

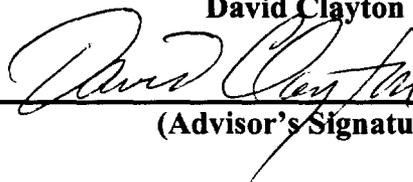
**Why Don't They Understand?
An Exploration of MATHS 108**

An Honors Thesis (HONRS 499)

By

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**Thesis Advisor
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A handwritten signature in cursive script, reading "David Clayton", is written over a solid horizontal line.

(Advisor's Signature)

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Abstract

MATHS 108 has historically been a class at Ball State University in which students do very poorly. In fact, out of all of the classes on campus, it often has the highest Drop/Withdrawal/Failure (DWF) rate of over 60%. In general, the material presented in the course can be found in math classes ranging from 6th to 12th grade levels. So the question must be asked, why do so many students do poorly in a class which covers material presented to most people in high school?

This has been a big question in my mind since I started attending Ball State. As an actuarial science major in the math department, I obviously do not have many of the struggles many math students often complain of. However, as an employee of the Learning Center for three and a half years, I have been able to interact with MATHS 108 students throughout my career, and that interaction has helped me develop ideas on why people do poorly in MATHS 108, or in math in general.

As the time to select a thesis topic approached, I felt I would like to try to do something that could make a useful contribution to the university. The more I thought about it, the more I thought I could do it within the math department because I have had so much experience there. Eventually I decided to work with MATHS 108. I know it is a feared class among many students, but why?

Acknowledgements

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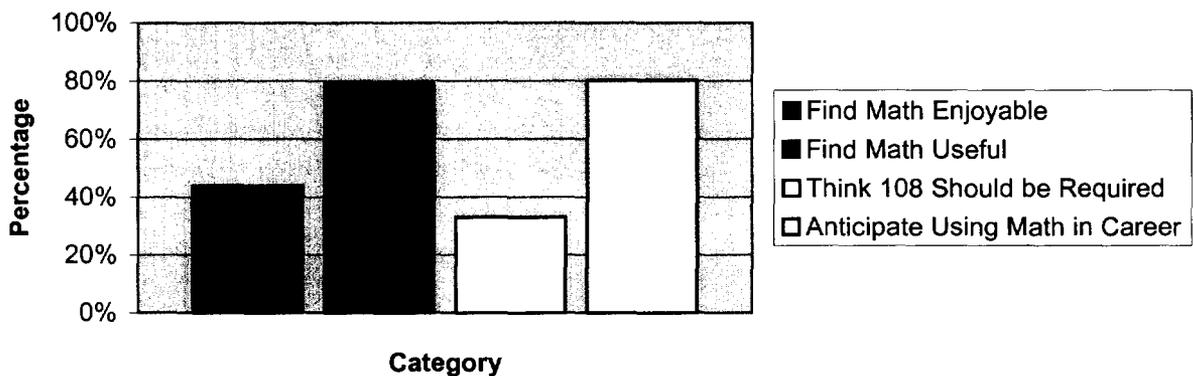
To facilitate this paper, I administered a survey (Appendices A-C) to three groups of students. The first group was composed of students selected randomly from names who had taken MATHS 108 in the past two semesters. Just 16% responded of the 69 students asked to participate. The next group was made up of students who had taken MATHS 105/106 the first semester that it was offered (Fall 2000). The final and most important group consisted of students currently in MATHS 108 (Spring 2002). The survey was administered to two full classes and produced 91 responses. That survey was given after half of the semester was completed, so many of the students who would have dropped the class already did. On the survey, there were questions like age and year to group students into categories, followed by yes/no, and expected grade questions, which asked things like whether or not they enjoyed math or found it useful. Following those were four short-answer questions.

Some answers were expected, and some others were fairly surprising. I intend to present many items that students think are detrimental to their success, current processes attempting to solve those problems, and some possible new approaches that the university could take in the future to advance students.

**Causes of Poor
Performance Among
MATHS 108 Students**

In the survey given to current M-108 students, four questions asked were designed to prompt answers that would be verbal explanations as to why students think they struggle, or why they think others struggle in the course. Specifically, questions asked whether or not supplemental instruction sections given by the Learning Center were helpful, what they think their biggest weaknesses are in math if they have any, what actions they would suggest their professor take to help them do better, and why they would think MATHS 108 would have a high DWF rate. Below Figure 1, these problems, suggested by the students, are discussed. Figure 1 is a summary of the basic characteristics of the survey participants.

**Figure 1
Attitudes of Survey Participants**



Class Size

In the surveys, many students stressed that they think the often large number of people in a MATHS 108 class hinders their learning. In a given semester, the department may have one small section of M-108, and, additionally, one or two large ones. In most

cases, judging from the surveys, students would prefer a smaller class, but are often unable to find one. Many express frustration because they think the professor would not be able to make sure everyone in the entire class understands, and students will be left behind no matter what. One student who took M-108 in the fall stressed that if the school wanted to see more students pass they should have “less people in the class” and “more one-on-one help with the teacher.”

