Title:	**Improving Achievement Scores in a Basic Education (BE) Mathematics A30 Course**
Name of Researcher:	**Janet Galbraith**
Name of Delivery Organization:	**Saskatchewan Institute of Applied Science and Technology (SIAST), Wascana Campus, Basic Education Program**
Contact Information:	**janet.galbraith@siast.sk.ca**
Question Posed:	**Given that attendance usually falls mid-semester, would changing the order of the topics covered have a positive effect on learner achievement scores?**

Outcomes:

<u>Major Content Areas</u>

Interestingly, the results for Unit 1 were quite lower than that of other semesters. In Unit 3 & Unit 4, the average marks were raised rather significantly. In Unit 5, there was a slight drop.

<u>Minor Content Areas</u>

For Unit 2, the achievement scores were increased from 2 out of 3 semesters. For Unit 6, the scores were significantly decreased and for Unit 7, the scores were slightly increased.

<u>Student Feedback Form</u>

From their own observations, the learners rated the organization of the material as **4/5** (5 – excellent; 1 – poor). They rated their own confidence in the core content areas as **3.6/5** and their confidence in the minor content areas as **2.9/5**. The average

attendance was 86.1%. When asked about when the majority of their absenteeism occurred, beginning, middle or end, they responded as follows: beginning – 1; **middle – 5**; end – 3; not sure –1.
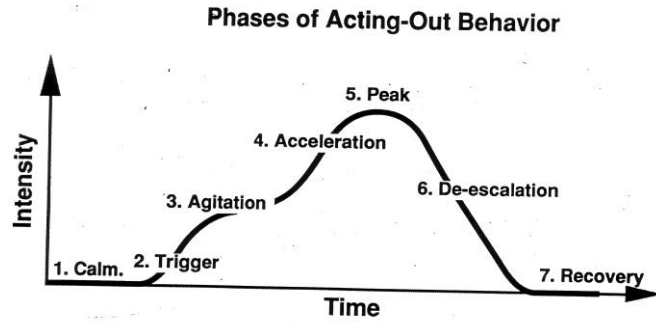
Abstract:

Participants:	Fifteen learners were registered in the Mathematics A30 course that ran from February 2, 2009, through to April 8, 2009. The classes ran for 2.5 hours per day in the afternoons in group-taught format.
	It had been noted by me and by other colleagues that attendance tends to fall mid-semester. This particular class was no different as they tended to have less ability to handle their various responsibilities midway through the term.
	It should be noted that four of the learners were repeating the course and that two other learners withdrew mid-semester – one based on a career goal change and the other due to a family emergency. Three of the learners had fairly significant diagnosed learning disabilities (particularly in math related areas) and two of those three were unsuccessful.
Research:	As this is a rather narrow, limited topic, literature is not readily available. However, in discussion with other colleagues, one finds that changing the order of topics, questions, examination format, etc. often leads to better achievement results and more significant learning.
	One instructor recounted an assessment tool that learners tended to be surprisingly unsuccessful on. When a change was made to the order of the questions, the assessment tool yielded far better results. This is the same premise that led me to my project.

Phases of Acting-Out Behavior

Intensity

5. Peak

4. Acceleration

6. De-escalation

3. Agitation

1. Calm. 2. Trigger

7. Recovery

Time

Although the "why" of this trend in attendance is beyond the scope of this research project, it is interesting to note that there may be some connection with Colvin's Phases of Acting-Out Behavior. As illustrated, individuals are faced with an event or a stressor that acts as a trigger. They are then faced with an escalation of emotions, leading to the climax. At "peak", they are faced with a fight or flight decision.

The trigger, then, and the escalation of agitation may be the pace and intensity of the workload. The "peak" corresponds with the drop in attendance mid-semester. Once recovered from this outburst, they return to class having missed key material that often causes their achievement scores to fall and even result in failure of the course.

I would hope that such interventions as proving a safe, comfortable environment for learning along with predictable, consistent and routine expectations are what lead them back to class. Regardless, the majority of learners persevere until the end of the term, but end up with major gaps in their learning particularly in the major content areas of Math A30.

As a result, my hypothesis is that changing the order in which the key concepts are taught may be more beneficial to them – catch them before they reach the "peak" or "fight or flight" stage of the Acting-Out cycle.

Reference

Colvin, Geoff. PhD. <u>Managing the Cycle of Acting-Out Behavior in the Classroom.</u> Pacific Northwest Publishing Company: 2004.

