

1) Title

A comparative study of Basic Education-Adult 12 students at SIAST Kelsey Campus taking Mathematics A30 with a Bridging Mathematics class and those without during 2009/2010.

2) Name of Researcher:

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3) Research Circle Members:

Brian Bryce	Mathematics Instructor
Roberta Campbell – Chudoba	Counsellor
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4) Name of Delivery Organization:

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5) Contact Information:

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6) Question Posed:

What is the effect of taking a Bridging Mathematics class on achievement, retention, attendance and student perception of readiness, competence, satisfaction with their mark and motivation for taking other 30 level Mathematics classes. The findings indicate the Bridging program was highly successful, as discussed below.

7) Introduction:

Wayne Halky and Linda Dier in their book Getting By or Getting Better (2009) define effective schools as follows:

“An effective school is one, in which over time students show improved achievement, more positive attitudes, better attendance and more appropriate behaviours.”

Effective school research confirms that “improved student achievement will lead to improved behaviour, attitude and attendance” (2010, Canadian Effective Schools, Inc.). Improving student success, retention and attendance are ongoing goals for Adult Basic Education at SIAST. Accordingly, instructors strive to plan and implement positive changes in instruction and programming to improve student performance and engagement. Planning and decision making at the classroom and program level should be based upon information derived from accurate statistics, authentic assessment and student feedback. That information is what this study is designed to provide. Situational factors such as: employment, childcare, transportation, health, addictions legal and/or financial difficulties are largely beyond our control. Educators can however manipulate enough of the critical variables that affect learning to improve achievement for virtually all students. Action research can help us learn how.

8) The Problem Posed and the Study Context:

Students can enter the Adult 12 program from the Basic Education 10 program or directly from the community through a screening registration process. Programming and scheduling are based on a review of student transcripts, assessment of basic literacy and numeracy, ESL and special needs requirements and the career goal(s) identified by the student. Diagnostic testing, initial classroom performance and student requests may result in program changes if appropriate alternate programming is available. Students that have been out of school for an extended period or with weak basic mathematic skills are recommended to take Bridging classes before attempting level 30 classes. The final decision however, is up to the students. I was the instructor for the three Bridging Mathematics classes. The Mathematics A30 classes were taught by two other Adult 12 instructors. The hours of instruction, learning process, evaluation instruments, project work and method of determining final marks were consistent for all Bridging Mathematics and Mathematics A30 classes.

To answer the question, “What is the effect of taking a Bridging Mathematics class on achievement, retention, attendance and student perception of readiness, competence, satisfaction with marks achieved and motivation for taking other Mathematics 30?” each of the above indicators

were compared for students with a Bridging Mathematics class and those without. The comparisons should provide a measure of the effectiveness of the Bridging Mathematics class to improve performance and engagement.

9) Background and Baseline Data:

Research done during the period 2004 – 2009 found that 33% of students in Basic Education—Adult 12 program completed or graduated. Another 11% continued in the program for a total success rate of 44%. For the 2008-2009 school year, the percentage attendance for all Adult 12 students at SIAST Kelsey Campus was 86.4%.

Statistics from the 2008/2009 Mathematics classes were used as baseline data

- % retention was 75%
- % passing was 83%
- % average grade was 68%

SIAST Kelsey Campus includes two additional statistics:

Over the past five years

- between 50% and 70% of students in Adult 12 were Aboriginal
- there is a 20% lower success rate for Aboriginal students in SIAST programs

10) Data Collection Process:

The percentages of attendance, retention, passing and average marks for 2008/2009 and for each class in 2009/2010 were calculated using data provided by the administrative support staff and the official original and final class lists, attendance records and final mark sheets. The self-assessment data was collected using the survey shown in Appendix A. The comparative data appears in Tables 1, 2, 3 and in Math A30 Summary/Questionnaire. The survey was administered post hoc for the term 2 and 3 Mathematics A 30 classes but the term 4 class completed the first part of the survey at the beginning of the class and the second part at the end of the class. This was because the study was not initiated until the second term and the self-assessment survey was not approved by the Research Circle until the end of term. Using the feedback request form shown in Appendix B, the Research Circle members were asked to review the draft copy of the Research Report and to provide comments, questions and recommendations.