The fact that so many students in this class are freshmen could factor into this response. Fifty-three percent of the students surveyed currently in the course were freshmen, and MATHS 108 is likely one of their first large lecture classes. For many students, this is a new, intimidating atmosphere that adds to any struggles they already have in mathematics. One student, who had the ability to compare sections, noted, “Most of the classes are too large; I am doing much better in a smaller class.”

Amount of Material

Even mentioned more than the size of the class is the amount of material, or speed in which the material has to be covered in MATHS 108. For instance, one freshman elementary education major noted, “Right now in my class we are doing a new section each day in class. This makes me feel overwhelmed.”

Another student states, “We’ve covered 600 pages of the math text in two months.” A graduate student who is now teaching a section of MATHS 108 said that he had two extra days that prevented the need to average exactly a section per day. To many students, this kind of pace is exhausting and impossible to keep up with. If a student does not clearly understand a section after he does his homework, the next class period is

already dealing with the section after. It makes it difficult for students to feel like they can ask questions, and often times they are not given the opportunity to do that.

As a MATHS 108 supplemental instruction leader, I have witnessed the pinch syllabus put on professors. More than once I have seen teachers brush over material because they had to get a certain amount done before the campus-wide midterm or final. The math department has in the last year responded to these complaints by adding lower-level math courses (MATHS 105 and 106) and by eliminating the department midterm. I will address the success of these strategies later in this paper.

Although some solutions are currently being implemented, the amount of material covered is the biggest complaint of students who have taken the class or students who are currently in it. However, another issue that may have something to do with the lack of success is the number of freshmen involved. In general, university courses cover much more material than those in high school do, and part of these complaints may be an adjustment process that has to take place for these freshmen. However, the problem must go deeper than that, as one student even suggested the idea to “have the classes Monday through Friday and at a slower pace.” In my opinion, when the students are asking for more classes, the problem is severe.

Poor teaching throughout school

The survey given to students asked questions about how they felt about their math teachers throughout school. Three, in particular, asked direct questions. The first was whether or not they thought their previous math teachers enjoyed math. The second was whether or not they thought their previous teachers found math useful. The final teacher

question asked the students to grade all of the teachers they have had, based on an A-F scale.

When developing these questions, I expected a strong correlation between a student enjoying math and his or her teachers enjoying math. (Appendix A, Questions 7 and 10) I expected the same to be true for finding math useful. (Appendix A, Questions 8 and 11) However, this was not necessarily the case. After splitting the participants into those that found math useful and those that did not, it was surprising to discover that 89% of both groups thought their teachers had found math useful. When dividing the students into two groups by Question 7 on the survey, similar results were found. Ninety percent of students who enjoy math, and 80% of those who do not, had teachers whom they thought enjoyed math. It was surprising that this gap was not larger.

However, there are positive correlations between what students expect to earn in the class and how they graded their past teachers. Twenty-one percent of students who expect to get an “A” or “B” in MATHS 108 responded that they would give their previous math teachers an “A,” whereas only 6% who thought they would do worse than a “B” gave their teachers an “A.” (Appendix A, Questions 4 and 13) Conversely, only 2% of the students who expected an “A” or “B” judged their teachers with a “D” or “F.” Sixteen percent of students who expected a ‘C’ or lower gave a ‘D’ or ‘F’ to their past teachers. Many students noted specifically that poor teaching was their main obstacle to succeeding. (Appendix A, Question 18) One noted that he or she did “not have a good base in earlier years of math.” Another complained of “bad teachers that tried to make it really hard.”

What does this mean? It is clear, and probably has been clear to those in charge, that the better teachers a student has growing up in any particular subject, the better that student will tend to do in that subject later. This only doubly emphasizes the importance of MATHS 108, however. Fifteen percent of the students involved in the survey had a major involved in some way with education, implying that if they don't do well in college algebra, their future students will be less likely to succeed in math. It becomes a degenerative circle that is very hard to break. For this particular problem, however, the way to break the cycle is to send competent teachers into elementary, middle, and high schools.

Poor MATHS 108 Professors

Quite a few students also mentioned that they were displeased with their current math professors. A student suggested that BSU "find teachers who are willing to help students." Another said "Teachers . . . don't care about the students understanding." Still a third claimed, "The teachers seem not to care as much as those that I've had in the past." (Appendix A, Questions 19 and 20) These comments stem from a basic problem that may not be able to be solved at Ball State. In general, contract faculty teach lower-level math classes like M-108. Pairing up students who are already not strong math students with professors who may not have the amount of background many regular faculty do may not always harvest the best results. However, regular faculty have taught the class previously, and the DWF rate has remained mostly constant (Figure 2). It is worth noting, however, that many students see this as a major problem.

