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PREFACE

It is our pleasure to present the *Southwest Teaching and Learning Journal*, Volume 3, Number 1, Fall 2013. The journal is affiliated with the Southwest Teaching and Learning Conference that is held on the campus of Texas A&M University-San Antonio every year. Please refer to the inside back cover for information about the theme and dates of the 2015 SWTL Conference.

The purpose of the journal and the conference is to facilitate a discussion of particular issues associated with educating traditionally underserved student populations. We hope to bring together scholars not only from throughout the Southwest region of the United States, but also from around the country to share their expertise. Our hope is that by bringing together this powerhouse of knowledge and experience, we might be able to build and extend pathways to better educational opportunities for educators and for students.

Articles published in this journal have received a double-blind, peer review. Members of the editorial board have contributed to the success of this publication, and we appreciate their efforts.

In Appreciation

On behalf of the editors, in appreciation for their excellent work, I would like to thank the reviewers who so generously shared their knowledge and expertise and gave of their time to review manuscripts for the journal. I also would like to thank all authors who submitted their manuscripts for review.

Josephine Sosa-Fey
Editor-in-Chief
PRACTICE MAKES (IM)PERFECT: REPLICATION PROBLEM SETS IN COMPARATIVE POLITICS

Jennifer Epley
Texas A&M University-Corpus Christi

ABSTRACT

This article examines the process and results of redesigning an upper-level comparative politics course at a regional university to improve students’ critical thinking and information literacy skills. In a simulated think tank environment, students were assigned replication problem sets over the course of the semester to give them hands-on practice with applying political science theories and methods to new contexts. A routine schedule of alternating units between lecture days, data days, and debriefing days that incorporated technology, instructor feedback, and peer review facilitated the overall learning process. Student performance held steady or improved significantly over time depending on the group. Most students developed the ability to make insightful comparisons, ask the “right” kinds of political science questions, and employ quantitative and qualitative research methods accurately and effectively.

Keywords: Critical thinking, comparative politics, political science, research methods

INTRODUCTION

Introductory undergraduate courses for comparative politics usually use a country case approach. Most textbooks available for purchase are organized by countries, not by research questions, concepts, or theories. American undergraduate students can get overwhelmed by this approach because they typically have limited prior knowledge about political science, especially in the subfield of comparative politics, and countries besides the United States. They can easily get lost in the new language of the discipline and the new information of international geography, cultures, governments, and economies. A former student once commented that it was like a double-whammy for learning.

This article examines the process and results of redesigning an upper-level comparative politics course at a regional university to improve students’ critical thinking and information literacy skills, while reducing the double-whammy experience insofar as possible. The course redesign consisted of two main parts. First, the redesign involved a new textbook titled Comparative Politics Today: A Theoretical Framework, 6th Edition by G. Bingham Powell, Russell Dalton, and Kaare Strøm (2012) that emphasizes a theoretical approach throughout its pages and weaves comparative country data into each chapter as needed. Rather than organize chapters around a limited number of country cases, the book discusses the purpose of government, how to compare political systems, political culture and socialization, interest articulation and aggregation, and policy processes. Where applicable, the authors present qualitative and quantitative data in multiple figures and tables on topics such as democratization, economic development, identity issues, and community or social development. Students
observed that the book is shorter, but denser than other textbooks, where *denser* refers to making *them* think more rather than a criticism of its readability.

Second, the overall course changed from a traditional lecture-based setup to a simulated think tank environment. Think tanks are generally non-profit or for-profit policy institutes that conduct research and engage in advocacy projects on a range of political, social, and economic matters. Think tanks can be identified by their ideological preferences; affiliations with a government, business, or university; and domestic or international networks. Prominent think tank examples include the Brookings Institution, Carnegie Endowment for International Peace, RAND Corporation, Council on Foreign Relations, the Heritage Foundation, and the Center for Strategic and International Studies. Leslie Caliva and Ivan Scheier (1992) note that think tanks can also be understood as a process rather than a structure in which there is an “in-depth consideration of issues and challenges whose relevance reaches beyond the individual person or program and the immediate time frame.” They explain that an in-depth approach seeks not just to list but to analyze potential factors or proposed solutions. It releases and identifies underlying assumptions, and even challenges their essential validity. Participants learn to question the question itself. Restated, the in-depth process goes beyond ‘how’ to ‘why’ and beyond ‘what’ to ‘what if’” (Caliva & Scheier, 1992, What is a Think Tank section, para. 3).

In the classroom think tank simulation, students had opportunities to work and be evaluated as individuals and in small groups. They had hands-on research experience with actual data and current events in the form of replication problem sets. These problem sets may be considered a type of problem-based learning. Barbara Duch, Susan Groh, and Deborah Allen (2001, p. 6) explain, “In the problem-based approach, complex, real-world problems are used to motivate students to identify and research the concepts and principles they need to know to work through those problems. Students work in small learning teams, bringing together collective skill at acquiring, communicating, and integrating information.” Research training incorporated technology at every step to aid the problem-based learning process. Debriefing sessions allowed all of the students to contribute their perspectives about research problems and best practices in a large group setting as well. According to Joanne Gainen Kurfiss (1989), “Small group work, class discussions, and writing can be used to help students deepen their understanding of the subject, generate new questions, and reflect on the inquiry process.” Kurfiss continues, “Groups provide a forum where all students can argue about questions and develop their ideas. Reports from group representatives stimulate lively whole-class discussion since group members become invested in their work and want to test it in the public forum. Differences that inevitably arise lend new impetus to the inquiry” (para. 9). Peer review further facilitated in-depth questions and answers. The course relied on the peer review workshop strategy recommended by John Bean in Engaging Ideas (2011) in which students read and respond to works in progress to “stimulate global revision of drafts to improve ideas, organization, development, and sentence structure (p. 194). In specific, students conducted advice-centered reviews, which are more “product-oriented and more directive” as peer reviewers collaborate to give advice to the writers (p. 298).

For the purposes of this article, an analysis of students’ work from the think tank structure and process serves as the basis for identifying advantages and disadvantages of using problem sets in classroom settings and assessments. The problem sets functioned as hands-on practice for students to develop their critical thinking and information literacy skills and apply political science theories and methods to new contexts. In addition, the problem sets exposed students to country-specific information and comparative approaches.
BACKGROUND

In 2010, the Association of American Colleges and Universities (AACU) produced a set of institutional-level rubrics and related materials to correspond with a set of “Essential Learning Outcomes.” Each Valid Assessment of Learning in Undergraduate Education (VALUE) rubric facilitates student knowledge and skills-building in one of three areas: (1) intellectual and practical skills, (2) personal and social responsibility, or (3) integrative and applied learning. Two rubrics from the first category – titled “Critical Thinking” and “Information Literacy” – guided the development and implementation of the redesigned course.

One AACU rubric states, “Critical thinking is a habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion.” Student performance is ranked on a scale of 1 to 4 depending on how well and in what manner students explain issues, locate and use evidence, analyze contexts and assumptions, present specific perspectives, and report and understand different implications and consequences. 1 means “Benchmark,” 2 to 3 refers to “Milestones,” and 4 indicates “Capstone.” The AACU defines “information literacy” as “the ability to know when there is a need for information, to be able to identify, locate, evaluate, and effectively and responsibly use and share that information for the problem at hand.” Similar scales of 1 to 4 are used to ascertain students’ success in determining the extent of information needed, accessing the needed information, evaluating information and sources critically, using information effectively to accomplish a specific purpose, and accessing and using information ethically and legally. These two AACU rubrics were not used directly in the course, but rather served as general frameworks that informed the construction of overall objectives, lesson plans, and assessments.

The course redesign also incorporated a discipline-specific understanding of critical thinking and information literacy. In the discipline of political science, “critical thinking” refers to the careful understanding and use of theory, evidence, judgment, and application. Political science students with good critical thinking skills are able to organize and articulate ideas concisely and clearly, use evidence correctly and impartially, distinguish between valid and invalid conclusions, question their own and others’ views and assumptions, recognize bias, identify similarities or connections that are not easily apparent, and problem-solve in a variety of contexts. “Information literacy” in political science is similar to the aforementioned AACU’s definition, but the information and processes of interest are political in nature.

The primary benefit of developing critical thinking and information literacy skills is improved decision-making. Halpern and Hakel (2002) write, “The world is an increasingly complicated place, which means that a greater proportion of the population needs an advanced education than at any previous time in history… College faculty need to ensure that their students can understand and use fundamental concepts in the sciences and mathematics, make informed decisions about complex issues such as health care, finances, and the bewildering array of topics that appear on voter ballots, and keep up with the changing technologies and demands of the workplace” (p. 4). Better decision-making translates into benefits for the individual and society. According to Facione (2013), “Teach people to make good decisions and you equip them to improve their own futures, and become contributing members of society, rather than burdens on society. Becoming educated and practicing good judgment does not absolutely guarantee a life of happiness, virtue, or economic success, but it surely offers a better chance at those things” (p. 1-2).
In line with the VALUE rubrics, an orientation towards political science, and the overarching goal of improved decision-making, the course syllabus included the following information:

Course Description and Objectives:
Political Science #### is an upper-level course about the subfield of Comparative Politics. This course exposes students to a range of theoretical and empirical approaches to the comparative study of multiple countries’ political, economic, and social systems. Our main aim is to identify and explain similarities and differences for political phenomena between different countries. Through a process of collaboration, cooperation, and discovery, we will develop our knowledge base and skills. Substantive knowledge, critical thinking and analysis, developing and defending arguments, and the clear and concise articulation of ideas and evidence will be important components of the discussions, writings, and evaluations in this course.

Topics covered include, but are not limited to: political systems, political development, economic development, political culture, socialization, citizenship, public opinion, political behavior, interest groups, civil society, political parties, public policy, power, democracy, legal systems, technology, nation-building, military, war, representation, civil liberties, human rights, and various country cases.

Given the limited time and resources we have during one semester, this Comparative Politics course will focus on the specific region of **Southeast Asia** for case study and application purposes. Additionally, in an effort to help students improve their **critical thinking skills** and **information literacy**, the overall course will be structured as a **simulated think tank**. Students will get hands-on research experience with actual data and current events. As in a real life think tank, students will also have opportunities to work and be evaluated as individuals and in groups. There will be “private” and “public” components to the learning process and professional development.

**Learning Objectives / Student Learning Outcomes:**
Upon completion of this course students will be able to:
1. Define and apply key concepts in comparative politics (see “topics”).
2. Compare and contrast the basic features of various political systems from around the world and specifically in Southeast Asia.
3. Use a variety of theoretical tools and research methods to appropriately and accurately analyze contemporary global and regional political developments.

With the goal of meeting these three objectives, students completed several replication problem sets, which were worth 20% of the overall course grade, in small groups. Additional measures for evaluating student performance included one group infographic, four individual take-home essays, attendance, and class participation.

**METHODOLOGY**

The class of mostly political science majors met twice a week during the semester, and each session lasted 75 minutes. Students often met outside of class as well to work together on their assignments. A snapshot of the semester schedule is below (see Table 1). It had a repetitive rhythm to it in its alternation between lectures and discussions for the first week of a given unit (highlighted in dark gray) and application exercises for the following week (highlighted in light gray).

Students learned that the aforementioned pedagogical approach and schedule was a way to implement the old adage “practice makes perfect.”
Table 1
Sample Section of Course Outline

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Course Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Thursday, 08/23/12</td>
<td>Syllabus, Dialogue Guidelines, Professor-Student Relations, Professor Background, Student Introductions, and Academic Advice</td>
</tr>
<tr>
<td>2</td>
<td>Tuesday, 08/28/12</td>
<td>Chapter 1: Issues in Comparative Politics (lecture &amp; discussion)</td>
</tr>
<tr>
<td></td>
<td>Thursday, 08/30/12</td>
<td>Chapter 1: Issues in Comparative Politics (lecture &amp; discussion)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>→ Come prepared with answers to Review Questions 1-6</td>
</tr>
<tr>
<td>3</td>
<td>Tuesday, 09/04/12</td>
<td>Data Day for Chapter 1 (in-class problem set)</td>
</tr>
<tr>
<td></td>
<td>Thursday, 09/06/12</td>
<td>Debriefing Day and Technology Tips</td>
</tr>
<tr>
<td>4</td>
<td>Tuesday, 09/11/12</td>
<td>Chapter 2: Comparing Political Systems (lecture &amp; discussion)</td>
</tr>
<tr>
<td></td>
<td>Thursday, 09/13/12</td>
<td>Chapter 2: Comparing Political Systems (lecture &amp; discussion)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>→ Come prepared with answers to Review Questions 1-5</td>
</tr>
<tr>
<td>5</td>
<td>Tuesday, 09/18/12</td>
<td>Data Day for Chapter 2 (in-class problem set)</td>
</tr>
<tr>
<td></td>
<td>Thursday, 09/20/12</td>
<td>Debriefing Day and Technology Tips</td>
</tr>
<tr>
<td>6</td>
<td>Tuesday, 09/25/12</td>
<td>Chapter 3: Political Culture and Political Socialization (lecture &amp; discussion)</td>
</tr>
<tr>
<td></td>
<td>Thursday, 09/27/12</td>
<td>Chapter 3: Political Culture and Political Socialization (lecture &amp; discussion)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>→ Come prepared with answers to Review Questions 1-5</td>
</tr>
<tr>
<td>7</td>
<td>Tuesday, 10/02/12</td>
<td>Data Day for Chapter 3 (in-class problem set)</td>
</tr>
<tr>
<td></td>
<td>Thursday, 10/04/12</td>
<td>Debriefing Day and Technology Tips</td>
</tr>
</tbody>
</table>

During the first week of a given unit, the instructor lectured about political science content at the first meeting. The second meeting consisted of more lecture material and designated time for class discussion. Class discussions integrated the review questions from the end of each chapter. Where appropriate, the instructor provided preview information and research advice related to an upcoming problem set. The second week of a given unit consisted of a “Data Day” where students worked in collaborative groups in the regular classroom at the start of the semester. Students later switched from working in the classroom on a “Data Day” to group study rooms at the campus library after making a request to the instructor.