<u>Results of Similar Studies</u>

I was unable to find similar studies at this time.

<u>Process Involved</u>

As my project involved simply a change in the order of the material covered, I did not seek out the approval of my Program Head. I did, however, discuss this idea and the project with my learners. They were in agreement about the trend in attendance and appreciated the thought behind changing the order to better accommodate their needs. They were rather enthusiastic about the project and were looking forward to the results. They were also eager to offer their observations/comments along the way.

Following the completion of the courses, participants were asked to complete a feedback form which I have used to summarize the results.

Findings: Appendix A compares the average scores for 4 different semesters of Math A30. The areas marked in blue are the major concept areas which were rearranged to accommodate the times for better attendance.

<u>Major Content Areas</u>

Interestingly, the results for Unit 1 were quite lower than that of other semesters. In Unit 3 & Unit 4, the average marks were raised rather significantly. In Unit 5, there was a slight drop.

<u>Minor Content Areas</u>

For Unit 2, the achievement scores were increased from 2 out of 3 semesters. For Unit 6, the scores were

4

significantly decreased and for Unit 7, the scores were slightly increased.

<u>Student Feedback Form</u>

From their own observations, the learners rated the organization of the material as **4/5** (5 – excellent; 1 – poor). They rated their own confidence in the core content areas as **3.6/5** and their confidence in the minor content areas as **2.9/5**. The average attendance was 86.1%. When asked about when the majority of their absenteeism occurred, beginning, middle or end, they responded as follows: beginning – 1; **middle – 5**; end – 3; not sure –1.

**Reflections/
My Suggestions on
Future Research:**   The fact that the results for Unit 1 were significantly lower than that of other semesters may suggest that this group may have been at a lower skill level than other groups I have taught previously. If this is so, the results may underplay the significance of the change in achievement scores.

As such, I am encouraged by the positive results for Units 3 & 4. Unit 3 increased by an average of 32% and Unit 4 by 20%.   This may suggest that teaching these units at the beginning of the course was valuable to the learners as their attendance & focus were heightened at that time.

Unit 5 decreased by an average of approximately 5%. This rather disappointing, but not surprising, as it was covered at the end of the term when patience, focus and energy are at a minimum for learners and instructors alike.

For Units 2, 6, & 7, the average changes were +2%, -20%, and +5%, respectively. The decrease in Unit 6 is rather alarming but given the results from Unit 1 it is entirely possible that this group may have been disadvantaged in the area of the type of logical analysis that is required in Unit 6 (Permutations &

Combinations). The other results are not significantly different and suggest that the change had little or no effect on the achievement in those areas.

The students rated themselves as having a greater understanding of the major content areas as opposed to the minor content areas and rated the organization of the material as "very good". They reported that 50% of their absenteeism occurred around mid-semester. This suggests, for example, that if I was absent 10 days, 5 of those days were missed midway through the course which is in agreement with my initial assumption. Their observations tend to be in keeping with the conclusions drawn above.

Although there are so many contributing factors to BE learner success, and no factor can truly be identified as the cause of success in any given circumstance, it is possible that this change in the order of content area coverage had a positive result on the achievement scores of these students.   The results of this research project are relatively inconclusive and perhaps additional analysis and research can be done.

Sharing the Research: This study will appear on the SABEA/SLN website

Result
Comparison
RiP Project

Unit	Semester I 2007-2008	Semester III 2007-2008	Semester I 2008-2009	Semester III 2008-2009	Percent change
1	**77.9%**	**82.9%**	**78.6%**	**72.9%**	-9%
2	69.4%	66.7%	85.0%	75.0%	2%
3	**45.1%**	**53.0%**	**56.9%**	**68.1%**	32%
4	**51.0%**	**62.2%**	**56.3%**	**67.5%**	20%
5	**69.0%**	**64.1%**	**66.1%**	**62.8%**	-5%
6	78.7%	68.4%	72.0%	58.6%	-20%
7	68.6%	covered in final exam	69.8%	72.9%	5%
Final Exam	56.8%	57.4%	55.7%	52.2%	-8%
Final Overall Mark	64.5%	64.3%	65.0%	59.6%	-8%
Order	(1,2,3,4,5,6,7)	(1,2,5,4,3,6,7)	(1,2,3,4,5,6,7)	(1,3,4,2,6,7,5)	