Learner Centered Schemes in the Digital Age

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Abstract - *For many educators today, the internet represents an extremely useful means for the delivery of educational content in a timely manner with minimal cost. Indeed, institutional officials feel that the entire curriculum and assessment may also be carried out via the internet with minimal or no human intervention.*

As our experiences with digital technology evolve, some observers feel that there is a down side to extensive use of these digital devices. The author feels that digital technology often exploits various addictive tendencies of the brain and attention is diverted away from the desired task such as skill development in mathematics.

In this article, we present the results of a study involving a lecture based delivery model and another model that focuses on classroom engagement with face to face interaction and intervention techniques. This study suggests that the instructor role in the new digital age becomes more that of a coach much as in sports.

1 Introduction

Digital technology has proved to be a great boon to individual expression and social awareness as well as providing a new era for accessing information unprecedented in history. Perhaps no sector of our socioeconomic society has benefited more than the education component. With its interactive capability and the delivery of educational content in a 24-7 format, it promises that education and learning can now be designed to fit into the learner's time and space constraints and thus ensure greater success in achieving one's educational goals.

Despite this, the author is of the opinion that extensive use of digital technology, and especially social media tends to promote a withdrawal of face to face engagement brought about in part by the uncertainties of f2f interactive communication. Furthermore, this leads to disengagement of the user, preferring to interact in a minimal manner and does affect the degree to which the learner can become engaged in the subject matter in a classroom situation.

This paper will focus on College level statistics and efforts by the author to address the very diverse needs of students in several sections of the course. Success in statistics requires a medium level of algebra and math skills accompanied by an appropriate level of reading and study skills. The lack of an appropriate level of skills in these areas, coupled with constraining factors such as extra-curricular activities, outside work and addiction to social media all provide a complex interplay of variables which play significant role in relation to success in the educational setting. Without appropriate schemes in place to address the issue of student success with these constraining factors in place, the instructor is faced with high dropout and failure rates in the class

This then begs the question as to how an instructor or professor is able to address the diverse needs of such students and at the same time ensuring greater student success without sacrificing course content and grade inflation.

2 Research Rationale

During the period of 1980 thru 1992 the class averages in statistics were somewhat constant averaging 66-67 throughout the period. However, beginning in the late 1990's that class averages began falling with each year (Figure 1). The trend appeared to have no explanation from a statistical perspective as many factors were at play and the phenomena appeared to have no direct link other than lower entry level skills.

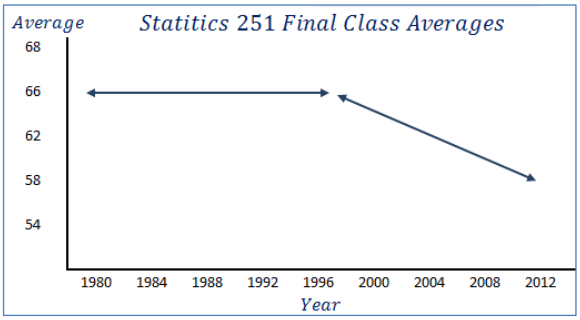

Figure 1

Faced with high dropout rates and high failure rates, a strategy was formulated to address these issues. The effort began by identifying those aspects of the teaching-learning process that are within the domain of the instructor/professor.

First consideration was the nature of the text book. The author feels that traditional mathematics and statistics textbooks often have intimidating page layouts filled with formulas and very tight text layouts. Moreover the coverage is often so vast as to be very daunting to the beginner level student.

To address many of these limitations, the author developed a 320 page "class workbook" intended to provide a focus of work activity for the student. This workbook features minimal theory with numerous word problems. The workbook layout provided space for students to demonstrate specific procedures utilizing paper and pencil techniques deemed necessary for proper problem solution.

Secondly, negotiations with a publisher resulted in the adoption of a customized text book with internet access at a substantially less cost than previously was available. The on-line content provided a means for self-testing with appropriate feedback allowing the student to undertake a more or less independent approach to learning and allowing self-assessment to gauge one's skill level.

Thirdly, the author developed thirty nine on line videos of 10 to 12 minutes duration, corresponding to 33 class hours. Each video addressed a topic that was covered in a class and these same questions appeared in the workbook thus enabling the student to do the workbook problems at home using these on line videos. The videos were made available in a 24-7 time frame in order that students are able to access the video content at any time.

Finally, on a weekly basis, the author provided a detailed study guide specifying which videos to watch, workbook problems to be completed and timelines for on-line assignments available. The tenor of the comments was such as to provide information and encouragement to the learner.

3 Methodology

During 2010, two sections of beginner level statistics were identified to become part of a study to assess two classroom management schemes.

Group A consisted of one section conducted utilizing a traditional approach with primary lecture techniques involving blackboard and PowerPoint presentations. The classroom workbook was used for a 10-15 minute problem solving session in each class..