During that same week, a Debriefing Day included topics such as best practices, problems encountered, and technology tips. The Debriefing Day also involved Think Tank Peer Review where groups gave each other formal written feedback that emphasized three strengths and three areas for improvement so that everyone could improve their work over the weekend and then submit a polished version at the next class session. The latter was another special request made by students. Initially the problem sets were due on Thursdays, but after seeing the value of repeated peer review, students asked for more time on their replication problem sets. Students were free to select their group members and stayed in their same groups for two problem sets at a time. They then had to create new groups for the next sets. Each group typically had two or three students.

The replication problem sets instructed students to replicate the work of authors Powell, Dalton, and Strom in *Comparative Politics Today* (2012) using country cases from Southeast Asia instead of those used in the original text. For example, students replicated data found in Table 1.2 Faiths of the World (p. 23) and Figure 4.1 Union Membership (p. 93), but for all Southeast Asian countries. Sometimes the data were quantitative and other times the data were qualitative. Each problem set consisted of two parts, which were explained in a handout:
Part 1) Varies – depends on each type of table, figure, description, etc. provided in the textbook. The goal is to replicate the original format as closely as possible. In some cases, the authors did not include citations. For our purposes, include citations for each replication.

Part 2) Process Report – 1 page, single-spaced with underlined subject headings as needed, Times New Roman font, font size 12, and 1-inch margins all around; heading should include names, student numbers, class and section, date, and “Chapter _____ – Process Report”; and include citations.

The process report contained descriptive and analytical information about the research process and what went “right” or “wrong.” Example questions included: What websites or books did your group use, and why? What keywords were useful or not? Did you notice bias of some kind (on the part of the students, the sources, or the data)? What was more or less efficient? What was clear versus what was confusing? Why did you use a certain source, example, statistic, etc. over another one? What would you recommend for future replication studies?

Both parts of the assignment aimed to give students hands-on practice with different research methods to develop their critical thinking and information literacy skills. The assignments as a whole also intentionally incorporated and addressed imperfection into the learning process. In other words, the replication problem sets gave students opportunities to implement “practice makes perfect” while at the same time learning that researching politics is an imperfect science. For instance, computational mistakes, time lags, language barriers, misinformation, incomplete information, communication problems, lost data, cross-cultural misunderstandings, and technical difficulties are all “normal” obstacles in research inquiries and projects; the question then becomes what does one do when one reaches an obstacle?

One of the major goals of the replication problems sets was to change students’ traditional orientation of “this is hard” to “what are we going to do to fix (or offset) the problem?” The instructor facilitated this shift by providing constructive feedback via typed responses for each problem set. The comments were a mix of content-related questions, corrections for methods, critiques of presentation/formatting, praise for different kinds of progress, and suggestions for improved logic and analyses on future problem sets.

RESULTS

The first surprising trend identified during grading the replication problem sets was that scores typically were higher than scores usually earned on formal assignments or assessments in other upper-level political science courses previously taught by the instructor. Instead of the common bimodal distribution where there are clusters of students on each end of the grading scale (i.e., typically A’s and B’s or D’s and F’s), there was general consistency in the B range. There were no major drop-offs in scores over the semester, either. Instead, students were able to build on previous work and apply the lessons in new contexts over time, resulting in incremental improvements. Scores for students 5, 8, and 15, which are highlighted in light gray in Table 2, steadily increased in a linear fashion. The scores of eight of the sixteen students, which are highlighted in medium gray and include the students marked in light gray, demonstrated a positive change between the first and last problem sets. The scores of students 6, 7, and 11, which are in dark gray below, fluctuated and declined over time.
<table>
<thead>
<tr>
<th>Participant</th>
<th>PS 1</th>
<th>PS 2</th>
<th>PS 3</th>
<th>PS 4</th>
<th>PS 5</th>
<th>PS 6</th>
<th>PS 7</th>
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<tr>
<td>Student 1</td>
<td>84</td>
<td>88</td>
<td>83</td>
<td>84</td>
<td>85</td>
<td>89</td>
<td>85</td>
<td>85</td>
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<tr>
<td>Student 2</td>
<td>87</td>
<td>88</td>
<td>93</td>
<td>95</td>
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<td>Student 3</td>
<td>87</td>
<td>93</td>
<td>88</td>
<td>88</td>
<td>85</td>
<td>89</td>
<td>85</td>
<td>88</td>
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<tr>
<td>Student 4</td>
<td>83</td>
<td>88</td>
<td>88</td>
<td>88</td>
<td>78</td>
<td>83</td>
<td>91</td>
<td>86</td>
</tr>
<tr>
<td>Student 5</td>
<td>84</td>
<td>88</td>
<td>93</td>
<td>95</td>
<td>97</td>
<td>97</td>
<td>98</td>
<td>93</td>
</tr>
<tr>
<td>Student 6</td>
<td>87</td>
<td>88</td>
<td>83</td>
<td>84</td>
<td>70</td>
<td>74</td>
<td>73</td>
<td>80</td>
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<tr>
<td>Student 7</td>
<td>78</td>
<td>86</td>
<td>83</td>
<td>84</td>
<td>70</td>
<td>74</td>
<td>73</td>
<td>78</td>
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<tr>
<td>Student 8</td>
<td>88</td>
<td>88</td>
<td>93</td>
<td>95</td>
<td>97</td>
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<td>Student 9</td>
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<td>91</td>
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<td>91</td>
<td>86</td>
</tr>
<tr>
<td>Student 10</td>
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<td>84</td>
<td>88</td>
<td>81</td>
<td>77</td>
<td>78</td>
<td>83</td>
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<td>Student 11</td>
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<td>84</td>
<td>88</td>
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<td>77</td>
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<tr>
<td>Student 15</td>
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<td>95</td>
<td>97</td>
<td>97</td>
<td>98</td>
<td>91</td>
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<td>93</td>
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<td>91</td>
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<td>91</td>
<td>91</td>
<td>90</td>
</tr>
</tbody>
</table>

Declines in certain scores may be partially attributed to the type of problem set assigned to students. For example, Problem Set 3 involved replicating qualitative information related to political values and ideology. Students appeared to struggle with understanding the logic and analysis of the qualitative data in the original tables and then making applications to new countries and cultures.

Score differences between problem sets could also be attributed to personnel issues. For example, groups switched members over the semester, and one student mentioned that just as she was getting used to working with a particular group, the class had to make new groups. While this may have been a disadvantage for some students, it was valuable for students to get experience working with many different people, personalities, and work styles, which is actually part of the real environment of a think tank. Another example of a personnel issue that potentially influenced performance was personal issues along the way where groups may have been impacted by work, family, and extracurricular obligations or the occasional emergency. This was especially the case for those three students highlighted in dark grey above. However, despite regularly encountering new tasks and professional or personnel changes and challenges, students in general were fairly able to stay in the A to B range, which is atypical of student performance in previous cohorts of the comparative politics course or other upper-level political science courses. Besides scores, students demonstrated improvement in the presentation of their work over time. “Presentation” here refers to replicating the original format of the tables and figures (e.g., design, structure, fonts, shading, citations, etc.) in an accurate/professional fashion per political science norms. Examples from Problem Sets 1 and 7 are shown below along with the original tables that were assigned:
Table 3
Original Table Assigned for Problem Set 1

This original table listed major faith groups for different regions around the world. The authors referenced Encyclopedia Britannica. There were a range of skillsets in the course, which is apparent in the next couple of examples. One student group produced a replication table (A) for Southeast Asia. Basic Microsoft Excel skills are evident, but not yet advanced. Select data are missing and no citations or sources are listed.

Table 4
Student Work Example (A) for Problem Set 1

Faiths of Southeast Asian Countries. Table 1.2

<table>
<thead>
<tr>
<th>Countries</th>
<th>Muslim</th>
<th>Christian</th>
<th>Buddhist</th>
<th>Hindu</th>
<th>Other/Na</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunei</td>
<td>67%</td>
<td>10%</td>
<td>13%</td>
<td>n/a</td>
<td>10%</td>
</tr>
<tr>
<td>Myanmar</td>
<td>4%</td>
<td>4%</td>
<td>99%</td>
<td>n/a</td>
<td>3%</td>
</tr>
<tr>
<td>Cambodia</td>
<td>2.10%</td>
<td>n/a</td>
<td>96.40%</td>
<td>n/a</td>
<td>1.50%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>86.10%</td>
<td>6%</td>
<td>n/a</td>
<td>1.80%</td>
<td>3.4</td>
</tr>
<tr>
<td>Laos</td>
<td>n/a</td>
<td>1.50%</td>
<td>67%</td>
<td>n/a</td>
<td>31.50%</td>
</tr>
<tr>
<td>Malaysia</td>
<td>60.60%</td>
<td>9.10%</td>
<td>19.24%</td>
<td>6.30%</td>
<td>4.90%</td>
</tr>
<tr>
<td>Philippines</td>
<td>5%</td>
<td>87.40%</td>
<td>n/a</td>
<td>n/a</td>
<td>7.60%</td>
</tr>
<tr>
<td>Singapore</td>
<td>14.50%</td>
<td>14.60%</td>
<td>42.5</td>
<td>4%</td>
<td>24%</td>
</tr>
<tr>
<td>Thailand</td>
<td>4.60%</td>
<td>0.70%</td>
<td>94.60%</td>
<td>n/a</td>
<td>0.10%</td>
</tr>
<tr>
<td>Vietnam</td>
<td>0.10%</td>
<td>7.20%</td>
<td>9.30%</td>
<td>n/a</td>
<td>83.40%</td>
</tr>
</tbody>
</table>

Here is an example (B) from a different group that had slightly more advanced information literacy and software skills at the beginning of the semester.
Near the end of the semester, all groups appeared to show improvement. In some cases, the changes were dramatic, and in others, skills were refined or honed further. Table 6 presents one of the original tables from the book that was assigned for Problem Set 7. Multiple sources were cited and several different quantitative measures were included for twelve countries.

### Table 6

**Original Table Assigned for Problem Set 7**

<table>
<thead>
<tr>
<th>Country</th>
<th>Brazil</th>
<th>Britain</th>
<th>China</th>
<th>France</th>
<th>Germany</th>
<th>India</th>
<th>Iran</th>
<th>Japan</th>
<th>Mexico</th>
<th>Nigeria</th>
<th>Russia</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religion</td>
<td>Christians</td>
<td>Muslims</td>
<td>Nonreligious</td>
<td>Hindus</td>
<td>Buddhists</td>
<td>Jews</td>
<td>Other</td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.1</td>
<td>2.1</td>
<td>545.8</td>
<td>314</td>
<td>48.5</td>
<td>1.1</td>
<td>194.3</td>
<td>2,433.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>299.1</td>
<td>214.1</td>
<td>-</td>
<td>4.5</td>
<td>14.4</td>
<td>1.8</td>
<td>67,901.2</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.6</td>
<td>5.2</td>
<td>-</td>
<td>-</td>
<td>8.5</td>
<td>2.3</td>
<td>2,187,699</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.5</td>
<td>3.1</td>
<td>-</td>
<td>-</td>
<td>4.4</td>
<td>2.1</td>
<td>37,474.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>98,793.9</td>
<td>91,599</td>
<td>73.9</td>
<td>1.3</td>
<td>5.4</td>
<td>3.1</td>
<td>40,878.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>781,610</td>
<td>176</td>
<td>235,459.6</td>
<td>214,199.7</td>
<td>3.2</td>
<td>147.1</td>
<td>201.7</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Near the end of the semester, all groups appeared to show improvement. In some cases, the changes were dramatic, and in others, skills were refined or honed further. Table 6 presents one of the original tables from the book that was assigned for Problem Set 7. Multiple sources were cited and several different quantitative measures were included for twelve countries.

