

Free literature review on the role of supplemental instruction in success and ret...

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- Problem Statement – Area(s) of Improvement

In any educational process the only way for a student to learn is by actually remembering what they have been taught. This is doubly true in any of the more precise subject such as math, science and technology; all of which rely on solid evidence to prove someone's point and more importantly, numbers. By this very attribute, math has gained the ire of students around the world despite the numerous improvements and possibilities the field has provided to society.

In this light, the main problem that this research paper is trying to answer is “ how do we raise the retention of students enrolled in mathematical courses in college?” while the problem may seem like a personal problem for students to handle, the sheer number of students facing such a problem has made it a social problem instead . In fact, colleges and universities also see this as a problem. The reasons why would be further discussed later in the literature section of this paper.

- Introduction (Context of the Deficit)

The problem arises in the fact that not only is math the most hated subject of students, this hatred of it has caused a great decrease of students taking on courses majoring in math, a higher drop out of students who are enrolled in courses majoring in math, and attrition rates of students who are interested in the subject.

There are many reasons why a student drops out of college; family problems, financial problems, dissatisfaction with the quality of education and so forth. But the one thing that does remain clear is the fact that if such actions do continue, it will not be for the betterment of neither the students

nor the institution.

An increase in dropout rates would not benefit the students as they will have wasted the loan they took from banks to pay off an education that they did not complete. This does not help society as someone who could have been a great achiever has lost their opportunity and neither is it good for the institution as a big dropout or erosion rate of students taking up math courses will reflect back upon the institution as a poor place to study math or that something is wrong within the institution as a whole. This in turn will most likely affect enrollment rates in the future. As such, what can be conceived as a small problem must be addressed long before it becomes a very big one.

- Description of the community

The community wherein the research will be held is a collegiate educational institution that averages on all accounts when it comes to its standing in the field of mathematics. While not necessarily meaning that this institution does not excel in other fields, we believe that the best place to start working is where the students do not stand out when it comes to mathematical achievement to better ensure that the results of the research can be applied more widely. Specifically, the research will be held on its (the institution's) freshmen students to better achieve fruition in the long term goals of the research should it be a success. Furthermore, the research will focus on a batch of students, namely those taking applied mathematics as their course of study and on the subject college algebra.

- Local Data Vs. Comparative

The data gathered from the institution's records of its first year applied

mathematics students in college algebra will help us differentiate the level of mathematical knowledge they have from other first year students also taking up the same subject. With it, we can compare it to other scores of students who are also taking applied mathematics in different studies done by other researchers specifically on the subject of algebra.

- Stakeholder Input

- Parents

The researchers will ask for the help of the parents of the students involved in the research in the sense that they will also monitor their child's grades when it comes to college algebra and help us see if there was a change in the student's grades and study habit once the Supplemental Instructions Model is applied to their child.

The teachers of the classes under study will also be asked to make their own observation between the experimental group and the control group to see if the application of the SI model is beneficial to their students. They will be asked to answer a simple questionnaire that will help compare the students whom the SI model is applied to and to the other students where the SI model is not used.

- Administrators

Should the SI model be proven effective in increasing the span of retention the students have for math courses (in this case, the subject of college algebra) the researchers would like to ask the administrators of the institution to try and apply the SI model on other math subjects and other classes as well. Regardless of the outcome though, the researchers will still ask for help from the administrators of the institution to officially sanction

the study in hopes of increasing their student's retention span, the institution's reputation and a decrease of students dropping out due to "hard math subjects".

- Students

With the students being the primary subject of the study, the researchers will work most closely with them. Students of two applied mathematics class, both first year, both taking the subject college algebra will be the main focus of the research to see if the SI model will help them. Both classes must have the same teacher, studying the same topic at the same time; the difference is that one class will apply the SI model for their subject while the other will not.

- Improvement Goal and Definition of Key Terms

- Overall Long Term Goal(s)

In the end, what the researchers want is to increase the retention of students when it comes to subjects and courses that are heavily laid with mathematics. Regardless of the field, be it in technology, science, engineering, medicine or even applied mathematics. In the end, the main goal is to ensure that no matter how the students may feel when it comes to the subject of math, the researchers would still be able to discover various factors affecting student retention rates, and identify what interventions have been effective so far, in addressing the problem. The researchers also wish to increase the rate of how well first year students of the future will be able to handle mathematical subjects in the collegiate level.