Student Responsibility

Many who were surveyed think that it is the direct responsibility of the students in class to pass, and if they do not, it is entirely their fault. Although all did not feel this way, there were many problems suggested in the surveys that may not be immediately thought of by those not directly involved with MATHS 108. Each of these problems will be discussed in detail.

Attendance

Those surveyed made a surprising number of comments involving the number of students not coming to class. Some participants even admitted that they would probably do well in the class if they attended more often. One student bluntly stated “Students don’t go to class, which can lead to failure.”

Another student noted, “You have to come to class to be able to do well in this class, or [you] have to be extremely good at math to be able to teach yourself.” That same student attributed many attendance issues to freshmen, saying that there were a lot of them, and that “freshmen don’t like to come to class.” This may be a very valid point. It is obvious to anyone that if you combine a fast-moving class that may cover a section per day with a lot of absences, success will not be high.

Many professors attempt to solve this problem by grading for attendance. This helps many students who would be borderline on the basis of test grades; however, it may actually contribute to a higher failure rate because so many students do not attend. As one junior said, “If you did not come to class, like many freshmen didn’t, then you would not earn those points.”

Expectations

“People come into the class thinking it’s easy because it’s M-108, so they don’t take as much time to study as they should,” commented one student. Many expressed similar views. The expectations combined with the type of material covered at the beginning of a semester may lead to the attendance problems experienced. In the first couple weeks of class, it is very possible, if not probable, that a student would actually find the pace slow and would think that the class was mostly review. The material covered in the first couple of weeks may be material a student had encountered before high school. If a student entered the class not expecting too much of a challenge, then faced so much review material, that student may stop attending class.

Again, the freshmen issue may enter when addressing this problem too. Freshmen may expect much less work than actually required to pass M-108. This may be the case with older students as well. Even though many of them would require a lot of hard work to pass, many probably expect less difficulty out of MATHS 108 than their 300- or 400-level class. Once they stop working for even a day or two, they easily fall behind for the rest of the semester.

Student expectations may be one of the more valid causes of poor pass rates in MATHS 108. If students expected the class to be very challenging, they would immediately attend SI sessions and maybe acquire a tutor for the semester. However, if they felt it would not require much work, they would obviously not put in the work needed.

Work Ethic

Students assigned to MATHS 108 lack the mathematics background suggested in Ball State's Admissions Materials, according to www.bsu.edu (two years of high school algebra). Being put into M-108 implies that the student has not acquired the necessary algebra knowledge and quite possibly the necessary work ethic to succeed. Therefore, inherent in this group of students is likely to be a weaker work ethic as well. To me, displaying a good work ethic in this class would involve attending SI sessions and MATHS 108 review sessions, completing all assigned problems, and possibly getting a tutor. One sophomore had this to say: "I think if students take time and actually do their problems in the book, it will be helpful. Also they should take advantage of all the resources on campus like the SI sessions and the Learning Center."

In addition, many students who feel they are succeeding in the class recommended asking questions when something is not understood. Students who do not feel comfortable asking questions in front of the big class should be able to attend an SI or tutoring session to do just that.

Current Solutions

Implemented at Ball State

The Ball State mathematics faculty is aware of the lack of success in lower level classes such as MATHS 108. In fact, there was a new class introduced into the curriculum this past year intended to alleviate some of the problems that Ball State students have in M-108. Additionally, there is good help available at the Learning Center, from private tutoring and supplemental instruction sessions to a department of the Learning Center specializing in study strategies, to find alternative solutions for students. The university has not sat on its heels and let this problem develop; it has in fact taken actions to reduce failure. Through the many surveys administered, it is clear what students like and dislike about these solutions.

Learning Center

The Learning Center at Ball State was opened in the fall of 1985. Since that time, it has become a key to battling failure in math, composition, and other core curriculum classes that typically trouble students. The Math Desk is the busiest of the four desks (core, math, writing, study strategies) and deals with many students taking classes like MATHS 108 or MATHS 125. As of April 19, 2002, the math desk had 540 different clients for 2,131 visits in the spring semester compared to the core curriculum statistics with 361 clients on 1,687 visits, the next closest totals. (University College Data) In addition, the Learning Center Math Desk provides, on average, supplemental instruction for three different classes (usually 108, 131, and 132). An SI leader is assigned to a given class, sits in on that class during the week, and provides two one-hour help sessions during the week. Most feedback received through the sessions is positive. Eighty-four percent of the MATHS 108 students who participated and attended a tutoring or an SI

session said that it was helpful, and all students who attended more than two sessions found them helpful. The second statistic may be explained in two ways; either students who went once or twice stopped going because they did not think it would ever help, or when students consistently do seek help, they will always find the sessions useful.