### Table 7.5

**Education, Equality, and Information**

<table>
<thead>
<tr>
<th>Country</th>
<th>Brazil</th>
<th>Britain</th>
<th>China</th>
<th>France</th>
<th>Germany</th>
<th>India</th>
<th>Iran</th>
<th>Japan</th>
<th>Mexico</th>
<th>Nigeria</th>
<th>Russia</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religion</td>
<td>Gross Percentage of Relevant Age Group Enrolled, Teritary, 2007</td>
<td>Percentage Fifteen Years and Above Illiterate, Male/Female, 2007</td>
<td>Ratio of Female to Male Earned Income, 2007</td>
<td>Personal Computers per 100 Inhabitants, 2008</td>
<td>Internet Users per 100 Inhabitants, 2008</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>10/10</td>
<td>0.60</td>
<td>75</td>
<td>38</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>58</td>
<td>-</td>
<td>0.67</td>
<td>89</td>
<td>76</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>-</td>
<td>0.59</td>
<td>68</td>
<td>68</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3/10</td>
<td>0.66</td>
<td>68</td>
<td>68</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>55</td>
<td>-</td>
<td>0.63</td>
<td>68</td>
<td>68</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>49</td>
<td>-</td>
<td>0.59</td>
<td>75</td>
<td>75</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>23/45</td>
<td>0.32</td>
<td>11</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>13/23</td>
<td>0.32</td>
<td>11</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>58</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>6/9</td>
<td>0.42</td>
<td>14</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>44</td>
<td>20/36</td>
<td>0.42</td>
<td>14</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>1/1</td>
<td>0.64</td>
<td>13</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>82</td>
<td>-</td>
<td>0.62</td>
<td>81</td>
<td>76</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The next work examples (Table 7 and Table 8) show many similarities to the original table, thus demonstrating successful replications. While not perfect, these students’ work indicates development as researchers and critical thinkers:
Table 7
Student Work Example (C) for Problem Set 7

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunei</td>
<td>42</td>
<td>4/7</td>
<td>0.59</td>
<td>23</td>
<td>46</td>
</tr>
<tr>
<td>Cambodia</td>
<td>15/13</td>
<td>5/12</td>
<td>0.44</td>
<td>26</td>
<td>7</td>
</tr>
<tr>
<td>Indonesia</td>
<td>30</td>
<td>18/37</td>
<td>0.76</td>
<td>34</td>
<td>3</td>
</tr>
<tr>
<td>Laos</td>
<td>12</td>
<td>5/8</td>
<td>0.63</td>
<td>34</td>
<td>5</td>
</tr>
<tr>
<td>Malaysia</td>
<td>24</td>
<td>6/11</td>
<td>0.42</td>
<td>38</td>
<td>55</td>
</tr>
<tr>
<td>Myanmar</td>
<td>44</td>
<td>7/14</td>
<td>0.61</td>
<td>15</td>
<td>0.22</td>
</tr>
<tr>
<td>Philippines</td>
<td>9</td>
<td>7/7</td>
<td>0.44</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td>Singapore</td>
<td>4</td>
<td>3/8</td>
<td>0.53</td>
<td>42</td>
<td>58</td>
</tr>
<tr>
<td>Thailand</td>
<td>51</td>
<td>5/8</td>
<td>0.63</td>
<td>34</td>
<td>5</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>17</td>
<td>3/12</td>
<td>0.44</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>Vietnam</td>
<td>44</td>
<td>7/14</td>
<td>0.69</td>
<td>-</td>
<td>24</td>
</tr>
</tbody>
</table>


Table 8
Student Work Example (D) for Problem Set 7

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunei</td>
<td>42</td>
<td>4/7</td>
<td>0.59</td>
<td>23</td>
<td>46</td>
</tr>
<tr>
<td>Cambodia</td>
<td>15/13</td>
<td>5/12</td>
<td>0.44</td>
<td>26</td>
<td>7</td>
</tr>
<tr>
<td>Indonesia</td>
<td>30</td>
<td>18/37</td>
<td>0.76</td>
<td>34</td>
<td>3</td>
</tr>
<tr>
<td>Laos</td>
<td>12</td>
<td>5/8</td>
<td>0.63</td>
<td>34</td>
<td>5</td>
</tr>
<tr>
<td>Malaysia</td>
<td>24</td>
<td>6/11</td>
<td>0.42</td>
<td>38</td>
<td>55</td>
</tr>
<tr>
<td>Myanmar</td>
<td>44</td>
<td>7/14</td>
<td>0.61</td>
<td>15</td>
<td>0.22</td>
</tr>
<tr>
<td>Philippines</td>
<td>9</td>
<td>7/7</td>
<td>0.44</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td>Singapore</td>
<td>4</td>
<td>3/8</td>
<td>0.53</td>
<td>42</td>
<td>58</td>
</tr>
<tr>
<td>Thailand</td>
<td>51</td>
<td>5/8</td>
<td>0.63</td>
<td>34</td>
<td>5</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>17</td>
<td>3/12</td>
<td>0.44</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>Vietnam</td>
<td>44</td>
<td>7/14</td>
<td>0.69</td>
<td>-</td>
<td>24</td>
</tr>
</tbody>
</table>

Group membership rotated over the course of the semester, so it is difficult to determine at the individual level how much progress each student made, but overall the general outputs steadily improved. While there might have been instances where one or two students “carried” their other group members, meaning they did most of the work while the others acted as “free riders,” students did not voice major complaints or concerns to the instructor. Instead, it seemed that with each new task, students were able to leverage their individual strengths in the groups. For example, a student might not have been as strong at locating necessary resources, but perhaps was good at creating tables; the other student partners in the group then stepped in to facilitate by filling in any gaps, mentoring, and advising as needed. Furthermore, students regularly commented that they were emailing, using Facebook, calling, and/or meeting with group members to ensure everyone was contributing in some fashion.

The process reports, too, indicated improved comprehension of the course material, critical thinking, and information literacy skills. The reports initially were almost exclusively descriptive, incomplete, and contained inaccuracies. Later reports showed development with descriptions, analyses, and professional presentations. Figure 1 shows one partial example of the first process report. This work comes from the same student group as Table 4 earlier. The circled numbers correspond to instructor feedback, which is explained in Figure 2.

The instructor initiated a dialogue with students on paper with the aforementioned feedback. Where necessary, students met with the instructor individually or in their groups for further clarification and guidance. Figure 3 is a good example of students applying such feedback. The following process report submission for Problem Set 7 is from the same student group as Table 8 earlier.

This process report also included a list of fifteen references, all of which were relevant, appropriate, and formally presented.

Besides instructor feedback, the Debriefing Days included time for discussions and peer review. Over time, the repeated constructive feedback from the instructor and peers taught students about the professional expectations and standards for political science along with how to meet those expectations and standards. Regularly asking specific questions about the choices that students made during the research and replication process encouraged them to take the time to be more thoughtful and communicative in their work. One limitation of the peer review, however, was that students often did not have sufficient background knowledge on the geographic region or countries’ political histories to provide detailed critiques. In some cases, students also did not have enough experience with quantitative or qualitative methods to identify research biases.

The debriefing sessions also allowed students to learn and develop creative and innovative strategies when faced with research obstacles. For instance, students came up with several original approaches on their own without input from the instructor or other faculty members in the department when faced with the absence of information or when available information was too vague and open to interpretation.
Figure 1
Process Report for Problem Set 1

Chapter 1: Process Report

Our group decided not to include East Timor in our data because we felt that there was not enough complete data which may or may not be accurate. Another reason we decided not to use East Timor is because the ASEAN website does not recognize it as a Southeast Asian country; this is also the reason we decided to use Myanmar rather than Burma. Most of the sites we visited used both Burma and Myanmar other than ASEAN. Being English Speaking students who do not have a lot of knowledge about Southeast Asia, we were somewhat biased on our decisions, analysis and searches. In our searches we also noticed the websites were biased based on the fact that we used American Study in English and data which was in English. Maybe the more accurate data would have been in another language that we could not understand. We did run into sites in another language. Our conclusion of this first replication gave us a better understanding of conducting and analyzing data, but most importantly improving research techniques such as clear and concise web searches, efficient data collection, and proper use of the Comparative Method.

For the first data set, we decided upon the Southeast Asian country of Thailand because of its interesting political background involving the troubling amount of governmental corruption. Though a bias towards Google seemed evident in the group, Yahoo and Bing were perceived to have shown less reliable sources, whereas Google provided many trustworthy, qualitative articles on Thai corruption. Our Google search led us to an article, “Thailand’s recent seeking corruption.” Direct from the Asian Human Rights Commission, this essay ultimately depicted similar corruption because it contains thorough evidence with a public opinion survey and corresponding incidents. Also the essay describes direct and indirect measures taken to prevent and eliminate corruption, a consequence unlike that of the original case.

For the second data set we recreated data for religious percentages of South East Asia. We searched many sites on Google. We ran into many sites which were in another language and could not understand the data. So we went with the CIA world fact book for the proper percentages. In a way the CIA Fact Book is biased. Based on the fact that it is an American Agent website and that the site is in English. The religions that the group used we decided not to change the main religions the book listed, which is why there are some columns that have N/A meaning from the CIA World Fact Book there were no percentages for those countries of South East Asia.

For the third data set we just changed the data for the provided countries in the book for the ten Southeast Asian countries we chose. We simply gathered the information from the charts on the PDF file and documented them in our own tables. Afterwards, we made notes of the trend, and it is clear that the HDI of the countries increased from 1990 and 2014. So we used these particular years because these were the years provided for us in the book. There were different life expectancies between male and female, therefore we simply took the average of the two; these were from the UN World Development Report in 2009.

References


Dr. Suwannap, Churas. Asian Human Rights Commission-Fighting Corruption from the Bottom: The Case of Thailand.

Finally, students not only worked in their groups during the data and debriefing days, they also worked as one large group where the entire class shared resources, especially at the library. One student commented that each separate group was like its own think tank and then the entire class itself was a think tank, too. This was quite helpful for the more qualitative-oriented problem sets in which a lot of “thinking” was needed for interpretations and conclusions.
CONCLUSION

The main challenges in this comparative politics course included striking a balance of political science content and research methods into the lesson plans, managing and supporting students’ emotions or psychology through their various professional and personal difficulties, and time management for the instructor, instructor and students, and between students. The overall structure of the course along with its routines mediated some of these challenges. Regular discussions and feedback also facilitated development and improvement over time. For students
new to political science and comparative politics in particular, the repetitive practice helped students have small “wins” over time which can boost morale and confidence; showed them that deeper inquiries and careful attention to detail have greater payoffs for critical thinking, information literacy, and grades; and taught them that coordination, communication, and collaboration can help individuals and groups succeed.

In the simulated think tank environment, students shifted from overly focusing on memorizing or recording country information to understanding and analyzing comparative contexts. They learned that research questions, analytical frameworks, and different kinds of research methods can “travel.” Students developed the ability to make insightful comparisons and to ask the “right” kinds of political science questions no matter what country or set of countries are under investigation. Either partially or wholly, they achieved the learning objectives of identifying what information is needed to understand a research puzzle, knowing how to organize that information, understanding how others have organized such information, evaluating resources for accuracy and completeness, and sharing information. They were able to do so in part because of the routine of replication problem sets that focused on critical thinking and information literacy skills over the course of the semester. Students did not reach perfection, but the practice proved to be worthwhile at the individual and group levels in multiple ways.

One major advantage of the replication problem sets is that they are portable to disciplines outside of political science. Students can replicate original work or apply original work in new contexts for almost any subject matter. The central idea is to model and teach what it means to be a professional in a given field. Problem sets basically build on the notion that “practice makes perfect,” but embedding “imperfection” into the assignments and discussions also teaches students what it truly means to do scholarly or creative activities.

Should instructors find that replication problem sets are not the best fit for certain disciplines or content, the think tank format, instructor feedback process, and peer review might still be applicable and useful for improving students’ critical thinking and information literacy skills? Instructors can freely adapt the size of think tank groups, types of individual and group assignments or assessments, frequency and amount of instructor feedback, and peer review of different kinds depending on the course content, number of students, allotted times, and general schedule. This pedagogical approach is similar to those found in “flipped classrooms” where there are fewer lectures and more in-class assignments and activities to create a more active and meaningful learning environment (Bowen, 2012).