10) Tables of Statistical Data

Table 1: Bridging Mathematics Statistical Data

	Term 1 N=16	Term 2 N=9	Term 3 N=8	Summary N=33
% Retention	100	100	100	100
% Passing	93	89	88	91
% Attendance	89	91	90	90
% Average Mark	67	60	73	67

Table 2: Mathematics A30 Statistical Data

	Term 2			Term 3			Term 4			Summary		
	N=13 B	N=16 NB	N=29 C	N=6 B	N=3 NB	N=9 C	N=8 B	N=8 NB	N=16 C	N=27 B	N=27 NB	N=54 C
% Retention	100	75	86	100	100	100	100	100	100	100	85	93
% Passing	100	100	100	83	0	56	100	88	94	96	86	91
% Attendance	79	91	85	92	83	87	84	85	85	83	89	86
% Average Mark	69	82	75	68	52	63	78	70	75	71	75	73

B = Students who completed a bridging class

NB = Students that did not complete a bridging class

C = Combined group

Table 3: Comparisons showing Retention, Passing, Attendance & Average Mark

	BE 12 Math Class 2008/2009 (Base Line Data)	Bridging	Math A 30 Combined	B	NB
% Retention	75	100	93	100	85
% Passing	83	91	91	96	86
% Attendance	86.4(BE All Classes)	90	86	83	89
% Average Mark	68	67	73	71	75

Math A30: Summary/Questionnaire

Are you upgrading? Yes 58% No 42%

1) How well prepared did you feel when you began taking Math A30 with respect to :

	Not At All Prepared		Somewhat Prepared		Adequately Prepared		Well Prepared	
	B	NB	B	NB	B	NB	B	NB
Knowledge of Mathematics Content	0%	0%	14%	58%	62%	11%	24%	32%
Mathematics Skills (Measuring, Calculating, Solving, Interpreting, Graphing)	0%	5%	24%	32%	52%	32%	24%	32%
Your Ability To Use The Learning Process (Looking, Listening, Practicing, Checking, Correcting)	5%	11%	29%	32%	43%	26%	24%	32%

Bridging

- a) I could do the textbook work but I had test writing problems. Ex. Anxious, over-thinking
- b) I had an excellent teacher. My teacher was great in A30
- c) I feel I would not have been able to feel as confident in Math A30 without the bridging
- d) Graphing quadratics/parabolas I think need to be covered more for a little bit longer than other sections in Math A
- e) I feel us student who have taken the bridging Math A30 course should have a little more teaching in graphing and binomials/trinomials
- f) I was really pumped to go into A30 felt that I knew majority of what was to come and would get a good mark
- g) I don't think I would do good in Math A30 without taking Bridging Math first
- h) Somewhat nervous about if I can follow this class. But I'm sure if I can keep up and study hard, things will work out.
- i) I really did not have an adequate math background and as a result did not know what to expect or how I would do, but I think I did as well as I could have give my lack of math skills prior to coming to SIAST. I hope I passed it was a good challenge.

Non-Bridging

- a) It was a difficult transition from a non-organized set-up to organized schooling. Most of the difficulty was associated with test-related stress
- b) I was not at all prepared to use the learning processes and was not informed or directed to any learning assistance required.
- c) The classes go fast for some people
- d) My previous mathematics course did not deal with many aspects of Math A30 content. I was not well prepared because I had very limited knowledge of graphing and factoring.
- e) I would have liked to take the Math A30 bridging, but unfortunately it wasn't available in April. I do however feel that I do have enough skills to achieve the mark needed with adequate teaching
- f) In high school I struggled through math, but I think the teachers here at SIAST are good at teaching math because I have no problem or struggles with math now
- g) I'm taking this class again
- h) I'm prepared in taking math30 because I love math and I already learned Math A30 in the Philippines when I was in high school

2) How confident did you feel about your ability to achieve the grade that you were working for?

a) Not at all confident	B	5%	NB	11%
b) Somewhat confident	B	32%	NB	21%
c) Confident	B	48%	NB	47%
d) Very Confident	B	14%	NB	21%

Bridging

- a) In Math A30 I was sure I had the proper stepping stones, but Math A seemed rushed and was very different in some aspects

Non-Bridging

- a) At the beginning of the course I felt that I would be an over-achiever due to my academic excellence in my previous course, but that quickly faded as I realized I should have taken bridging math. Bridging would have saved my confidence in my ability
- b) Good to go
- c) I know all my mistakes I made. I wasn't working hard enough. I slacked but I also wasn't prepared mentally with school and balancing home life.