Other interesting data can be extracted from the surveys. Those students who had not attended any tutoring or SI sessions at the time of the survey actually expected higher grades on average than did those who had attended sessions. Although interesting, this may not be unexpected. People who are doing well in the class would obviously not feel the need to seek a tutor, or any outside help for that matter. Those that had attended sessions expected between a “B” and “C” on average, while the students who had not attended expected a “B.” Learning Center statistics, however, show that students who visit the Learning Center do slightly better on average in their given class than those who do not visit. According to these statistics, in the Fall of 2001, freshmen clients of the learning center had a 2.592 average GPA while all freshmen averaged a 2.429. The difference is less pronounced between sophomore learning center clients who average a 2.738 GPA and an average sophomore, who averages a 2.697.

Looking at the expected grade vs. help sought results (Appendix A, Questions 4 and 14) from the another angle, 78% of students who expect to get a “C” or lower attended at least one SI or tutoring session. This says very positive things about the availability of information about the Learning Center. Signs posted in Robert Bell Building advertise help sessions, while everyone in a section with an SI leader is given stickers to remind them of session dates and times. Additionally, many M-108 professors are aware of help sessions and tutors, and they make them known to their students. This

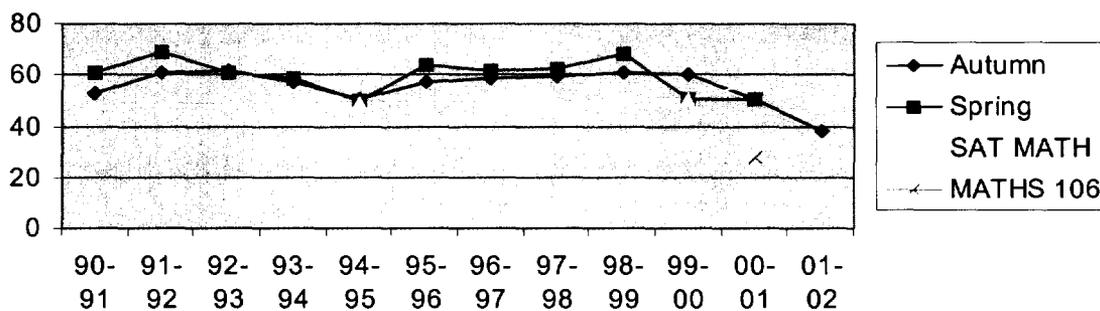
statistic implies that students who might be considered “at risk” of failing do seek help. It also displays something more important, that the Learning Center and faculty do a good job of letting students know that help is available, which is the first step in providing that help.

Not everything with the Learning Center is perfect, however, and many students are turned off to the experience early. For example, fully 100% of the students who did not find their tutor or SI session helpful attended only one or two of those sessions. This suggests that if students have an unfavorable experience, they do not often return. Many elements could create this circumstance. First of all, many Learning Center clients complain about not being able to understand the spoken English of their tutor. The Learning Center is one of the places where math graduate students can work during their schooling. Many of these students are from a non-English speaking country and have some trouble speaking the language. Not much can be done to solve this problem. The other main reason a student could have a bad experience is that their tutor or SI leader just may not have a good day, or may not click with their client. “Sometimes students come in here and you put a lot of effort into helping them, explain it 3 or 4 ways, and it just doesn’t click,” noted one Learning Center tutor. The fact is that not everyone will be able to explain everything all of the time. Therefore, a client may feel awkward, or may think that the tutor has not helped at the conclusion of the hour. There is not much incentive for a student to return when he or she thinks the session was not helpful.

MATHS 105/106

In the fall semester of 2000, Ball State initiated a class series for students who expect to have trouble in passing algebra. This series covers in two semesters what MATHS 108 covers in one semester, which addresses many suggestions and concerns that current M-108 students have. The success was immediate, as the DWF rate was lower than any MATHS 108 semester going back to at least 1990 - a full 10 percentage points lower, in fact. This is very encouraging to many administrators and faculty.

Figure 2
MATHS 108 - Autumn & Spring %DWF
New Freshman Average SAT - MATH
MATHS 106 - Spring 01 %D-W-F



Surveys were given to students who have taken 105/106 to gain input as to whether or not those students preferred being in a slower class. One student in particular noted that the best thing about 106 relative to M-108 was that it went at a “slower speed.” In general, although it is too early to call the series a great success, a pass rate over 70% says enough to garner support. (Figure 2) The graph above displays the great improvement achieved in the spring of 2001 compared to past years’ DWF rates and to average math SAT scores for incoming freshmen.

One MATHS 108 student advised the university to “not make classes with 100 students in them,” and to “not make it cumulative.” In a sense, the 105/106 series addresses both of these problems. The one section of MATHS 106 that was offered in the fall of 2001 only had 27 students enrolled, only 3 of whom failed. Also, splitting up the M-108 material into two semesters prevents students from having to remember so much algebra. As stated earlier, the class covers what some students learn in middle school to what others learn in late high school, and it is a lot to ask of students to expect them to take a test on all of that material. A department final is even tougher because certain items that are stressed on the exam may not be stressed in a particular section, with the converse being true as well.