In conclusion, this article presented an exploratory analysis of one course redesign for one semester. While the research conclusions and generalizability are limited due to this being a single case study of a small number of participants in a particular discipline, this article can serve as a basis from which others might develop future research questions and projects. Instructors could, for example, implement multiple redesigned courses over time or the same course in different academic institutions and conduct various tests to check the validity, reliability, and feasibility of certain teaching and learning techniques.
REFERENCES


About the Author:

Dr. Jennifer Epley (Ph.D, University of Michigan-Ann Arbor) is an Assistant Professor of Political Science in the Department of Social Sciences at Texas A&M University-Corpus Christi. She currently teaches courses in Comparative Politics, International Relations, U.S. Government and Politics, and research methods.
HOW DO DIGITAL NATIVE PRE-SERVICE TEACHERS INTERACT WITH CHILDREN?

Debbie Vera
Texas A&M University-San Antonio

Jana Sanders
Texas A&M University-Corpus Christi

ABSTRACT

Interactions occur in every profession and characterize effective practices for collaboration. However with the influence of technology, this study hypothesized face to face interactions would be challenging for digital natives. Specifically, this study analyzed the technology practices and the emotional intelligence factors of pre-service teachers from two institutions. Data from the emotional intelligence survey answered the question about how pre-service teachers perceive themselves while interacting with children. Analysis of technology usage from both institutions was also included. In addition to analyzing the data from two surveys, journals were analyzed to determine the reflective practices of pre-service teachers after interacting with children. Data from the surveys and reflections was extensive, so preliminary results were shared.

Keywords: Technology, emotional intelligence, pre-service teachers

INTRODUCTION

Reflective abilities, regardless whether observed in the personal or career realm, enlighten us on how and when to respond in varied situations. Cooperative and collaborative partnerships emerge because the participants understand the hidden social dynamics of circumstances. Teachers of all ages need to comprehend the nonverbal and verbal cues that surround reflective practice, emotional intelligence and social sensitivity. John Dewey (1910, 1916) and Daniel Schön (1983) advocated the importance of mentally pausing, contemplating then acting on those decisions. The work of Dewey and Schön provided the impetus for valuing sensitivity to the unique needs of each student to attain the intended goal.

However, communication has become increasingly digital through texting, email and social networking. According to a study completed by Pew Internet (Chen, 2012), texting has increased from 58% in 2007 to 80% in 2012. In the same study, cell phone users who sent email expanded from 19% in 2007 to 50% in 2012. Cisco (2013) surveyed how 18-30 year olds worldwide communicate and found 30% of the participants surveyed in the United States preferred interactions with friends online while 35% preferred face-to-face (FtF). On the other hand, 69% of the participants surveyed in China and 64% in Mexico prefer online interactions (Cisco, 2013). These dramatic increases resulted in more communication but less time is spent experiencing nonverbal behavior, verbal tones and general observations.

As communication has become increasingly digital the question arose whether our capacities to perceive others thoughts and emotions has been affected. Pea, Meheula, Rance,
Kumar, Bamford, Nass, Simha, Stillerman, Yang and Shou (2012) studied the effects of technology on social interactions in children ages 8-12. Pea et al. (2012) found positive self-concepts were related to FtF contact while negative outcomes about self-concept related to media multitasking. On the other hand, Borae & Namkee (2010) found that increased cell phone use was associated with FtF communication. College students employed mobile communication to connect emotionally with a social group on campus. In the Borae & Namkee (2010) study, digital communication enhanced FtF interactions (Borae & Namkee, 2010).

Even with the increase in digital communication FtF communication remains significant especially within the field of education. The significance of teachers effectively interacting with children has been widely documented (Brophy and Good, 1974; Collinson, 1996; Good and Brophy, 2008; Pianta & Stuhlman, 2004). Effective interactions exhibited dispositions of self-control, flexibility, social sensitivity and perspective taking. The National Council for Accreditation of Teacher Education (NCATE) defined dispositions as “attitudes, values and beliefs demonstrated through both verbal and nonverbal behaviors as educators interact with students, families, colleagues and communities” (NCATE, 2013, p. 6). Exercising these dispositions requires practice because often an immediate response to a child is necessary. Additionally, Bharti (2013) has studied how emotional intelligence affected personality traits. Using a battery of tests on 80 student teachers, Bharti has confirmed that student teachers possessing high emotional intelligence tend to respond to students effectively. Correspondingly, Corcoran and Tormey (2011) has concurred with Bharti’s findings of the importance of teacher candidates, pre-service and student teachers, are characterized with high emotional intelligence. Therefore, it is imperative that pre-service teachers acquire experiences to develop and enhance their ability to interact with children.

The significance of the increase in technology along with the necessity for pre-service teachers to react to the nonverbal and verbal cues of children prompted this research. Research on technology usage for EC-12 pre service teachers has focused on the integration of technology within the curriculum. Effective integration has depended on many factors, such as teacher self-efficacy, teacher support and access of technology (Gulbahar and Guven, 2008; Lim, 2007). Tezci (2011) studied pre-service teachers’ attitudes about technology and the Internet and found that regardless of gender, the levels of self-confidence in using technology and the Internet were moderate. To effectively implement technology, self-efficacy should be high. The one factor not observed in these studies was how pre-service teachers used technology.

Further, the research on the significance of pre-service teachers possessing responsive attitudes, emotional intelligence and sensitive dispositions occurs often in the literature (Brophy and Good, 1974; Collinson, 1996; Good and Brophy, 2008; Pianta & Stuhlman, 2004). However, there is little research on how teachers perceive their ability to interact responsively. This paper will report on preliminary findings related to the types of technology implemented and the perceptions of pre-service teachers about their ability to handle their emotions. To begin to understand how pre-service teachers, who were assumed to be technology familiar, interact with children, the following questions framed this study. What kinds of technology are pre-service teachers utilizing? How do pre-service teachers perceive themselves interacting with others? What dispositions occur as pre-service teachers reflect upon their interactions with young children?
Current Student Strategies

This study was conducted in two locations within the southwestern United States (Location #1; Location #2). Both institutions have Teacher Education programs certifying teachers for placement in Early Childhood to the 12th grade. Participants were enrolled as either juniors or seniors at both institutions. However, Location #1 is a four-year institution and Location #2 is a two-year (junior-senior) institution. At Location #1, 14 pre-service teachers chose to participate, while at Location #2, 30 cooperated in the study. From the total number of participants, 86% identified themselves as female and 14% as males.

Procedures and Instruments

After permission was secured, participants completed two surveys: Traits of Emotional Intelligence Questionnaire (TEIQue) (Shipley, Jackson & Segrest, 2010) and the Technology Use Survey (Lin, 2009). The TEIQue survey included 30 questions focusing on emotional intelligence statements where participants responded to choices given in a seven-point Likert scale. An example is provided in Appendix A. The Technology Use Survey consisted of four sections of questions ranging from basic technology use to proficiency levels. Questions varied from one to multiple responses. An example is provided in Appendix B. Participants at both locations had the option of not answering a question that made them feel uncomfortable.

To analyze teacher dispositions and validate the survey results of the study, participants reflected on their interaction with the children in an online journal. Participants answered specific questions related to a three-step process for interacting with children (Dombro, Jablon and Stetson, 2011). Dombro et al. (2011) outlined the procedures for effective interactions to include: “Be Present, Connect, Extend the Learning” (p. 6-7).

During the first stage, “Be Present” (Domobro et al., 2010, p. 6), participants described how they cleared their mind, how they felt and how they prepared emotionally for this interaction. Also participants reflected about the verbal or nonverbal behavior of the child before the interaction. In stage two, participants described how they connected emotionally with the child. Again, information was provided on the nonverbal behaviors of the child that led the participant to believe a connection had been formed. In the last stage, participants noted how the child continued learning during the interaction. In this section, participants again transcribed their emotions and the child’s responses to the interaction. After completing the three-step process, participants completed reflection questions about challenges, benefits and how this process could be implemented in classroom settings.

Data Analysis and Results

The two surveys were analyzed separately using the software program Statistical Program for the Social Sciences (SPSS), version 20. Next, both groups of participant responses from the Technology Use Survey ((Lin, 2009) and the TEIQue (Shipley et al., 2010) were calculated and compared separately. Finally, reflective journals were analyzed with inter-rater reliability identifying trends according to effective teacher dispositions. Last, individual reflections were analyzed using specific survey questions to validate the surveys.

Usage of the computer framed the technology questions of the study. Researchers believed the participants were familiar with the Internet and computers. Forty-seven percent of
the total participants began using a computer from kindergarten to grade three, twenty-five percent began in grade 4 - 5, fifteen percent in grades 6-8, seven percent in grades 9-12 and four percent after grade 12. Therefore, over half of the participants appeared to be “digital natives” (Prensky, 2001, p. 1). The following survey responses focused on technology familiar to the participants. The researchers found that 100% of all participants owned a cell phone and personal computer while 74.3% owned an iPod or other mp3 player and 47% possessed a game console (Table 1).

Table 1
Which do you own?

<table>
<thead>
<tr>
<th>Technology Item</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell Phone</td>
<td>100%</td>
</tr>
<tr>
<td>Personal Computer</td>
<td>100%</td>
</tr>
<tr>
<td>iPod</td>
<td>74.3%</td>
</tr>
<tr>
<td>Game System</td>
<td>47%</td>
</tr>
</tbody>
</table>

Question nine identified specific uses of computers. Participants chose all answers that aligned with their personal use of technology. Out of the total responses, and as expected, 92.9% used computers for learning activities and also for communicating socially. Ninety-five percent made use of computers for locating information while 77% played games and watched videos on their computers. Another usage area was shopping at 72.9% (Figure 1). Question ten inquired about using email and 100% of the total responses availed the Internet for email. Also in this question, 84% identified their Internet usage involving social networking sites.

Figure 1
Method for Using Computers
The last questions in the Technology Use Survey (Lin, 2009), examined participant responses to a number of statements about technology using a Likert Scale. One interesting statement involved how comfortable participants were with technology. When rating the statement, “I feel comfortable using technology” (Lin, 2009), 82.9% either agreed or strongly agreed with the statement (Table 2). In Table 2 participants from both locations felt comfortable with using technology.

Table 2
I Feel Comfortable using Technology

<table>
<thead>
<tr>
<th></th>
<th>Location #1</th>
<th>Location #2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>5.9%</td>
<td>3.8%</td>
<td>4.3%</td>
</tr>
<tr>
<td>Disagree</td>
<td></td>
<td>3.8%</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>5.9%</td>
<td>11.3%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Agree</td>
<td>47.1%</td>
<td>50.9%</td>
<td>50%</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>41.2%</td>
<td>30.2%</td>
<td>32.9%</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

In response to the second research question, participants answered questions on the TEIQue (Shipley et al., 2010). This survey asked participants to rate statements about emotional intelligence according on a Likert Scale. One statement questioned participants about how they bonded with others. Table 3 shows 89.9% of all respondents reported they disagreed or completely disagreed with the statement, “I find it difficult to bond well even with those close to me” (Shipley et al., 2010). Correspondingly, participants were asked to respond to the statement “I can deal effectively with people” (Shipley, et al., 2010). Table 4 illustrates 88.3% of the participants agreed or completely agreed with the statement. Similarly, when responding to “I usually find it difficult to regulate my emotions” (Shipley et al., 2010), 75% disagreed or completely disagreed with the statement. However, 11.76% agreed with the statement and 13.24 remained neutral.

Therefore, at this point in the preliminary research, the results indicated the participants were comfortable with technology and many appeared to be “digital natives” (Prensky, 2001, p.1). Additionally, the results revealed a belief in the participant’s ability to interact effectively with others. To substantiate this outcome and understand the dispositions of the participants, some of the reflective journals were analyzed.

To ensure reliability of the initial analysis, one journal entry from each location was randomly selected. The researchers then separately read the entries examining the contents for themes. Each theme was noted along with journal text to substantiate the theme identified by both researchers. Next, the researchers compared their analysis looking for similarities and differences.
Table 3
I Find it Difficult to Bond Well Even with Those Close to Me.