- Specific Outcomes and Measures

- Immediate

The application of the Supplemental Instruction Model to increase retention span of students in mathematical subjects in the collegiate level. While the SI model will be the main focus, the researchers will also apply Dr. Alan Seidman's retention formula to a varying degree.

- Intermediate

The decrease of attrition rates of students and teachers within the field of mathematics. Also the increase of enrollment rates when it comes to courses with higher levels of mathematics, and the decrease of dropout rates of students because of fear of the subject or their failure to pass it.

- Long term

The elimination of the thought that math is an impossible subject to master, an increase of enrollment rates within the institution as a whole, the recognition that the institution is a good place to learn higher mathematics and preparing students to take on college level mathematics within their first year alone.

- Impact on the School Community

The most obvious impact that the researchers would like to see within the community is the decrease of students complaining that math is a hard subject solely because they were not prepared to take on collegiate level math, neither because they cannot remember anything they have learned in the past years when it came to math. As such, the research is meant to increase the retention span of students in the short run and make the institution known as a center for learning when it comes to collegiate math in the long run. Furthermore, if the SI model proves to be effective within the school community, then the institution gains another method to teach

students while decreasing the burden place upon its teachers as the students themselves will also be responsible for the understanding of their fellow students of the math subjects taken.

- Literature Review – Research Based

- Review of Literature

There can be a lot of factors why students may leave an educational institution. Some of the most common factors are the current level and quality of education, the prices of matriculation and other school-related services, the social environment inside the institution. In this literature review, we will examine the various direct and indirect factors that could significantly affect the student attrition and student retention rates.

Literatures in this field of research recognize the idea that the harder the subject is, the more likely that the students will drop out. This has been true for students enrolled in Mathematics and other related courses. Significant attrition rates were noted and so, there is an inherent need to conduct a study about this topic.

This paper only aimed to justify the already established effectiveness of providing Sis in educational institutions with low student retention rates. Student Retention is one of the major issues in education that schools as well as the local state government should address. It has been noted that drop out and attrition rates among students enrolled in Mathematics and Mathematics-related subjects were higher. Provisions for SI or Supplemental Instructions have been used in the past to increase student retention rates in STEM or Science, Technology, Engineering, and Mathematics Subjects. The authors concluded that Provisions for Supplemental Instructions turned out

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to be effective in decreasing attrition rates and later on, in improving student retention rates. This research could serve as evidence which can be used by administrators of educational institutions and future researchers in the field of education who considers the use of Supplemental Instructions in preventing excessively high student attrition rates.

Guiding Questions for Student Retention - (Swail, 2006)

This research was a qualitative research article published by the President of the Educational Policy Institute in Texas, U. S. as a response to the increasingly high student attrition rates in colleges and universities. There are numerous reasons why students leave colleges and universities and colleges and a common problem is that the educational institutions concerned do not exert efforts to be informed of the reasons for student attrition. The author had concluded that administrators should manage educational institutions properly, by addressing the higher and lower levels of administration, particularly, the faculty and the directors of every department. This way, there will be a stable form of communication between the administration and the students which would later on lead to lower attrition rates. This research identifies one of the most common but most commonly neglected issues in student retention and/or attrition. It exposes possible approaches that administrators could use in the management of such issue.

Academic Progress in Developmental Math Courses – (Silverman et al., 2011)

This was a quasi-experimental study which aimed to identify whether an earlier developed intervention called Seidman's retention formula which involves early identification of student deficiencies followed by an intensive early and continuous set of interventions could really increase student retention rates. Majority of college students are not prepared to face the difficulty of college-level math courses—this is one of the major reasons why most of them, not initially but after some time, drop out from college and discontinue their studies. The Seidman's formula for student retention has been a promising tool that an increasing number of administrators are considering applying. However, claims about the effectiveness of this approach are still controversial. Results showed that students who were able to complete the MMW program—basically those from the treatment group, got higher GPAs (Grade Point Average), that the subjects (students) who are from the control group who received no significant changes in GPA. This research justifies the real possible effectiveness of the Siedman's approach in addressing excessively high student attrition rates in educational institutions. Results have shown how the subjects' GPAs increased after the management program.