However, there appears to be a major problem with this series: At this time, not enough people know that it exists. In fact, when one student was asked to suggest how to improve the M-108 pass rate proposed “a class before MATHS 108 to help students who have had very little math, or students who haven’t had math in decades.” The fact that this student was looking for a class before M-108, and did not know that 105/106 existed, is a shame. With its early success, the series should be advertised enough to be available to all students and not limited to those who are lucky enough to discover it.

Admission Standards

As of 1998, Ball State University made public their intentions to progressively increase the quality of freshmen admitted into the university. It appears that this trend has had some effect in the math department as well. The average math SAT score for an incoming freshman has increased by about 20 points in the last six years. (Figure 2) This

does not seem like much, but the top students cannot get more than an 800 on the exam, which implies that it must be the lower-end students who are raising that average. To increase an average over a group of 3,500 or more students is a large task. Although this probably has some impact on MATHS 108 statistics, it is tough to measure because it is still those lower students who are in MATHS 108. It does appear, however, that those lower students have improved.

Results

According to DWF rate data, the fall semester of 2001 showed some significant signs of improvement in MATHS 108. (Figure 2) The pass rate was the highest it has been in more than 10 years. Two things have changed in the last year that could possibly explain this dramatic shift. The fall semester was the first semester that did not have a department midterm, and, as discussed earlier, MATHS 105 and 106 were offered for the first time just one year earlier.

It is very difficult to measure exactly how much impact either of these changes had individually, but it is clear that they had some impact. Department-wide tests may produce lower grades than individual classes. This occurs for a couple of reasons. First of all, to cover all of the material on a department exam, professors sometimes have to rush and are not able to teach well what will be tested. Also, in a basic math class like M-108, students get used to hearing and seeing problems presented in a certain way, and when they are presented in even a slightly different way, it can throw them off. That is not necessarily bad. Many would argue that if students fully understood the material,

they would be able to do a problem no matter how it was presented. However, it is worth noting that this aspect throws many students off when completing a test produced by someone other than their professor. A final reason for poor performance on a department test is time. If a professor, administering a test, saw that students did not generally finish within the time expected, the professor could adjust the grades accordingly. However, department tests are to be done within a period, and if they are too long for most students, grades cannot be changed.

Because MATHS 105/106 was discussed in detail earlier, there are no new ideas worth noting at this time. However, it is worth repeating that enrolling students that found MATHS 108 difficult in a slower-moving class not only improved the pass rates of those students, but also overall in the MATHS 108 classes. With more publicity, this series could become a great success for the university.

**New Solutions that Could
Make a Difference**

The first thing that must be realized when trying to solve the MATHS 108 “problem” is that it will never be solved. Students will always fail classes, and M-108 is not exempt from that reality. In addition, there are costs associated with every idea that must be factored in when considering what steps can be taken to improve results. However, it must be troubling to the university to see so many students failing a class that would be passed by many high school students. In fact, it has to be troubling for the university if it is concerned with providing a well-rounded education for its graduates. No matter how many changes are made, some class has to be the most failed class on campus. However, many share the opinion that it should not be a basic math class. Many ideas have come from students, faculty, and tutors about what can be done to increase success. Some of the ideas presented are not supported by the author, and yet they must be discussed to promote discussion.

Elimination of Math Requirement

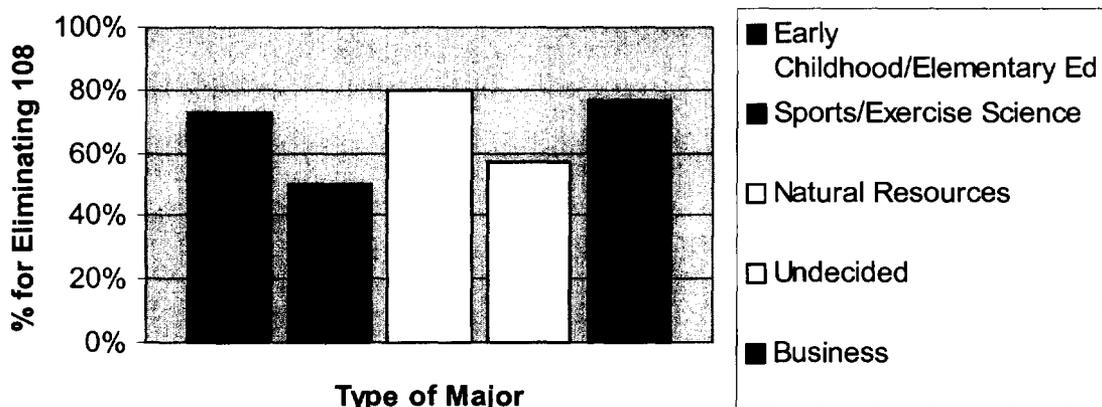
Not surprisingly, many of the students surveyed specifically said that MATHS 108 should not be a required course. In fact, two out of three students felt it should be eliminated from degree requirements. What is curious about this argument is that almost all MATHS 108 students are going to have to take math classes after M-108 to complete their major. The university requires students to take MATHS 125 if they are not in a major that requires algebra or advanced mathematics. More than one student thought that the class was not required. One in particular suggested that the reason M-108 has such a high DWF rate is “because it is not required, so you can drop it easily.” Unfortunately for some, it is required as a background course in their majors, and the fact that they may