<table>
<thead>
<tr>
<th>Score</th>
<th>Location #1</th>
<th>Location #2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>2.00</td>
<td>3.00</td>
<td>4.00</td>
</tr>
<tr>
<td>0.00</td>
<td>47.1%</td>
<td>53.8%</td>
<td>52.2%</td>
</tr>
<tr>
<td>2.00</td>
<td>29.4%</td>
<td>28.8%</td>
<td>29.0%</td>
</tr>
<tr>
<td>3.00</td>
<td>17.6%</td>
<td>5.8%</td>
<td>8.7%</td>
</tr>
<tr>
<td>4.00</td>
<td>5.8%</td>
<td>4.3%</td>
<td></td>
</tr>
<tr>
<td>5.00</td>
<td>1.9%</td>
<td>1/4%</td>
<td></td>
</tr>
<tr>
<td>6.00</td>
<td>3.8%</td>
<td>2.9%</td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 4
I Can Deal Effectively with People.

<table>
<thead>
<tr>
<th>Score</th>
<th>Location #1</th>
<th>Location #2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>2.00</td>
<td>3.00</td>
<td>4.00</td>
</tr>
<tr>
<td>0.00</td>
<td>5.9%</td>
<td>1.4%</td>
<td>1.4%</td>
</tr>
<tr>
<td>2.00</td>
<td>1.9%</td>
<td>1.4%</td>
<td>1.4%</td>
</tr>
<tr>
<td>4.00</td>
<td>11.5%</td>
<td>8.7%</td>
<td>8.7%</td>
</tr>
<tr>
<td>5.00</td>
<td>11.8%</td>
<td>13.5%</td>
<td>13.0%</td>
</tr>
<tr>
<td>6.00</td>
<td>47.1%</td>
<td>38.5%</td>
<td>40.6%</td>
</tr>
<tr>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

First, the data from the reflective journals were analyzed identifying trends in the dispositions possessed by the participants. The reflective journals inquired how the participants recognized non-verbal cues of children, focused on the social-emotional domain rather than the cognitive domain, considered the social sensitivity of the child’s background, and reflected upon how the children felt during the interaction. Three separate journal entries were recorded for each participant. However, at this time only journal entry #1 was analyzed. A random sampling of journal #1 entries from both locations revealed participants demonstrated reflective characteristics. One pre-service teacher wrote in her journal “she (the child) was nonverbal at first because I am someone new to her and she has to get to know me.” Another reflected back to her own experiences in school.

“I cleared my mind of all the stigmas, prior knowledge I learned about the child…. Due to the prior knowledge I had gained from my mentor teacher about the student, I was feeling very anxious to meet and work with the student one-on-one. I prepared myself mentally by reminding myself of how difficult it was to learn a second language and by remembering the different strategies that helped me get through my struggles.” (#12)
These reflections characterized the participants’ ability to view other perspectives, which is a key skill when interacting with others.

Continuing in these reflections, a participant chronicled “I could tell the student had connected with me through her smile and when she would nod her head when I said something that she could relate to.” Participants considered the viewpoints of the socio-cultural aspect of interactions. “It was Easter weekend and some families do not celebrate Easter, so I needed to think of other topics to discuss.” Another participant wrote “they both smiled and rocked back and forth in their chairs.” Nonverbal cues were recognized by the random sample of reflections.

The last section of the journal entry involved participants analyzing the interaction and reflecting on lessons learned. “I feel very positive about our connection and feel he is comfortable with me even after only spending 15 minutes with each other.” This response appeared to be sensitive to the connections developed during the interaction. However, other responses to this section revealed more self-centeredness than previous individual responses. “Next time I would try to tell him more about myself than just listening to him talk about himself.” “I did not talk very much about myself; I just listened to their stories.” “The only thing I would change was some of their (the children’s) randomness and difficulty staying on topic.”

Also, some of the responses illustrated a focus on the cognitive development of the children rather than the social-emotional domain. In the third section of the reflective journal, participants were supposed to develop the knowledge gained by the child within the interaction then reflect on improvements while interacting with the child. However, many of the journal entries focused more on how to improve their teaching rather than enhance their ability to interact effectively. Teacher dispositions concentrate on developing the reflective practices, sensitivity and cultural understanding of the child rather than enhancing methods for teaching.

In addition to understanding the dispositions, the reflective journals assisted in triangulating the data from the surveys. At this initial stage, the researchers analyzed individually a small random sample from the TEIQue (Shipley et al., 2010) with the participant’s individual journal#1 entry. The TEIQue scale was from 1-7 with 1 being ‘completely agree’ and 7 being ‘completely disagree’. The following are some of the preliminary findings for two participants from the random sample, #12 and #27.

For the statement ‘I can’t figure out what emotion I am feeling,’ participant #12 scored a 6 (disagree) on the TEIQue (Shipley et al., 2010) and wrote in the reflections “I was feeling very anxious to meet and work with the student one on one.” On the other hand, participant #27 scored a 1 (completely agree) on the TEIQue (Shipley et al., 2010) and reflected “when I met two children I was calm and excited.” These specific reflections corresponded to the participant responses in the TEIQue (Shipley et al., 2010) survey, thus validating the initial results.

However, other journal entries and survey questions did not align. In the statement, ‘I can deal effectively with people,’ participant #12 chose a 4 (neutral) but recorded, “I prepared myself mentally by reminding myself of how difficult it was to learn a second language.” Even though #12 wrote a responsive reflection, his/her perception of how they deal with people was neutral. Another statement analyzed for these participants was “I’m usually able to find ways to control my emotions when I want to.” Number 12 scored a 6 (disagree) but wrote, “I cleared my mind of all the stigmas, prior knowledge I learned about the child.” This response did not align with her survey answer. Number 27 scored a 5 (neutral) on the statement and wrote, “I was calm and excited,” which appeared to align with her survey response. These responses led the researchers to question how these particular participants scored on the Technology Survey (Lin, 2009).
The same procedure used with the TEIQue (Shipley et al., 2010) and the corresponding journal entries was employed with the Technology Survey (Lin, 2009). Analysis of #12 and #27 revealed how each participant began using a computer in the 4th or 5th grade. Both participants devoted 2-3 hours a day using computers. When examining the statement, ‘I feel comfortable using technology,’ both #12 and #27 scored a 4 on the 1-5 scale with 1 being Strongly Disagree and 5 being Strongly Agree. Therefore, these initial findings revealed that even though these participants indicated similar familiarity with technology, their reflections varied in response to their scores in emotional intelligence.

CONCLUSIONS AND IMPLICATIONS

One surprise from this research was the similarity of the sample from two different locations. The researchers hypothesized a difference in the technology use and comfort at each location. The locations differed according to how teachers are prepared with one institution being two-year and the other being a four-year program. However, regardless of the institution attended, technology use appeared to be a significant part of their life. Participants identified similar ease with technology usage at both institutions.

Additionally, from the technology survey, cell phone use ranked higher than nationwide studies. According to a Pew Research Center (Duggan and Rainie, 2012) who polled adults from 18 years and up, 85% owned a cell phone. Further, cell phones emerged as instruments to accomplish more activities than the ordinary phone call. In this study, 100% of the participants surveyed at both institutions owned cell phones.

According to the Emotional Intelligence Survey (TEIQue), participants’ beliefs regarding interactions with others rated high. Results indicated that 40-50% of the participants surveyed believed in their ability to bond and cooperate with others. Bandura (1977) identified personal beliefs about one’s ability to implement a task as “self-efficacy” (p. 191). The pre-service teachers appeared convinced of their ability to interact with others therefore, perseverance should occur among these participants when difficulties arise. The ability to interact effectively has characterized exemplary teachers and should become a goal for pre-service teachers because of the need for interpersonal skills within the profession (Collinson, 1996; NCATE, 2013).

Even though the surveys illustrated high self-efficacy beliefs about interactions with children, the reflections revealed areas of weakness. Although some reflections were insightful, others contained attributes of self-centered behavior. The age of the participant or stage of life was not studied for this analysis, but may have been a factor from these comments.

Additionally, the reflections focused less on developing relationships with the students and more on achieving an academic standard. One reason behind this finding may be attributed to the grade participants were placed to observe children. At one location, participants were placed from prekindergarten to the 6th grade. Another reason for the focus on the cognitive domain stemmed from the study occurring during the spring semester when standardized tests occur throughout regional public schools at both institutions. Future studies will analyze this trend to determine whether changing the time of year to the fall will redirect the focus towards the social-emotional domain of the children.

This study revealed extensive data from both surveys totaling 108 questions. The researchers have concluded that the length and time involved in completing the survey were deterrents to students. Thus, some of the questions were not completed and therefore the data
may appear to be faulty. Demographics in this study were limited to gender. Future studies will include age since the two locations differ in age of students.

Additionally, the reflections were limited to only one journal entry. Future studies should analyze multiple journal entries to understand the true picture of the reflective practice of the participants. The preliminary analysis of the journal entries was limited; future studies should increase the number of journal entries analyzed for effective teacher dispositions and additionally to validate the findings in the surveys.

The findings from this study stimulated an interest in analyzing how technology affects emotional intelligence. Future studies will analyze individual participants’ emotional intelligence to understand any correlation with individual technology use. For better participation and to narrow the focus of the study, fewer questions will be included. Validation of the responses would be improved if the researchers observed the interaction between the participant and child. Additionally, future studies will analyze the reflections with teaching disposition rubrics to understand changes in dispositions during the semester.

Even as technology communication becomes ever increasing across the world (Cisco, 2013), face-to-face communication continues to be significant in the lives of children. The element of trust established through verbal and nonverbal communication characterizes effective teachers (NCATE, 2013). As the world of education evolves and reinvents itself in the digital age, the basics of meaningful communication must remain significant for teachers to reach a diverse population.

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26 Southwest Teaching and Learning Journal, Volume 3, Number 1, Fall 2013


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Appendix A
Questionnaire

Instructions: Please answer each statement below by clicking the number that best reflects your degree of agreement or disagreement with that statement. Do not think too long about the exact meaning of the statements. Work quickly and try to answer as accurately as possible. There are no right or wrong answers. There are seven possible responses to each statement ranging from ‘Completely Disagree’ (number 1) to ‘Completely Agree’ (number 7).

<table>
<thead>
<tr>
<th>Statement</th>
<th>Completely Agree</th>
<th>Completely disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Expressing my emotions with words is not a problem for me.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>2. I often find it difficult to see things from another person’s viewpoint.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>3. On the whole, I’m a highly motivated person.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>4. I usually find it difficult to regulate my emotions</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>5. I generally don’t find life enjoyable.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>6. I can deal effectively with people.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>7. I tend to change my mind frequently.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>8. Many times, I can’t figure out what emotion I’m feeling.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>9. I feel that I have a number of good qualities.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>10. I often find it difficult to stand up for my rights.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>11. I’m usually able to influence the way other people feel.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>12. On the whole, I have a gloomy perspective on most things.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>13. Those close to me often complain that I don’t treat them right.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>14. I often find it difficult to adjust my life according to the circumstances.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>15. On the whole, I’m able to deal with stress.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>16. I often find it difficult to show affection to those close to me.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>17. I’m normally able to “get into someone’s shoes” and experience their emotion.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>18. I normally find it difficult to keep myself motivated.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>19. I’m usually able to find ways to control my emotions when I want to.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>20. On the whole, I’m pleased with my life.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>21. I would describe myself as a good negotiator.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>22. I tend to get involved in things I later wish I could get out of.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>23. I often pause and think about my feelings.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>24. I believe I’m full of personal strengths.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>25. I tend to “back down” even if I know I’m right.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>26. I don’t seem to have any power at all over other people’s feelings.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>27. I generally believe that things will work out fine in my life.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>28. I find it difficult to bond well even with those close to me.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>29. Generally, I’m able to adapt to new environments.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>30. Others admire me for being relaxed.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
Appendix B
Technology Use Survey
Section 1: Please check your responses to the following questions, or fill in the blanks where appropriate.