3) How satisfied are you with your achievement in Math A30 with respect to:

	Not At All Satisfied		Somewhat Satisfied		Satisfied		Very Satisfied	
	B	NB	B	NB	B	NB	B	NB
Knowledge of Content	10%	11%	25%	17%	40%	39%	25%	33%

Mathematics Skills	5%	6%	30%	17%	30%	56%	35%	22%
Ability To Use The Learning Process	0%	5%	35%	22%	50%	39%	15%	33%

Bridging

- a) Attendance issues and a speedy course load were hard to handle
- b) Gave up and very discouraged with my test marks
- c) I think since I had been taking math since the beginning of the year, and I was getting sick and tired of it
- d) I should have focused more for Math A30. I can get a better mark!
- e) I didn't understand the last part of class
- f) I think it's more so me not working more efficient and ahead of my teacher
- g) There was a lot of new things I have never heard of and had a hard time understanding . Needed more time for it to sink in.
- h) I have problem with math, because it is a little bit a different than in my country
- i) I felt I needed to focus more and put more effort
- j) Don't know what my final mark was midterm I did well but I don't know what it will be in the end. I definitely could have done better.

Non-Bridging

- a) I did not gain the knowledge I should have because I became extremely frustrated with my lack of necessary skills to succeed.
- b) The teaching skills did not work with the way I learn
- c) It was over and above what I was expecting in terms of the mark I achieved
- d) It was somewhat, but I thought I would do better. There were a couple of sections that were new to me and that's where I struggled.
- e) I wasn't as successful as I should have been in the end. I almost gave up again but didn't cause I don't like being a quitter. So I tryed my best
- f) Not sure of exactly where marks are at right now
- g) My absences were a contributing factor for me
- h) I had an awesome study buddy who assisted me with the areas of the course that troubled me. Without her I would have failed.

4) Was your final mark consistent with the final mark you were working to achieve?

Yes B 40% NB 61% No B 60% NB 39%

5) Identify at least one positive experience you had taking Math A30 (something that helped you).

Bridging

- a) The students and teacher of the classroom
- b) Teacher gave extra help if needed after classes
- c) Understood more when the teacher was teaching
- d) I learned how to tolerate environmentalists
- e) Working with another student who helped both of us to understand somewhat better
- f) I achieved a desired goal by passing
- g) Projects that helped to better understand the material
- h) The website Harbridge was a really big help when I got home and had no instructor to help
- i) The group work has helped me. Also, journal writing in the Math A30 class helped.
- j) I enjoyed being in this class
- k) Having a smaller class helps because you get more time one on one with the teacher. My class has great teamwork and helped each other
- l) I learnt how to do the math I was still confused about and now fully understand those concepts
- m) Group work and teacher close relationship and math
- n) the teaching
- o) I like everything new, so I like this course
- p) The support from everyone here, realizing this doesn't have to be done alone
- q) LaPointe math online so I could see what I was doing wrong while I was at home doing homework.
- r) Learning how to use the LaPointe website for help
- s) A good teacher that helped me when needed
- t) Taking Math A30 was a good learning experience, it helped me open up my mind to new processes and they way I look at things.

