with mixed results as faculty assigned to be course coordinators are not being able to adequately supervise the other instructors due to a lack of time. This project would like to support course coordinators with 1 release per academic year.

Goals and Project Activities

Though not an Area A course, MATH 1070 services approximately 2500 students each academic year, and in recent years has experienced a rise in its DWF rate (See Table 3). Increased usage of technology, and required Excel projects have increased the demand these students have placed on the MAC, both for tutors and technology. A primary goal of this project is to decrease the DWF rate in MATH 1070 and increase the overall statistical ability of our students (both theoretically and technologically) by purchasing 3 PCs for the MAC and provide funding for additional GLAs to staff the MAC. These PCs and tutors will also be equally available to the MATH 1101 students, of whom there are approximately 1600 students each academic year. The department is also experimenting with a technology supplement to MATH 2211 which averages over 800 students per academic year.

Note: The MILE is a *classroom* for MATH 1111 and 1113 (approximately 1000 students each semester) and is scheduled as such (See Table 4, Fall schedule of classes.). It is *not* an open access lab where a student can walk in anytime and seek assistance in any core mathematics class – that is the purpose of the MAC. Allowing MATH 1070, 1101, and 2211 students (totaling approximately 2300 students each semester) to walk into the MILE seeking assistance would be totally disruptive to the classes in session and be detrimental to all students' learning.

A second overarching goal is to improve the quality of instruction and equity of assessment across all sections of our core courses. The department is convinced that the support necessary for this to be successful is time for the course coordinators to do their jobs. This would be possible if each course coordinator received a course release during the fall semester. For this release the coordinator would:

1. Collect and reviewing syllabi and hourly exams from each faculty member teaching the course in question.
2. Initiate informal dialog with other faculty members concerning the course and the assessment of the course's learning outcomes.
3. Monitor the coverage of the prescribed topics of the course and that appropriate assessments are used in their evaluation.
4. Serve as an informal mentor for new faculty teaching sections of the course.
5. Collect, oversee the development of, and share common course materials (questions, review problems, handouts, projects, etc.).

Evaluation

The impact placing additional tutors and technology in the MAC will be measured by the DWF rates as well as student performance on the required Excel projects in MATH 1070 and 1101. Evidence from other institutions participating in the Redesign of curriculum shows that the use of undergraduate student assistants has had a huge positive impact on student learning and retention. Thus, we request funding for 1600 hours of student assistants.

Evaluation of the impact of the course coordinators will be measured by student performance on selected specific learning outcomes for each course as well as the overall performance of the students on the quantitative literacy assessments.

Data Referenced in Document

AY 2001					AY 2002				AY 2003			
					Overall		Completers					
					TOTAL	DWF	DF	ABC	Overall		Completers	
					TOTAL	DWF	DF	ABC	TOTAL	DWF	DF	ABC
1101					1273	35.66	24.11	75.89	1630	35.95	24.55	75.45
1111	2820	44.26	28.27	71.73	1979	40.93	25.26	74.74	1903	40.88	28.57	71.43
1113	1335	41.72	24.68	75.32	1311	48.59	29.99	70.01	1510	44.97	28.35	71.65
2211	853	55.10	34.05	65.95	849	51.94	28.60	71.40	955	52.88	32.82	67.18
Total	5008	45.43	28.16	71.84	5412	43.27	26.50	73.50	5998	42.48	27.94	72.06

AY 2004					AY 2005				AY 2006			
					Overall		Completers					
					TOTAL	DWF	DF	ABC	Overall		Completers	
					TOTAL	DWF	DF	ABC	TOTAL	DWF	DF	ABC
1101	1647	30.90	21.68	78.32	1632	32.72	22.76	77.24	1683	29.65	21.42	78.58
1111	979	28.40	20.40	79.60	1111	27.18	17.28	82.72	986	30.83	18.75	81.25
1113	1102	43.19	28.96	71.04	1011	44.51	30.40	69.60	948	39.98	27.84	72.16
2211	817	51.16	32.06	67.94	736	47.96	30.53	69.47	773	61.06	40.04	59.96
Total	4545	36.99	24.63	75.37	4490	36.50	24.11	75.89	4390	37.68	24.76	75.24

Table 1. DWF and Success Rates for Mathematics Courses used in Area A.