not know it is disturbing. Another student may have shed some light on this opinion however. “Since it is a class for placement in another course, people probably just do not care as much as they would for other math classes,” she said. That may well be the case.

Many of those who are studying to become elementary school teacher showed particular disdain and thought that it should not be required for their major. Out of those who were early childhood education or elementary education majors, 73% felt that they should not be required to take M-108. “I don’t find it interesting, and it has little to do with what I’m going to do as a career,” noted one early childhood education major. “I will not be teaching this type of math to third-graders and under, and if so, it won’t be like this.” To an extent, this may be a valid point. But to ask a future teacher to understand what her future students will be taking a couple of years ahead does not seem out of line. In fact, it would seem that if these early teachers did understand what was ahead for their students, they could prepare them better.

To explain this feeling among students, a chart has been included (Figure 3) listing certain types of majors, such as those dealing with sports or business, and what percentage of those majors surveyed think that M-108 should be required. Only types of majors with a number of participants large enough to make any inferences are included. Majors who had something to do with sports were surprisingly the group that most thought MATHS 108 should be in their curriculum while business, teaching, and natural resource majors were strongly opposed. Overall however, it does not appear as if this opinion is held by one major over another as much as it is thought by a majority of students currently enrolled in the class.

**Figure 3
Removing 108 from Requirments**



More Professors

As discussed earlier, many students think or believe as if their section of M-108 is much too large. There are two possible obvious solutions if one were to try to eliminate this issue. One option is to make professors teach more hours, which is nearly beyond what can be done. Not only would this strain personal lives and schedules, but it would also decrease the productivity of a professor in a given class.

The other option is to hire even more professors. Again, this is not likely to happen for financial reasons. Especially in a time of reduced funding, it is hard to consider the possibility of spending money to hire more professors to teach a high school-level algebra class. In times like these, cutbacks are mandatory, and additional expenditures are few. However, if the university ever thought this problem had become

too large and something had to be done, hiring a couple of more professors would seem to appease many students and would also seem to improve success. Almost any publication ranking schools mentions their average class size, with the most desirable schools having very small classes. Although this solution is unlikely to soon be implemented at Ball State, it still looms as a very real factor in student success.

Increase Awareness of MATHS 105/106

It is striking when one considers that there is currently a class at Ball State that goes slower than MATHS 108, and that many of the students who would benefit from that class do not realize that it exists. The success of the class is apparent, and yet many of those who could be in the class are not aware of it. To accomplish this, the university may be most successful through advising and classification. Through the advising sessions that all incoming students have to attend during orientation, they could be made aware of MATHS 105 and 106, especially if they are students who do not appear strong in math.

That is where classification comes into play. A study could be done, not too much different than this exploration, which could correlate things like SAT scores, ACT scores, GPA, and high school math results with grades students achieve in MATHS 108. As one student put it, "What should be taken into consideration besides SATs is previous math classes." Although that sort of information is not available to an average student writing an honors thesis, it is available to those who would find such a study useful. Students could then be categorized as "at risk" and receive even more information about the option of MATHS 105 and 106. By grouping these students, the university could

further reduce the number of students in M-108 that would be unlikely to pass in the first semester anyway. This would not be a process worth going through if most students passed the course, but with DWF rates often between 60 and 70 percent, it seems like time well-invested. Additionally, with the early success of the new series, it seems that many students would benefit from participation.

Reverse roles of 105/106 and 108

Currently, the “default” class for lower-level math students is M-108, and if they have trouble in M-108, or it is thought they will, they have the option of enrolling in the 105/106 series. If instead by “default” a lower-level student would be placed in 105, while those who think that course would be too slow for them enrolled in M-108, more success would be possible. This would reduce many complaints of those who participated in the survey including classes that are too large, covering too much material in a semester, not knowing much algebra entering school, and the idea that students may not get what they expect in M-108. Additionally, it would reduce the demand for tutors and SI sessions, because the professors would be able to take more time with their students in and out of class, and may even have time to review for tests in class.