Non-Bridging

- a) The great working environment in class
- b) I had an awesome study buddy who assisted me with the areas of the course that troubled me. Without her I would have failed.
- c) I started taking my own notes out of the textbook, instead of paying attention. Made a group of study buddies to work out problems.
- d) Getting glasses and getting help from a friend.
- e) The teacher gave students time and personal help.
- f) Making simple errors on the last test. The teacher would both mark and take marks away. I realize I could increase my precision in answering questions could improve.
- g) The teacher was a very personal teacher. I enjoyed his jokes and his friendly manner.
- h) The math assistance really helped.
- i) Relaxed atmosphere and a good teacher
- j) The instructor was awesome.
- k) The teacher is really good at explaining everything so it is easy to understand.
- l) Helped me learn more techniques and easy way of solving and understanding math.
- m) The teacher was very encouraging and understanding.
- n) Being able to receive help where I needed it.
- o) The extra period from 11 to 12 because I had opportunities to ask personal questions.
- p) LaPointe MathA30, great instructor
- q) I've never took Math A30 before and I liked it.

6) Identify at least one challenge you had in taking Math A30 (something you had trouble with or frustrated you).

Bridging

- a) To try and follow teacher while he was teaching. Very confusing.
- b) Getting homework done prior to exams
- c) My teacher
- d) Students chatting too much and too loud
- e) The bus system sucks. Takes 40 min. To get here.
- f) I did not achieve or receive the grade I desire and can achieve. It was too fast to take in all material and retain
- g) Some of the material was hard to understand
- h) Graphing Quadratics was my worst section and my worst mark I still didn't have a clue even after the General Math
- i) Trinomials and binomials is the first problem and then it got worst. Like I've said before, I could have done better, if I had focused more
- j) I had trouble understanding chapter 7 and quadratics
- k) Section 3 really troubled me maybe some more helpful ways to deal with that would be good for the future
- l) I really struggled in Chapter 3 and everything about it. Definately needed more time and help.
- m) The rush on test, not knowing the time to spend in section. Spend less time on section, not as it says on book or support to spend
- n) I still have problem because need to understand everything after start to count
- o) Balance. Changing a cycle is a tough thing to do
- p) I was my own worse enemy for falling behind. No real challenges besides myself.
- q) The short amount of time to learn many concepts
- r) Rushing through chapters and not fully understanding
- s) It was a challenge keeping up with the fast pace and trying to keep up with homework and assignments

Non-Bridging

- a) Time. Too much content for time allotted. If we were struggling with a section the instructor could not take an extra class to go through the material again or more thoroughly. You can't rush math. Too many mistakes if you do.
- b) I didn't have any challenge related to Math A30, however, the only challenge for me was English, since English is not my native language.
- c) The way the teacher taught, loud classmates, could not see the board.
- d) Decomposition. Class of 30 made it hard to ask questions, in the time available.
- e) We did not spend enough time delving into deeper (more complicated) subject matter.
- f) A lack of focus or help to those with a learning disorder.
- g) The projects were a challenge
- h) Class size was a bit large, and this led to a few distractions
- i) Negatives and positives when I was adding
- j) Not having taken the bridging Math 30
- k) The sections that were new to me, I had trouble with and I don't remember learning them in bridging
- l) Chapter 4 in itself was challenging for me

- m) Applying the concepts when it came to writing the test.
- n) Frustrated on factoring
- o) Some chapters felt like they were rushed a bit too much because of lack of time
- p) Graphs at first – graphing Linear equations

7) How confident do you feel about your ability to succeed in a future mathematics class?

a) Not at all confident	B	10%	NB	0%
b) Somewhat confident	B	30%	NB	33%
c) Confident	B	50%	NB	50%
d) Very Confident	B	10%	NB	17%

Bridging

- a) A little hesitant on higher paced higher math levels
- b) Because my test writing skills sucked i didn't think it was possible for me to get a high grade in future
- c) I felt I could get extra help if needed
- d) I am not sure how I will do in Math B or C because I didn't do as well as I expected in Math A30
- e) I now know how to apply myself
- f) I was never good at math but coming to this program really helped me like math
- g) With a balanced lifestyle, I can have a balanced mind and can achieve anything

Non-Bridging

- a) My present math instructor has found time to help me with my trouble areas and I am now doing very well.