1. Your gender:
   - Female
   - Male

2. When did you start using a computer?
   - Before kindergarten
   - In kindergarten-grade 3
   - In grade 4-5
   - In grade 6-8
   - In grade 9–12
   - After grade 12

3. About how much time do you spend on computers every day?
   - Not at all
   - Less than one hour
   - About 1-2 hours
   - About 2-3 hours
   - About 3-4 hours
   - More than 4 hours

4. Do you own the following devices?
   - Yes
   - No
   - Personal Computer
   - Cell Phone
   - Game Console
   - iPod (or other mp3 players)
   - PDA (Personal Digital Assistant)

5. Which of the following do you own?
   - Personal Computer
   - Cell Phone
   - Game Console
   - iPod (or other mp3 players)
   - PDA (Personal Digital Assistant)

6. What do you use computers for (choose all that apply)?
   - For learning-related activities
   - For entertainment (playing games, watching videos, etc.)
   - For social/communication activities (chat, e-mail, IM, etc.)
   - For practical purposes (find info. you need)
   - For self-expression (blogging, commenting, etc.)
   - For constructive activities (creating Web pages, uploading video/audio/music, files, etc.)
   - Shopping
   - Other (please specify) __________________

7. What do you use the Internet for (choose all that apply)?
   - Searching information for my study (e.g., preview, review, homework)
• Searching information for other practical purposes (e.g., weather, health, etc.)
• Reading news to know what’s going on in this country
• Reading news to know what’s going on in the world
• Sending and receiving e-mails
• Playing games
• Online chatting (chat rooms, Instant Messenger, ICQ, etc.)
• Surfing online for fun (reading novels, stories, entertainment)
• Downloading music, pictures, movies, etc.
• Blogging
• Publishing my digital media files online (e.g., on Youtube, podcasting, etc.)
• Social networking (e.g., Facebook, Myspace, etc.)
• Viewing and posting messages (e.g., on forums, discussion boards, etc.)
• Getting information about other places, countries, cultures, and peoples in the world
• Shopping (e.g., Amazon, Ebay, other online stores, etc.)
• Other (please specify)

8. Overall, on which task do you spend most time while using the Internet every day (only choose one)?
• Searching information for my study (e.g., preview, review, homework)
• Searching information for other practical purposes (e.g., weather, health, etc.)
• Reading news to know what’s going on in this country
• Reading news to know what’s going on in the world
• Sending and receiving e-mails
• Playing games
• Online chatting (chat rooms, Instant Messenger, OICQ, etc.)
• Surfing online for fun (reading novels, stories, entertainment)
• Downloading music, pictures, movies, etc.
• Blogging
• View or publishing digital media files online (e.g., on Youtube, Podcasting, etc.)
• Social networking (e.g., Facebook, Myspace, etc.)
• Viewing and posting messages (e.g., on forums, discussion boards, etc.)
• Getting information about other places, countries, cultures, and peoples in the world
• Shopping (e.g., Amazon, Ebay, other online stores, etc.)
• Other (please specify) _________________

9. To you, what’s the most exciting thing about the Internet?
• Getting information I need for my study
• Getting information I need for other practical purposes
• Reading news
• Playing games
• Making new friends
• Communicating with my friends
• Chatting with strangers
• Knowing things about the world
• Shopping
• Downloading files I needs
• Express my ideas freely
• Other (please specify) _______________

Section 2: Please indicate, on a scale of 1 to 5, your responses to each of these statements.
(1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree)
Computers are generally reliable.
• The more technology you use, the more respect you will get from your peers.
• I feel comfortable using technology.
• I do well with computer technologies.
• Computers and related technologies will isolate students from one another.
• I am interested in computers and related technologies.
• I am interested in learning new technologies.
• I am interested in learning technologies that will help my teaching in the future.
• I believe that technologies can help me teach better.
• I believe that technologies can help my students learn better.
• I can solve most of the problems when my computer doesn’t work.
• I am confident in using technology in my learning.
• I am confident in using technology to teach.

Section 3: How would you rate your proficiency of the following skills? Please check your response on a scale of 1 to 5. Thanks.
1 = No experience
2 = Beginner (little skill)
3 = Moderate (can use some already-prepared applications, or can perform the task with help)
4 = Substantial (can use and create/customize many applications on my own, or can perform the task on my own)
5 = Expert (could teach others how to use and create/customize many applications, or can teach others how to perform the task)
• Navigating the Web
• Finding information from Web searches
• Evaluating information from Web searches
• Searching electronic library databases for books, articles, and other resources
• Using e-mail
• Using Web-based course management software (e.g., SyrCLE, BlackBoard)
• Using instant messenger software
• Developing a wiki
• Blogging
• Maintaining a personal social-networking site (e.g., Facebook, Myspace, etc.
• Downloading pictures/movie/music
• Setting up a video conference
• Word processing
• Using electronic spreadsheets (e.g., MS Excel)
• Using electronic databases (e.g., MS Access)
- Desktop publishing (e.g., writing newsletters)
- Using presentation software (e.g., PowerPoint)
- Scanning documents
- Editing documents
- Using digital cameras
- Using audio devices to record sounds
- Using digital video cameras
- Editing pictures
- Editing audio files
- Editing video files
- Publishing pictures (e.g., on Flickr.com)
- Publishing audio files
- Publishing video files (e.g., on Youtube.com)
- Using music edit applications
- Developing Web pages
- Using graphic design applications
- Creating animation
- Programming
- Playing computer games
- Using hand-held and other mathematical calculators
- Using hand-held and other scientific digital probes
- Using personal digital assistants (PDAs)
- Using a SMART board
- Using idea processors (e.g., Inspiration, concept mapping)
- Using drill and practice programs/tutorials
- Using other software specific to content in areas you plan to teach
- Using augmentative systems to help persons with disabilities communicate
- Using assistive technology to help persons with disabilities learn
- Setting up computers (e.g., connecting power cable, data cable, etc.)
- Installing software
- Managing, storing, and backing up files on servers, CDs, zip disks, etc.
- Using Macintosh operating systems
- Using PC-based operating systems
- Troubleshooting hardware problems
- Troubleshooting software problems
- Exploring new technology

Section 4: Please respond to the following two questions about your experiences and opinions on technology use in classrooms.

Based on your own experience, what are the good things about integrating technology into classrooms? What are the problems?

How technology should be used in PK–12 classrooms?
TECHNOLOGY IN THE CLASSROOM: DOES THE USE OF CLASSROOM PERFORMANCE SYSTEM (CPS) CLICKERS ENHANCE LEARNING OUTCOMES IN A QUANTITATIVE COURSE?

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ABSTRACT

A common phenomenon in large classes, especially in quantitative subjects, is the lack of interaction between instructor and students. This paper reports the results of a study conducted at a state university in the Southwestern U.S. This institution strives for strong connections with its students; class sizes are small and often capped at 35 or fewer. Although student apprehension and frustration related to quantitative content of the course might be expected to be mitigated by the small class size, quality of learning outcomes primarily depends on students’ understanding of the subject matter and their engagement in the learning process throughout the semester. The study examines the results of introducing a Classroom Performance System (CPS) in an undergraduate statistics course in the College of Business. The first part of this study seeks to understand student learning processes and to explore benefits related to the use of an instant feedback response system (i.e. CPS clicker). The second part of this study begins with pedagogical concepts regarding quantitative courses and analyzes the benefits of using CPS in such courses, while coordinating the basic statistical analysis to correspond to the use of CPS in a small class. A major contribution of this study is empirical support for the idea that student engagement in small classes is greater due to the introduction of technology (CPS), along with corresponding improvements in student learning outcomes.

Keywords: Clicker, Systems Thinking, Students Learning Process, Classroom Performance System

INTRODUCTION

Lack of interaction between instructor and students is a common challenge in large classes, and this is especially problematic in quantitative subjects such as mathematics and physics. A sizeable body of literature on the subject of instructional design challenges traditional pedagogical approaches suggesting that students’ level of understanding of the material during the lecture somehow differentiates their learning expectations from their learning outcomes (Fink, 2003). As a result, designing a learning-centered approach in the classroom helps students have a deeper understanding of the subject matter and creates a pleasurable learning experience. The classroom performance system (CPS) is one of the technologies successfully introduced in the design of course formats and the stimulation of the educational process. Studies have shown that the use of an instant feedback system is a practicable technology that provides students with an interesting and effective way to voice their opinions and responses in a large classroom teaching arena. Additionally, student participation in a course where such technology is used throughout the semester has been greater than in courses utilizing a traditional lecture format.
Despite its widespread use, few studies have been conducted regarding the use and efficacy of CPS in small classes. This study contends that the subject matter might be a major factor in the determination of the effectiveness of such technology since the learning benefits of questions and formulations are related to students’ understanding and participation during the learning process. Beginning with pedagogical concepts regarding courses that are quantitative in nature, statistical analyses were utilized to determine whether the use of technology (i.e., CPS) enhances student engagement and learning in small-size classes. The remainder of the paper is organized as follows: Background and literature review that describes the model and philosophy of student learning processes and benefits of using classroom technology are presented. Methodology including data description, design of experiments (DOEs), and research questions are subsequently described. Data analyses and results are presented as well as limitations of the study, and future research recommendations are discussed. Finally, conclusions of research results are shown in the last section of this manuscript.

BACKGROUND

This study was conducted at a state university that offers junior and senior-level as well as graduate classes. This institution is located in the Southwestern U.S. and emphasizes a strong connection with its students. The student population includes both traditional students who continue their higher education immediately after graduating from a community college, and non-traditional students who discontinue their education in order to seek employment and often are fully employed when they resume their college education. Although this university is a state institution, class sizes often are small and capped at 35 or fewer, which helps to reduce student apprehension levels and frustrations common to a quantitative content courses. However, due to the nature of the subject, the quality of the learning outcomes primarily depends upon the students’ understanding and engagement with the material during the learning process. Therefore, this study explored the benefits of using CPS in a quantitative undergraduate course (i.e., Business Statistics) in the College of Business. The purpose of this study is to determine whether the use of CPS (i.e., clicker) enhances the learning environment in a small class setting and increases student engagement levels and knowledge as measured by the grade earned for the course.

LITERATURE REVIEW

Student Learning Processes

Although student efforts determine how well and how much they learn in class, it is the instructor’s responsibility to manage the classroom in a way that motivates student learning and reinforces student understanding of key concepts. According to Biehler and Snowman (1990), students’ learning motivation can be classified as either internal or external motivation. The impetus of internal motivation is that students want to benefit from academic tasks to gain knowledge and apply what they have learned in real life scenarios. By contrast, external motivation is created by a desired reward such as praise, privilege and/or some bonus points toward student grades. Instead of using transitional teaching (i.e., lecturing), often the educator will use active learning, such as group discussions, in-class activities, the use of technology, etc.,
to motivate students. To more effectively motivate underperforming students, instructors may need to assign more moderately challenging tasks that provide a higher probability of success. However, learning from mistakes or failure is also part of the learning process; thus, teaching content should progress to a more advanced level throughout the semester. The basic components of student learning processes are shown in Figure 1. The box at the bottom (i.e. classroom pedagogy) refers to the integration that must occur in order to maximize student learning outcomes. This process has a significant influence on the success of student learning. The three circles refer to key components required for achievement of the desired performance. The upward arrows indicate that a transition should be made in the process by using three key components that support the goal. The arrows connecting the three circles indicate connectivity and mutual support.

![Figure 1: Key Components of Students’ Learning Processes](source)

The Basic Loops for Assignment Backlog

Next, we apply systems thinking to student learning processes. Systems thinking is the foundation of the field of system dynamics, which provides a conceptual approach, a body of knowledge, and tools for making full patterns more identifiable and provides a more effective understanding of the theory (Sterman, 2000). The system deals with feedback loops and time delays that influence the behavior of the entire system. The application of the feedback loop diagram (i.e. causal loop diagram, CLD) explains the interrelationships among tasks during the student learning process. CLD is a method of analysis focusing on the entire system, not just one interaction between two variables (Sterman, 2000).

A causal diagram consists of variables connected by arrows (causal links) that show the causal influences among the variables. Each causal link has its polarity either positive (+) or negative (-) to indicate that a change in one variable causes the other variable to change in the same or opposite direction, respectively. Time delays are indicated in the diagram by a delay box. There are two types of delays (information delay and flow delay) found in the system. Whenever a process output lags behind its input, a delay occurs. Reinforcing loop and balancing
loop, denoted by R and B in the loop identifier, indicate a positive or negative feedback process, respectively. It is important to recognize that CLD only tells you what would happen if there were changes (Liu & Liu, 2012). For example, Figure 2 provides the logic of burnout loop (i.e. reinforcing loop - R) and midnight-oil loop (balancing loop – B) during student learning processes. The causal map in Figure 2 describes how student efforts associated with assignment due date, work pressure, work hours, energy level, productivity, work completion rate, etc. are interrelated. (Here, the possibility that students drop out the class during the semester is not factored in).

Figure 2
Key Components of Students’ Learning Processes

In Figure 2, the assignment rate is assumed to be exogenous and will be determined once a student has enrolled for a course. Assignment backlogs will increase due to the increase in the rate of assignments but will subsequently diminish because the work completion rate also increases. While assignment backlogs continue to build, work pressure also will continue to increase. Although the work pressure can be relieved by having longer due dates for those assignments, larger backlogs and relatively shorter due dates will cause an undue burden on the students. Students, therefore, will need to spend more effort (i.e. work hours) to complete assignments on time. Once students commit to longer work hours, there are two processes that students might face: (1) the longer work hours increase the work completion rate and reduces the assignment backlog forming the midnight-oil loop (see balancing loop B), or (2) if the work pressure remains too long and too high, the increasingly longer work hours will eventually force the energy level to decline when fatigue sets in. As the energy level falls, concentration and focus decrease, causing productivity and work completion rates to drop. Lower work completion rate will cause the backlog to remain high, intensifying work pressure and leading to longer work hours. This self-reinforcing loop is called burnout loop (see loop R). Therefore, if the burnout loop dominates the midnight-oil loop, the extra work hours will be offset by decreasing work quality and increasing errors. Unfortunately, students are unable to take a rest break because of
the imminent due date. In other words, exhausted student efforts often are counterproductive despite the additional work hours.