Better Teacher Reviews

If the university means to make M-108 a priority, the best professors must be in place to lead these students. Simply put, if one professor has an extraordinarily high or low pass rate, answers should be searched for. If 100 students remain in a section of this course, it is imperative that professors be very competent in the material they are

presenting. The difficulty of keeping all 100 students on pace in the class can only be achieved by those who are best at it. In still other words, MATHS 108 students should not be left to struggle just because they are not math majors. Therefore, if they are not getting the best effort of the department or the professor, they are being deprived of what they pay for.

Enforcing Attendance as Part of Grade

“Lots of people just don’t go to class because they think it is boring,” mentions one participant. This was not an uncommon response throughout the surveys. The responsibility rests squarely on the shoulders of the student when it comes to attending classes. However, making attendance mandatory in all sections may motivate some students to be in class. In some ways, more students may struggle because of a bad attendance grade, but positive improvements are likely to outweigh the struggles of some students to attend. It seems as though this policy may take more responsibility away from students, but it may be a policy that could achieve higher pass rates.

Continue Current Policies

The good news is that progress is being made. After 10 years of fairly consistent DWF rates, success is much higher this year. Presumably, this is a result of the policies mentioned above. If the university continues to increase admission standards, it would seem all classes would have a higher pass rate. In MATHS 108 this may not necessarily be true always, but in general if the average student continues to get better, the lower-level math students should get better on average as well.

The addition of MATHS 105/106 has been a great success, and, if continued, the courses seem to have potential to help many Ball State students. As mentioned above, improvements can be made by making it more widely known, but the class in itself seems to succeed.

Finally, most students seem to think that having a tutor or going to supplemental instruction sessions helps them, so keeping those sessions available and advertising them well will continue to help students.

Author's Conclusion

In conclusion, Ball State is currently making great strides to help students in many subjects, specifically MATHS 108. The problem is much less severe than when I began attending Ball State. However, as with any problem, progress must be continuous. There must be no "mark" where the university can feel that they have gotten the pass rate to where it needs to be. Improvements must always be made, and they are always possible. The real solution to this entire issue is just interest and attention. The university needs to have an interest in seeing success in every class on campus, and MATHS 108 is a good place to start. There are thousands of problems around Ball State, many of which I am sure I am not aware, but that does not mean that students unsuccessful in MATHS 108 should take a back seat. Pass rates have been terrible for many years, and the problem has always been there; it is just waiting for someone to take an active interest in it and decide they will change things.

Changes do not happen overnight; they take a lot of time. Yet all it takes is some effort from all involved to get the job done. Effort from students, professors,

administrators, tutors, and other faculty is all needed to achieve results. Either those with power can collectively sit back and wonder why students struggle so much to get out of MATHS 108, or they can collectively take a role to make it a manageable class that students are not scared of. One thing is clear: It is not the math that is the problem, most all agree that this math can be done, so that means other reasons are lurking behind a 60% DWF rate. Hopefully, I have been able to present some ideas in this paper that will promote discussion and thought - not just thought about MATHS 108, but thought about any aspect of the university that can be changed for the better.

Appendix A

Math 108 Survey – for current students

Sex: M F

Age: _____

Year: Freshman Sophomore Junior Senior

What is your major? _____

- 1) Have you taken MATHS 108 before this semester at Ball State? Y N
- 2) If yes, how many times, and what did you get last time? _____ D W F
- 3) What grade is your goal for this class? Pass A B C
- 4) What do you **expect** to get in this class? A B C D Drop W F
- 5) Have you had similar math classes in high school? Y N
- 6) How much time has it been since your last math class (including 108)? _____
- 7) Do you, in general, enjoy math? Y N
- 8) Do you, in general, find math useful? Y N
- 9) Do you think you will need math for your career? Y N
- 10) Do you feel your previous math **teachers** enjoyed math? Y N
- 11) Do you feel your previous math teachers felt math was useful? Y N
- 12) Do you think MATHS 108 should be a required class at Ball State? Y N
- 13) If you were to grade all of the math teachers you ever had, what would you give them, as a whole? A B C D F
- 14) Have you ever gone to a tutor/SI session or review session? Y N
- 15) If yes, how many times? _____

16) If yes, did you find it helpful?

Y N

17) If you didn't find it helpful, what could have been better about your session?

18) If you feel that you have some weaknesses in math, what would you say is the primary source of that weakness (for example lack of interest, bad teachers, etc)?

19) Is there an action or an attitude that your professor/teacher could take that you think would help you do better in math?

20) MATHS 108 has a high drop/withdrawal/failure rate at BSU. Do you have any ideas as to why this is true, and what can be done to improve student success? Please explain.

Number Surveyed – 91

Number of Responses – 91

Percent Responded – 100%

17) If you feel that you have some weaknesses in math, what would you say is the primary source of that weakness (for example lack of interest, bad teachers, etc)?

18) Is there an action or an attitude that your professor/teacher could have taken that you think would have helped you do better in math?