8) How motivated are you to take more mathematics classes?

a) Not at all motivated	B	0%	NB	11%
b) Somewhat motivated	B	30%	NB	22%
c) Motivated	B	45%	NB	17%
d) Very Motivated	B	25%	NB	50%

Bridging

- a) I love math and will re-take if necessary to achieve desired mark
- b) I enjoyed Math A30 and wanted to continue n a Math career
- c) If I was going to take it then I would be ready
- d) I really want to take Math B and C but I don't want do it for my last term because I am sick and tired of math and I need a break. I am hoping though next year, I will have a good summer and be extremely motivated to continue on in Math B and C
- e) I am extremely confident I can do much better next time I take this class
- f) I know I didn't do well, but I still want to try
- g) But not what I would want to study for the future
- h) I really enjoy math and want to take more math classes
- i) I would like study everything on English it help me to understand better people

- j) I'm not a big fan of assignment, I feel less motivated when it's not "due".

Non-Bridging

- a) I enjoy math. But I am becoming less motivated due to time limits for work and understanding of given subjects.
- b) Because I want to be able to understand math
- c) Math ABC are pre-requisites for my post-secondary education.
- d) It is what makes this world go around

11) Interpretations and Conclusions

A) From the Statistical Data

1. The % of retention in Mathematics A30 was 15% higher for students with Bridging Mathematics compared to those without (100% compared to 85%).
2. The % pass rate in Mathematics A30 was 10% higher for students with Bridging Mathematics compared to those without (96% compared to 86%).
3. The % attendance in Mathematics A30 was 3% lower for students with Bridging Mathematics compared to those without, (83% compared to 86%) and 3.4% lower than the % attendance for Adult 12 students in 2008/2009 (83% compared to 86.4%) This statistic is an anomaly in as much as the % attendance in the Bridging Mathematics classes was 3.6% higher than the % attendance for Adult 12 students in 2009/2009 (90% compared to 86.4%).
4. The % average final mark in Mathematics A30 was 4% lower for students with Bridging Mathematics compared to those without (71% to 75%). This statistic must be interpreted with the knowledge that 58% of the students without Bridging Mathematics indicated they were upgrading and therefore had taken Mathematics A30 at some time before.
5. The % average final mark in Mathematics A30 for students with Bridging Mathematics was 3% higher than the % average mark for students in Mathematics classes in 2008/2009 (71% compared to 68%).
6. The % average final mark for Mathematics A30 increased by 4% for students with Bridging Mathematics compared to their % average final mark in Bridging Mathematics (71% compared to 67%).

In summary, the statistical evidence suggests that taking a Bridging Mathematics class prior to taking Mathematics A30 does improve the retention, achievement and success rate of Basic Education, Adult 12 students at SIAST Kelsey Campus

B) From the Student Survey Questionnaire

1. Overall 76% of students with Bridging Mathematics indicated that they were adequately or well-prepared to take Mathematics A30 compared to 55% without
 - a. Content – 86% to 43%
 - b. Skills – 76% to 64%
 - c. Learning Process 67% to 58%

2. 5% of students with Bridging Mathematics indicated they were not confident at all to achieve the mark they were working for in Mathematics A30 compared to 11% for students without
3. Overall 15% of students with Bridging Mathematics were not at all satisfied with their achievement in Mathematics A30 compared to 22% for those without
 - a. Content – 10% to 11%
 - b. Skills – 5% to 6%
 - c. Learning process – 0% to 5%
4. The level of confidence to succeed in future mathematics classes and the motivation to take more mathematics classes (60% to 67%) were essentially the same for students with and without Bridging Mathematics (70% to 67%)
5. Both groups expressed dissatisfaction with their final mark (49%)
6. Both groups commented that more time and a slower pace would have increased their level of confidence and understanding Mathematics A30
7. Both groups commented favourably on the positive, cooperative classroom climate and on the helpful, supportive, personal teaching style of their instructors

Student comments indicate that taking Bridging Mathematics was beneficial and positive; Bridging enhanced their level of confidence and motivation to succeed in higher level Mathematics classes.