Factors Affecting Student Motivation

Although the subject matter plays an important role in maintaining student interest, instructor behavior, teaching style, and class structure can significantly affect students’ motivational level. The Teaching and Learning Center at Temple University in Pennsylvania (www.temple.edu/tlc/) identified the following factors that affect student motivation: attitude, inclusion, meaning, competence, leadership, and satisfaction (see Figure 3 below).

![Figure 3: Key Components of Students' Learning Processes](image)

1. **Attitude**: Instructors must feel free to provide both positive feedback and constructive criticism. In order to avoid offending students and to reduce the risk of possible confusion by students, instructors need to transform their perceptions and evaluations to stimulate student learning and understanding of the subject matter. Thus, instructors provide a new perspective on improving student performance.

2. **Inclusion**: As much as possible, allow students have control over their own education. However, the instructor should ensure that students understand all of their options and the possible consequence of their decisions. Often, cooperative learning can be an effective motivator because of the positive social peer pressure this setting provides.
3. **Meaning**: Provide challenging and thought-provoking content. Allow students to find satisfaction by reasoning through a problem and discover for themselves the underlying principle **Competence**: Every student has his/her own learning process and understanding of subject matter concepts; therefore, it is important that the instructor set learning goals that are achievable. Thus, instructors need to set realistic performance goals to ensure that students are capable of achieving them.

4. **Leadership**: Be a role model for students. As an integral part of classroom presentation, the instructor should make the course personal and let students know why he/she is interested in the material and why learning the material is important. Instructor’s passion for the subject matter motivates student learning.

5. **Satisfaction**: Instructors should continue doing academic research to ensure that their knowledge of the subject matter they are teaching is current and will benefit the students, as well as to maintain or increase instructor credibility.

**Benefits of Using Classroom Performance System (CPS)**

Classroom performance system (CPS) is one of the technologies successfully introduced in relation to the design of course formats and the stimulation of the educational process (http://www.einstruction.com). CPS is a student response system using wireless connectivity, which gives the instructor and students immediate feedback (see Figure 4). A recent study done by Smith (2011) indicated that the response system increased student participation and helped students stay engaged and involved during the class; however, the cost of the clicker can become a financial burden for some students. In this study, the clicker was provided by the instructor; therefore, there was no additional financial burden for the students.

**Figure 4**
Classroom Performance System

![Classroom Performance System](image)

At the beginning of class, students selected a clicker with a unique identification number assigned by the instructor. Students used remote clickers to respond to either verbal or written questions posed by the instructor during a lecture. Questions were either multiple choice or true/false. In order to avoid the possibility of a student randomly selecting any answer (that would coincidentally turn out to be correct) because of the limited time to respond, “I do not know the answer” was included as one of the choices (refer to Figure 5). The results were displayed anonymously on a histogram after the instructor finished the question; the N/A category represents students who did not respond at all (refer to Figure 6).
If the majority of students were unable to answer the question within a reasonable time frame, or answered the question incorrectly, the instructor discussed the topic further and/or used other examples to explain and emphasize the concept. Otherwise, the instructor continued with the lecture. The purpose of designing a learning-centered approach in the classroom was to help students have a deeper understanding of the subject matter and create a pleasurable learning experience. After the class, the instructor reviewed the report (refer to Figure 7 for the sample report) from the CPS software and decided to further explain and review difficult concepts from the lecture and/or identify failing or underperforming students. If necessary, additional meetings or tutoring sessions were provided and arranged between instructor and students.
RESEARCH METHODOLOGY

Data Analysis

The overall goal of the study was to confirm the benefits and efficacy of the CPS clicker in a small-size class using instructor and student observations. Based on a significance level of 0.1, it was determined that the use of technology (i.e. CPS clicker) enhanced student engagement and learning outcomes at both the individual and class level. However, at the individual level only the student’s grade could be linked to the individual’s survey; therefore, results are available only for students who agreed to participate in the study and who completed the survey. The description of the data is provided in Figure 8 and Figure 9.

Design of Experiments (DOEs)

This study involved the use of technology ((i.e., CPS clickers) in two separate classes of a Business Statistics course (XXXX3355-001 & XXXX3355-002). Initially, the clickers were used in one class section only, and (at some point) the professor used clickers in both class sections to better assess students’ understanding of the material being presented. This involved the same professor, using the same textbook, the same 9 quizzes and the same two exams in both class sections. Although the advantage of using CPS was that the professor could tell instantaneously whether the students understood the material and was able to adjust her teaching style, one anticipated disadvantage was that the professor was not able to cover as much material as would have been the case if the traditional lecture style had been employed, without the use of CPS. In order to compare and identify the impact of using this technology, the professor used a traditional lecture style to deliver content without using CPS clickers for either class section from quiz 1 to quiz 3. The instructor then used CPS clicker in one of the two class sections from quiz 4 to quiz 6, and then used CPS clicker in both classes from quiz 7 to quiz 9 (refer to Table 1). A midterm exam containing quizzes 1–4 was employed to assess the level of knowledge halfway through the semester, and the final exam covering quizzes 5–9 was done at the end of the semester. Participation in the study included using students’ grades and opinions on a survey. Using the clicker was part of the class activities, regardless of student participation in the survey. The quiz and exam results were used to compare and confirm student learning outcomes, as well as survey results, to determine the level of engagement in the classroom, both at the individual level and the class level. However, the level of engagement at the individual level only linked to those students who completed the survey. At the end of the study the principal investigator used a 10% level of significance to determine if there was any significant difference on the effectiveness of using the technology, such as CPS clicker, in class. In addition, all of the testing was performed on two data sets: (a) the data set that included all students, and (2) the data set that included only students who attended at least 75% of the classes during a particular quiz, since it was assumed that attending classes and listening to the lectures helped students learn the subject matter to a greater degree.
Figure 8
XXXX3355-001 (N=21 who agreed to participate this study; the class started using the clicker after quiz 7 through quiz 9 including final exam review)

Figure 9
XXXX3355-002 (N=14 who agreed to participate this study; the class started to use the clicker after quiz 4 through quiz 9 including midterm and final review)
Table 1
DOE for This Study

<table>
<thead>
<tr>
<th></th>
<th>Quiz 1 ~ 3</th>
<th>Quiz 4 ~ 6 *</th>
<th>Quiz 7 ~ 9 **</th>
</tr>
</thead>
<tbody>
<tr>
<td>XXXX3355-001 (n = 28)</td>
<td>27/24/21***</td>
<td>26/18/22***</td>
<td>20/22/23***</td>
</tr>
<tr>
<td>XXXX3355-002 (n = 14)</td>
<td>11/13/12***</td>
<td>13/11/12***</td>
<td>12/14/14***</td>
</tr>
</tbody>
</table>

* Midterm is covered by quizzes 1 ~ 4; one week of review (i.e. 2 class periods) before Midterm Exam
** Final is covered by quizzes 5 ~ 9; one week of review (i.e. 2 class periods) before Final Exam
*** Students attending at least 75% of the classes

Research Questions

Since student understanding of the material presented in a lecture will differentiate their learning performance/expectations from their learning outcomes, designing a learning-centered approach in the classroom can help students have a deeper understanding of the subject matter and create a pleasurable learning experience. In order to determine whether the use of CPS enhances students’ engagements and learning in the small-size class, our research questions are:

1. Does the use of technology (i.e. CPS) have an impact on the learning process in small-sized classes?
2. Will the use of technology (i.e. CPS) create and empower the students’ learning environment compared to the traditional pedagogical method?
3. Will the use of technology (i.e. CPS) stimulate students’ understandings and improve their learning outcomes?
4. Is it worthwhile for an instructor to utilize the technology (i.e. CPS) in the classroom since it is very time-consuming and requires a lot of preparation from the instructor?

RESULTS AND DISCUSSION

Figure 10 shows students’ quiz and exam results between the two sections. It is clear that the average grade for students in section 002 is higher than the other section for several of the quizzes. It is also important to point out that the students’ final exam grades (in both sections) dropped dramatically. We checked the students’ individual performance before the final exam and concluded that the most likely reason for the drop in grade is that the majority of the students concluded that they only needed a certain grade to accomplish the grade they wanted for this course. With all of the final exams from different courses taking place in the same week, students, therefore, did not put forth their best efforts on the final exam. Another reason might be that the final exam was too difficult, compared to the online quizzes. Therefore, it was determined that it would not be reasonable to include student final exam scores in the study. Additionally, it was noticed that class size in section 002 was only half of that in section 001 and that section 002 had a higher attendance rate. Since the use the CPS clickers began after quiz 4 in section 002, it was concluded that the use of technology may be one of the driving forces in both increased attendance and improved quiz scores.
In order to perform the statistical testing to answer the research questions, it was first confirmed that the assumptions of constant variance, normality, and independence were satisfied. Partial results from the two-way analysis of variance (ANOVA) are presented in Table 2. According to the p-value, both data sets (i.e. “all students” or “students, excluding those who missed at least 25% of classes for that quiz class”) confirm (at a significance level of 0.1) rejection of the null hypotheses that quiz grades within each section are the same and that quiz grades between sections are the same. Therefore, we conclude that students’ learning outcomes are different for each of the quizzes as well as for each of the sections.

Table 2
ANOVA Table Comparisons for Two Factors (Quizzes vs. Class Sections)

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizs</td>
<td>293.7113</td>
<td>8</td>
<td>36.71391</td>
<td>3.576104</td>
<td>0.0451*</td>
<td>3.438101</td>
</tr>
<tr>
<td>Sections</td>
<td>59.36423</td>
<td>1</td>
<td>59.36423</td>
<td>3.860355</td>
<td>0.0850*</td>
<td>5.317655</td>
</tr>
<tr>
<td>Error</td>
<td>82.13166</td>
<td>8</td>
<td>10.26646</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>435.2072</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ANOVA - Without Those Missing the Class

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizs</td>
<td>442.9737</td>
<td>8</td>
<td>55.37171</td>
<td>4.283228</td>
<td>0.0276*</td>
<td>3.438101</td>
</tr>
<tr>
<td>Sections</td>
<td>49.905</td>
<td>1</td>
<td>49.905</td>
<td>3.860355</td>
<td>0.0850*</td>
<td>5.317655</td>
</tr>
<tr>
<td>Error</td>
<td>103.4205</td>
<td>8</td>
<td>12.92757</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>596.2992</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The data further confirmed the strong probability that the use of the technology was beneficial, enhanced the student learning environment, and stimulated student learning outcomes; thus, a t-test was conducted on every single quiz on both data sets. The results are shown in Table 3.
Table 3  
T-test Comparisons for Two Sample Mean on each Individual Quiz

<table>
<thead>
<tr>
<th></th>
<th>All Students (p-value)</th>
<th>W/O those missing the class (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiz 1</td>
<td>0.1469</td>
<td>0.0023*</td>
</tr>
<tr>
<td>Quiz 2</td>
<td>0.9000</td>
<td>0.6773</td>
</tr>
<tr>
<td>Quiz 3</td>
<td>0.8434</td>
<td>0.9569</td>
</tr>
<tr>
<td>Quiz 4</td>
<td>0.8444</td>
<td>1.000</td>
</tr>
<tr>
<td>Quiz 5</td>
<td>0.8134</td>
<td>0.8050</td>
</tr>
<tr>
<td>Quiz 6</td>
<td>0.8544</td>
<td>0.0699*</td>
</tr>
<tr>
<td>Quiz 7</td>
<td>0.8991</td>
<td>0.3391</td>
</tr>
<tr>
<td>Quiz 8</td>
<td>0.0234*</td>
<td>0.0901*</td>
</tr>
<tr>
<td>Quiz 9</td>
<td>0.1045</td>
<td>0.1646</td>
</tr>
</tbody>
</table>

Recalling the DOE in the study, from quizzes 1 to 3, both sections were under the traditional pedagogical method; starting from quiz 4, we began to use the CPS clicker in section 002 while excluding it from section 001. After quiz 7, section 001 began using CPS clickers during the lecture. Based on the t-test from quizzes 1 to 6, only the first and last one showed the significance difference. Additionally, there was no strong evidence to prove that these two sections are different, although we began to use the clicker in section 002 after quiz 4. The reason could be that the use of the clicker did not matter to the student learning outcomes or possibly that the use of the clicker did matter to the student learning outcomes, but the effect only occurred gradually, or was delayed, since the t-test is significant in quiz 6. If the above assumption was true, it could explain the significance testing on quiz 8 (and quiz 9 with almost rejection of the null hypothesis at a significance level of 0.1) when we started to use the clicker after quiz 7 in both class sections.