MATH	200401	200405	200408	200501	200505	200508	200601
0098	16	34	49	32	0	10	
0099	39	12	75	75	3	58	3
1101	365	57	386	406	104	414	811
1111	212	78	281	95	24	113	113
1113	359	109	583	546	23	159	5
1220	4	12	32	44	5	22	7
2211	764	51	854	513	199	990	638
2212	378	94	355	473	296	284	413
2215	67	64	103	53	90	210	26
2030	30	16	57	42	29	48	41
2420	53	2	127	8	3	45	22
1070	790	1111	805	955	180	745	728
Other	96	37	237	46	253	109	157
Total	3173	1677	3944	3288	1209	3207	2964

Table 2. Number of Students using the Mathematics Assistance Complex.

MATH 1070 Enrollment	Overall		Completers	
	TOTAL	DWF	DF	ABC
Fall 00	325	33.23	21.03	78.97
Spr 01	298	33.22	16.17	83.83
Fall 01	794	26.70	13.82	86.18
Spr 02	1003	28.81	13.31	86.69
Fall 02	1289	17.77	9.61	90.39
Spr 03	1579	20.08	12.09	87.91
Fall 03	1318	20.79	12.27	87.73
Spr 04	1377	22.37	11.01	88.99
Fall 04	1108	29.06	15.60	84.40
Spr 05	1307	31.60	19.37	80.63
Fall 05	1003	27.02	15.64	84.36
Spr 06	1177	30.42	17.63	82.37

Table 3. DWF Rates for MATH 1070

	Monday	Wednesday		Tuesday	Thurs
0800 0915	1111	1111			
		1113	0930 1045	1111	1111
				1113	1113
1000 1115	1111	1111	1100 1215	1111	1111
	1113	1113		1113	1113
1200 1315	1111	1111	1300 1415	1111	1111
	1113	1113		1113	1113
1500 1615	1111	1111	1600 1715	1111	1111
	1113	1113			1113
1730 1845	1111		1915 2030		1113
	1113				

Table 4. A Portion of the Fall MILE Schedule of Classes.

Budget

Item	Number	Per item Cost	Total
computers	3	\$1,700	\$5,100
course coordinators			
1101	1	\$2,700	\$2,700
1111	1	\$2,700	\$2,700
1113	1	\$2,700	\$2,700
2211	1.17	\$2,700	\$3,150
2212	1.17	\$2,700	\$3,150
1070	1	\$2,700	\$2,700
Student Assistants			
GLAs - MAC	6	\$2,500	\$15,000
Undergrad Assistants (MILE)	1600	\$8	\$12,800
			\$50,000

Notes:

- 1 – Course coordinators and GLAs are yearly expenditures.
- 2 – Money budgeted for Course Coordinators is to provide GTA stipends for covering the course the instructor would normally have been teaching. The course coordination of Math 1111 and Math 1113 sections will also include about 7-10 graduate students working in the MILE; course coordination of Math 2211 and Math 2212 will include developing, administering and grading the common final exams. The department does not require common final exams for Math 1070 and Math 1101.
- 3 – The computers would be on a 3-year replacement cycle.

The number of sections/instructors a course coordinator must oversee varies by course:

Course	SECTIONS		SECTIONS		SECTIONS	
	200308	200401	200408	200501	200508	200601
1070	31	33	28	31	25	30
1101	24	20	24	18	22	17
1111	25	13	24	10	31	7
1113	21	17	18	14	21	12
2211	12	13	12	11	12	11
2212	7	9	7	8	6	8

Separate sections taught by term

# INSTRUCT.s		# INSTRUCT.s		# INSTRUCT.s	
200308	200401	200408	200501	200508	200601
18	18	16	18	15	17
12	11	11	10	11	8
15	9	13	8	8	4
13	13	12	11	9	4
9	9	9	8	8	6
5	7	6	5	4	6

Individual instructors teaching the course by term