This was a quasi-experimental study which aimed to evaluate the effects of a Teacher Advancement Program in Chicago in fulfilling its main objective—decrease teacher attrition rates, which could be one of the variables that could affect student retention rates, whether directly or indirectly. Teacher Retention Rates play a significant role with the level of achievements tertiary

level of education students make in school which makes it one of the influential factors in student retention rates in educational institutions. TAPs (Teacher Advancement Programs) such as the one implemented in Chicago more than four years ago proved to have reduced the teacher attrition rates in subject educational institutions by 12 percent within an assessment period of three years compared to the subjects from non-TAP control groups. Results showed that implementing a program that would aim to improve the number and quality of achievements that students make could significantly decrease teacher attrition rates in universities, by up to 12 percent. Although there are very few to little number of literatures that that could prove the idea that there is indeed a strong correlation between teacher and student attrition rates, it is a highly relevant field to the current topic. The faculty members are the ones in the administration who are closest to the students and if even they themselves are not pleased with whatever is going on in the organization, then chances are the students are not as well.

Are Math Readiness and Personality Predictive of First-year Retention in Engineering – (Moses et al., 2011)

The Impact of a College Survival Skills Course and a Success Coach on Retention and Academic Performance – (Allen et al., 2012)

This was a descriptive and qualitative type of study that focused on determining the possible impact of using student engagement strategies and involving a college success coach in the equation in an effort to decrease the figures of students dropping out from college. Student retention is increasingly becoming one of the major concerns of both for profit and not

for profit educational institutions. This problem, no matter how serious can be solved by student engagement.

Preliminary Success and Retention Rates in Selected Math Courses – (Cuesta, 1999)

Although properly done, this study only focused on one institution with actually a limited number of subjects, therefore, more research is required before we could generalize the findings and apply it to other populations. There are many variables that could affect student retention rates in a particular institution and for the authors, it would always lead to academic achievements and preparedness in Math subjects such as elementary, intermediate, and advanced algebra, calculus, algebra and geometry. Traditional and Computer assisted course formats play a significant role in the students' academic success by serving as one of the predictors of success and retention in the course and thus in the college. Results from the exploration of researches on success, retention, and persistence in math courses at Cuesta College showed that the method of course delivery could affect the level or degree of achievement a student may attain which in turn affects the retention rates in colleges and universities. Indirect or secondary factors that influence student retention and attrition rates are definitely relevant to the topic and with the findings in this study; administrators of educational institutions would realize that indirect factors could make significant differences with student retention rates.

Making Sense of Disparities in Mathematics Remediation Courses and its relation to Student Retention Rates – (Bahr, 2010)

This was a qualitative study focused on skill gaps and on a very limited number of subjects only. Therefore, the credibility and the generalizability ratings for this paper would not be as high as those of experimental studies. The success and rate of success of Remediation of students taking up mathematics subjects in community colleges may be associated with differing rates of student attendance and retention. However, there is not enough evidence present in literatures that could clear out all controversies about their correlation. In successful remediation of mathematics subjects, persistence is a very significant factor. Results showed that while there may be skill gaps in learning mathematics and in its remediation, persistence can improve the likelihood of successful remediation although the author also mentioned that the relationship that exists between the involved variables—although there really is, is neither proportional nor equal. The results of this research would enlighten the readers and possibly, the administrators of educational institutions about another affective factor that could influence student retention—persistence.

Conclusion

In summary, the literatures reviewed suggest that there are indeed a lot of significant factor that could influence student retention, especially in educational institutions offering Mathematics and other related courses. The level and frequency of academic success, the preparedness of the students to face and take up college-level mathematics (algebra, trigonometry,

geometry, calculus, etc.), innate personality, and even the teachers and the learning environment were identified as some of the most significant variables influencing student retention and attrition rates.

- Assumptions for the Literature Review
- Conceptual Framework
- Research Design – Implementation

The researchers intend to implement the study by beginning with the approval of the administrators. With their sanction, the researchers will have an easier time to find a teacher willing to put his or her students under study. More so, with the sanction of the institution's administrators, the researchers will no longer have any problem with getting sensitive data related to the study from the institution. Such data will, of course, be kept confidential and will only be known by the researchers. These data will also only be used for comparative statistics, nothing more, and will not be revealed even within the study itself.

Once a teacher who is ready, willing and able is found, the researchers will then observe both classes to find out more about the students in their own environment and also find out which class will be more likely accepting of the Supplemental Instructions Model. Once a class is chosen, the researchers will lead the first batch of SI models to find possible second batch SI