Group B consisted of a second section of statistics conducted with the extensive use of videos, accompanied by very detailed weekly summaries of what sections of the textbook to read, problems to do and videos to watch etc. The class was conducted with a 15-20 minute presentation of key content material and problem solving techniques followed by 35 minutes of problem solving in groups with face to face interaction. During this time, the instructor was monitoring progress and interacting with students in more or less a coaching role, attempting to connect with each students and providing encouragement and help.

At the end of the semester in 2010 the final scores for each section were complied, and these results are displayed in the histogram in the figure labelled Figure 2 here.

A glance at the histogram illustrated at the top of Figure 2 suggests an extremely varied distribution with a mean of 49. This distribution may be considered typical of a presentation feature involving primarily a lecture format.

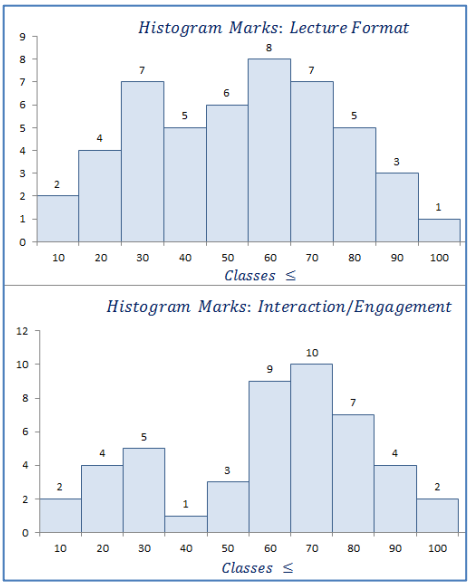

Figure 2

The bottom half of the Figure 2 depicts the histogram if marks for Group B involving classroom engagement, face to face interaction with instructor actively involved in the classroom. The most distinguishing feature of this histogram is the bimodal nature of the data suggesting two sub-populations present. Whereas the average for this class was 56-58%, the appearance of the two cluster points of 27 and 67 suggests that various factors were operating within the "populations" involved

4 Discussion

It is considered difficult to apply standard statistical methods to the data in question because the same instructor was involved in both deliver schemes and as such, it was difficult to block out instructor behaviors. Furthermore, one cannot treat the sections as being random samples from a population as the two sections were simply the only sections held during the semester.

In an attempt to identify potential variables at play in this study, questionnaires were designed and administered by phone or with personal interview follow-up. On the basis of the feedback obtained, the following "factors" were identified as significant:

- Lack of an appropriate math & study skills ;
- Number of courses enrolled;
- Outside work, often 16-24 hrs per week;
- Time spent on student activities & sports;
- Social media, internet & cell phone use;
- Personal issues, family, relationships, money etc;
- Timing of the class, mid-day vs late day times;

It seems obvious that Group B benefited significantly from the management scheme involving classroom engagement strategies and face to face interaction etc.. Most notable in this regard is the degree to which students began to

help each other in problem solving situations as well as making suggestions regarding which videos to view, which learning resources to use for study etc. Overall, there appeared to be a greater sense of satisfaction with what was happening in the classroom. Indeed on several occasions students would comment to the entire class that s/he was enjoying the classroom experiences.

5 Observations

This study revealed the rapidly changing world of digital technology and its impact in an educational setting. Considerable attention must be given to designing learning situations to meet the changing needs of our students. The following observations and speculations may be considered:

- Students less willing to assume responsibility for his/her learning;
- Greater feeling of entitlement & expectations;
- Greater connectedness to cell phones and social media to the extent that these devices with their rapid response and continuous engagement features tend to capture students attention subverting attempts to focus on one line of thought for a short period of time;
- Difficulty with comprehension and understanding word problems, especially those involving more than 30 to 40 words;
- Apparent loss of the art of human communication and inability to carry on a conversation in an interactive manner;
- Apparent inability to focus on the subject matter at hand and put thoughts and ideas together in a cohesive manner.
- Apparent loss of writing and critical thinking skills ;

Currently, efforts are underway to address these issues by working more closely with students on a one to one basis in order to effect greater commitment to success in the course.

6 Conclusions

Based on the results of this study, the author is of the opinion that the traditional lecture format utilized by post-secondary institutions does not benefit the majority of students today. The vast majority of students at the post-secondary level come to us with such an extremely varied background so as to suggest that there is not one solution that fits all situations.

Rather it appears that any solution to addressing the needs of today's learner should involve a diversity of schemes a few of which are outlined above. This may take many forms including appropriately designed digital media as well as group work, problem solving sessions, as well as project based learning with significant instructional leadership. Such a setting allows the instructor to better interact with the students and provide greater face to face interaction while monitoring individual student progress.

The author suggests that a new paradigm for addressing student learning needs in the digital age is evolving. The model places the instructor role to involve monitoring student progress, motivating and guiding the learner in a process involving face to face interaction and intervention techniques. As such the instructor's role becomes more that of a coach, much as in sports.

7 References

[1] Carr, Nicholas, *The Shallows: What the internet is Doing to Our Brains*, Norton & Company, 2011