19) MATHS 108 has a high drop/withdrawal/failure at BSU. Do you have any ideas as to why this is true, and what can be done to improve student success? If so, please explain.

Number Surveyed - 69

Number of Responses - 11

Percent Responded – 16%

Appendix C

Math 105/106 Survey

Sex: M F

Age: _____

Year: Freshman Sophomore Junior Senior

What is your major? _____

1) What did you expect to earn entering 106? A B C D Drop W F

2) What did you get in the class? A B C D F

3) Did you take MATHS 108 before entering 106?

4) If so, did you find 106 more suitable to you?

5) If so, what is the best thing about 106 that did not occur in 108?

6) Do you, in general, enjoy math? Y N

7) Do you, in general, find math useful? Y N

8) Do you think you will need math for your career? Y N

9) Do you think MATHS 108 should be a required class at Ball State? Y N

Number Surveyed – 14

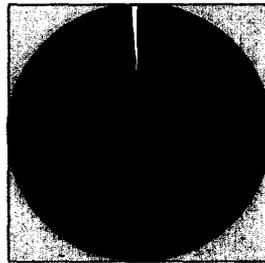
Number of Responses – 6

Percent Responded – 43%

Appendix D

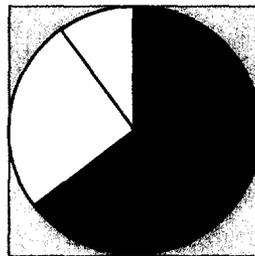
Summary Survey Results

Figure D-1
Percentage of Spring 2002 MATHS 108 Students
Who Were Previously Enrolled



■ Never Taken - 83.5% ■ Taken Once - 15.4% □ Taken More than Once - 1.1%

Figure D-2
Spring 2002 MATHS 108 Students'
Expected Grades



■ A - 16.7% ■ B - 47.8% □ C - 25.5% □ D - 10.0% ■ F - 0.0%

Figure D-3
Spring 2002 Yes/No Results
Appendix A, Questions 5, 7, 8, 9

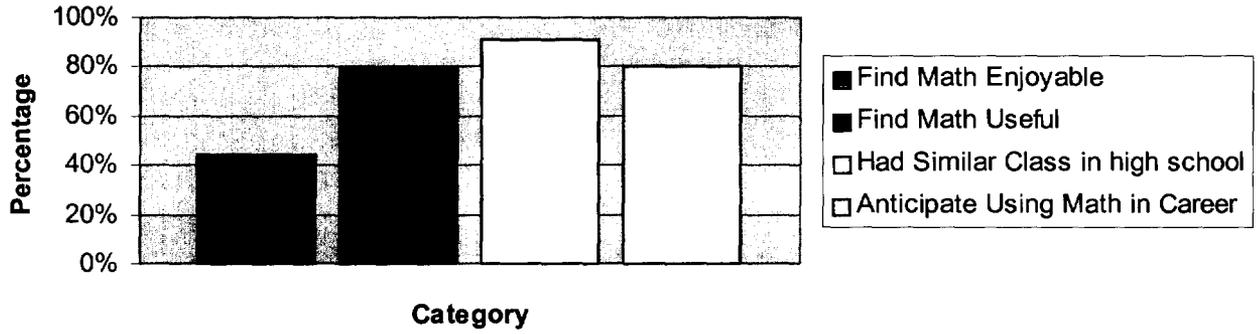
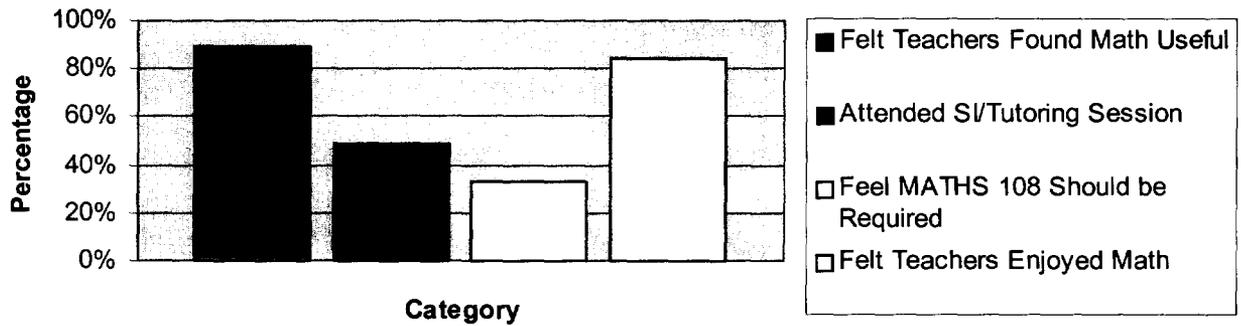


Figure D-4
Spring 2002 Yes/No Results
Appendix A, Questions 10, 11, 12, 14



Works Cited

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