12. “Quo Vadis” – Recommendations

1. The current system of pre-course screening to match student readiness, competence and career goal with the most appropriate program should be retained
2. Scheduling Mathematics classes simultaneously to facilitate the movement of students to the optimum placement (program and level) should be retained
3. Scheduling of consecutive Mathematics classes in terms 2, 3 and 4 to ensure continuity and a smooth transition from Bridging Mathematics class to Mathematics 30 classes should be retained
4. Students that have been out of school for an extended time, or with weak basic Mathematics skills and/or low confidence in their Mathematical ability should continue to be encouraged to take a Bridging Mathematics class prior to attempting a Mathematics 30 level class
5. Current maximum enrolment levels should be retained.
6. A similar comparative study should be repeated when the new Mathematics 10, 20 and 30 are implemented in 2012
7. A similar comparative study should be considered for Bridging English and English A30 and for Bridging Science and Science 30 classes
8. With the current emphasis on implementing Common Formative Assessment a research project should be designed to determine the effect on attendance, achievement, retention and student perceptions of success
9. Student comments would indicate a study on the effects of class size and number of hours allocated on retention, attendance and achievement in Mathematics A30 should be considered
10. Student comments also indicate an inquiry into the level of dissatisfaction with grades is warranted (49%)

11. This report should be shared with the Dean and Program Heads of the Adult 12 programs at all SIAST Campuses and the recommendations should be considered for implementation where appropriate.

Appendix A

Math A30 Survey/Questionnaire

Please take a moment to think about each of the following questions and then answer them as honestly as you can. Please do not identify yourself in any way when answering the questions. Please know that the purpose of this study is to determine the group responses and not individual responses. Thank you for participating.

1) What was the name of the last mathematics class or program you took prior to taking Math A30?

a) _____ **A B C D F**
 a. **Name of Class or Program** **When** **Where** **Approx. Grade**
Please Circle

b) Are you upgrading? Yes No

2) How well prepared did you feel when you began taking Math A30 with respect to :

	Not At All Prepared	Somewhat Prepared	Adequately Prepared	Well Prepared
Knowledge of Mathematics Content				
Mathematics Skills (Measuring, Calculating, Solving, Interpreting, Graphing)				
Your Ability To Use The Learning Process (Looking, Listening, Practicing, Checking, Correcting)				

Comments:

3. How confident did you feel about your ability to achieve the grade that you were working for?

Not At All Confident
 Somewhat Confident
 Confident
 Very Confident

4. How satisfied are you with your achievement in Math A30 with respect to?

	Not At All Satisfied	Somewhat Satisfied	Satisfied	Very Satisfied
Knowledge of Content				
Mathematics Skills				
Ability To Use The Learning Process				

Comments:

5) Was your final mark consistent with the final mark you were working to achieve?

Yes No

Comments:

6) Identify at least one positive experience you had taking Math A30 (something that helped you).

7) Identify at least one challenge you had in taking Math A30 (something you had trouble with or frustrated you).

Comments:

8) How confident do you feel about your ability to succeed in future mathematics class?

Not At All Confident Somewhat Confident Confident Very Confident

Comments:

9) How motivated are you to take more mathematics classes?

Not At All Motivated Somewhat Motivated Motivated Very Motivated

Comments:

Appendix B

Please review the draft copy of the Research Report. Please attach a separate sheet listing:

1. Your conclusions or interpretations
2. Your questions or concerns
3. Your recommendations for
 - a. Program/instruction changes or confirmation
 - b. Future research questions

Please return this to me as soon as possible or by October 18th. I will compile the results and share them at our meeting on October 21st. Thank you.

- | | | |
|--------------------------|----------------------------|--|
| <input type="checkbox"/> | Brian Bryce | Mathematics Instructor |
| <input type="checkbox"/> | Roberta Campbell – Chudoba | Counsellor |
| <input type="checkbox"/> | Darlene Danyliw | Program Head – Basic Education, Adult 12 (2010-2011) |
| <input type="checkbox"/> | Ted Deacon | Social Science/English Instructor |
| <input type="checkbox"/> | Jody Hershmillier | Mathematics Instructor |
| <input type="checkbox"/> | Kiyomi Kirkpatrick | Program Head – Basic Education, Adult 12 (2009-2010) |
| <input type="checkbox"/> | Shane Stack | Psychologist/Researcher |

1. Conclusions/Interpretations

2. Questions/Concerns

3. Recommendations