Table 4  
Survey Instrument

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strong Disagree ~ Strong Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 The CPS clicker is easy to use.</td>
<td>1 ~ 7</td>
</tr>
<tr>
<td>Q2 The use of CPS clicker has stimulated my thinking.</td>
<td>1 ~ 7</td>
</tr>
<tr>
<td>Q3 The use of CPS clicker has enhanced my learning.</td>
<td>1 ~ 7</td>
</tr>
<tr>
<td>Q4 The use of CPS click has improved my grades.</td>
<td>1 ~ 7</td>
</tr>
<tr>
<td>Q5 I have been benefited from the use of CPS.</td>
<td>1 ~ 7</td>
</tr>
<tr>
<td>Q6 I feel that I have learned more due to the use of CPS.</td>
<td>1 ~ 7</td>
</tr>
<tr>
<td>Q7 I would like my professor to continue using CPS in class.</td>
<td>1 ~ 7</td>
</tr>
</tbody>
</table>

Following the quantitative analysis, a survey was conducted asking students’ feelings on use of the clicker during the lecture. The survey instrument is shown in Table 4, and the results are represented in Figures 11 and 12. Figure 11 shows the result after both sections have used the
clicker for 3-quizzes, which means that section 001 was taking the survey after finishing quizzes 7 ~ 9 (i.e. in May, 2013) and section 002 was taking the survey after doing quizzes 4 ~ 6 (i.e. in April, 2013). Section 002 had a better rating on all seven questions, which may indicate that the instructor should implement the technology as soon as possible at the beginning of class since by the end of the semester (also see the survey taken in May, 2013 from class section 001), little or nothing can be done to affect students’ performance. Figure 12 shows the result from section 002 after having used the clicker for 3-quizzes (i.e. from quizzes 4 ~ 6) and for 6-quizzes (i.e. from quizzes 4 ~ 9). After prolonging the use of clicker throughout the semester, not only has the impact been reflected on the student grades (see Figure 10) but also the responses from the students are more positive (see Figure 12).

Based on these results, one can conclude that the use of this technology could reduce the communication problems between students and the instructor as well as discover student difficulties with the subject matter, since what might be difficult for them was not always what the instructor expected. Using the instant feedback system such as CPS can help the instructor focus on student difficulties and answer their questions. However, as an educator, one cannot just simply tell students what is wrong and then give them the correct answer since tutoring is not a quick fix or a band-aid approach to improve student grades. Instructors need to guide students and show them how to think independently so that they can become more responsible for their school work (Hartman, 1997). This study suggests, however, that there is a delayed outcome while students get accustomed to using the clicker so that classroom technology support can become an addition to their learning (see Table 5 & Figure 13). The class that has been using CPS is highlighted in Table 5. Comparing the class average of each test with the previous semester, it is obvious that the class from the experimental semester have higher average grades on both quizzes 7 & 8. Due to the class schedule, the class in Fall 2012 did not cover the last chapter; therefore, the information for quiz 9 is not applicable.

**Figure 11**
Survey Result for the Use of CPS clicker after 3-quizzes from BUAD3355-001 (in May) and BUAD3355-002 (in April)

![Average Rating in 001 & 002](image)
Figure 12
Survey Result for the Use of CPS clicker from BUAD3355-002 after 3-quizzes (in April) and after 6-quizzes (in May)

Figure 13
CLD for the Impact of Classroom Technology Supports

Table 5
Class Average Comparisons between Spring 2013 and Fall 2012 (w/o using CPS at all)
So, is it worthwhile for an instructor to utilize this technology in the classroom? The answer is definitely *yes* based on student survey responses; however, one has to be patient since it may take longer than expected to see the results. In sum, these results are very exciting since we were able to use them to answer our research questions. Moreover, one might be able to apply those findings to other subjects. However, in the absence of studies in other courses, specific conclusions cannot be made.

**STUDY LIMITATIONS AND RECOMMENDATIONS**

There were some limitations to this study. First, in order to understand the students’ background on this particular subject matter between the two class sections, the investigator had to use the traditional pedagogical method on both sections for the first three quizzes, which took nearly one-third of the semester. It would have been interesting to learn what the students’ academic performance would have been and their reactions/feelings regarding such technology if it had been used for a full semester. Second, the sample size for this study was relatively small. Future research could examine the use of CPS over several semesters so that the effect on small classes can be confirmed through longitudinal evidence. Finally, the trade-off between the time spent using the clicker and lecturing has not been considered in this study. Although the use of the technology stimulated student thinking and empowered the student learning environment, the subject matter is not easy for students to understand or study on their own, if the time spent using the CPS means that the instructor does not finish the chapter in the allotted time. Comparisons between the two class sections which fully used the traditional pedagogical method and those that implement the CPS clicker during the lecture throughout the semester will help to determine the effect of using the technology, which will strengthen the findings of this study.

**CONCLUSION**

Student learning processes and factors affecting motivation were studied in the classroom. Also examined were the student learning outcomes before and after the use of CPS clickers, as well as comparing the results between the two class sections. The results confirmed that the use of technology can stimulate students’ interest in the material presented, and that it can increase their engagement and learning. This increased interest and engagement in the learning process improves their academic performance; however, there may be a time delay since it takes some time for students to become accustomed to using the clickers as the semester progresses. Thus, it is recommended that clickers be used from the beginning of the semester, instead of delaying their use until the middle of the semester. Finally, based on classroom observations, the use of technology reduces the communications gap between students and instructor, creating a more interactive learning environment and a deeper discussion and understanding of the subject matter which otherwise might have confused the students.
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DOES ORAL LANGUAGE PRODUCTION PROMOTE WRITTEN LANGUAGE PRODUCTION? EXPLORATORY STUDY OF ADOLESCENT STRUGGLING WRITERS

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ABSTRACT

This study aimed to address relations between oral and written language production in adolescents in 10th grade by comparing whether students’ oral language production about a topic promotes their written language production of the same topic and vice versa. Students’ language samples were measured across five variables: productivity, expressed ideas, syntactic complexity, lexical diversity, and spelling accuracy. Twenty-five participants were randomly assigned to one of two groups: (1) an oral language production first group (OLP-F) and (2) a written language production first group (WLP-F). Students in the OLP-F group orally responded to the expository topic and then wrote about it. Students from the WLP-F group wrote about the expository topic and then orally responded to it. Both productions were transcribed and analyzed using the Systematic Analysis of Language Transcript (SALT-v8) software. Descriptive statistics and intercorrelations among all five dependent variables were obtained within each group. Dependent variables were analyzed using multivariate analysis of variance (MANOVA), with group (OLP-F vs. WLP-F) as the between subjects variable. Analyses showed that lexical diversity is the only variable that produced statistically significant results between the two language samples. In addition, ordering of the samples did not affect students’ performance on each dependent variable.

Keywords: Writing, oral language, adolescents

INTRODUCTION

Writing is valued as a critical factor in achieving academic proficiency. Generating thoughts and writing them down on paper can be demanding for advanced writers (Haynes & Jennings, 2006). The demand is intensified when this task is given to struggling writers (Graham & Harris, 2009). During the high school years, adolescent writers are required to learn how to write different forms of expository writing, such as persuasive, cause and effect, informative, and comparison/contrast. Their mastery of these skills is usually measured by the administration of one or more formal writing assessments. For example, many states and school districts require that students pass a formal writing assessment which examines their abilities to draft an impromptu essay. Students who are unable to achieve a passing score on such measures may be
held back or prohibited from graduating. Such requirements may present a significant barrier to graduation from high school for a number of adolescent students with written expression deficits (Gregg, Coleman, Davis, & Chalk, 2007).

Writing is and should be considered when discussing the term literacy. However, “Writing is sometimes seen as the flip side of reading” (Graham and Perin, 2007, p. 7). It has been understudied when compared to reading. A PsychInfo search, on December 15, 2012, using keywords reading and elementary students produced a total of 10,082 peer-reviewed articles. On the other hand, a PsychInfo search using keywords writing and elementary students produced only 1,924 peer-reviewed articles. Reading research is conducted and/or published at a significantly higher rate than writing research for students in elementary schools.

More studies examining writing instruction need to be conducted because nationally, many students have not mastered writing. In fact, on the National Assessment of Educational Progress (NAEP) (National Center for Education Statistics, 2012); writing assessment, 76% of eighth graders and 76% of twelfth graders did not meet NAEP writing proficiency goals. According to NAEP, proficiency means that students reaching this level have demonstrated competency over challenging subject matter, including subject-matter knowledge, application of such knowledge to real world situations, and analytical skills appropriate to the subject matter. These students scored at or below basic levels. NAEP is the only nationally representative and continuing assessment of what America's students know and can do in various subject areas. The percentages reflect a significant problem in America’s schools. (NAEP writing was only administered to 8th and 12th graders in 2011.)

It becomes critical, therefore, for researchers to understand the subset of writing behaviors that hinder students from becoming fluent and proficient at writing. Chorzempa, Graham, and Harris (2006) emphasized that there are two areas of skilled writing that pose problems for struggling writers. The first area that struggling writers often exhibit problems with is the overall meta-behaviors of the writing process, such as planning, monitoring, evaluating, revising, and so forth. The second area that is difficult for struggling writers is the acquisition of foundational skills such as handwriting and spelling. These skills must be learned to the point of near automaticity. When struggling writers have to devote too much time to thinking about correctly spelling words their working memory is compromised. Working memory is the system that temporarily stores information during the performance of cognitive tasks, for content generation, planning, and revising and it plays a significant role in the writing process (Arfé, 2012; Berninger, 1999; Dockrell, Lindsay, & Connelly, 2009; Fayol, Alamargot, & Berninger, 2012).

Moreover, Moats (2005-2006) and Abbott, Berninger, & Fayol, (2010) argue that there is a strong relationship between spelling and writing. “Even more than reading, writing is a mental juggling act that depends on automatic deployment of basic skills such as handwriting, spelling, grammar, and punctuation, so that the writer can keep track of such concerns as topic, organization, word choice, and audience needs” (Moats 2005-2006, p. 12). When students suffer from poor spelling they may limit the quantity and diversity of words that they write to only those words that they can spell. For example, if a poor speller was able to use the word, excellent, in his or her oral language, however, he or she did not use the word, excellent, in his or her writing, it could possibly be because the student did not know how to spell the word. Therefore, it is during this transcription phase, where ideas are turned into mental language and transcribed into written language, that the writing process becomes constricted (Berninger, 1999;
Some researchers have suggested that there may be a link between children’s oral and written language (Fey, Catts, Proctor-Williams, Tomblin, & Zhang, 2004; Dockrell & Connelly, 2009). However, there are only a few studies that have examined the link between written and oral language production. Such studies have made it possible to determine if struggling students limit their writing, but can somehow, produce the thoughts, phrases, or words in an oral discourse mode that may hinder them in writing. Depending upon the age of the students, mixed outcomes have been reported. For example, on a serial word recall task with second and fourth grade students, Bourdin and Fayol (1994) found that oral language production was a simpler task than written language production. Students were able to remember more words in a sequential order orally than when they had to produce the written form of the same words. Dockrell, Lindsay, and Connelly (2009) examined the writing performance of students with specific language impairments at ages 8, 11, 12, 14, and 16. The results suggest that the students at age 16 still suffered from poor sentence structure, short texts, and problems with generating ideas and organizing their thoughts. When writing, students have to use more of their cognitive processes to be able to remember the words and think about their spelling. Also, in an oral production task speakers typically have a listener who provides verbal or nonverbal feedback that may help the speaker be parsimonious and focused. On the other hand, written language can influence spoken language by encouraging organization and complexity of ideas and expression (Olson, 1977). This is particularly true for adolescents and adults whose handwriting and spelling is automatic. In this case, one’s written language production will allow for organization of ideas and expression to be the focus of writing, which enables writers to organize their thoughts before orally expressing them.

Furthermore, in a study comparing learning disabled peers with normal achieving peers on oral versus written language production of a narrative, Lane and Lewandowski (1994) found that learning disabled seventh and eighth grade students produced better oral than written stories because students did not have to be concerned with the mechanical tasks of writing. The seventh and eighth grade normal achievers produced better written than oral stories. With the elimination of lower-level mechanical tasks, such as handwriting and spelling, the normal achievers were able to devote greater resources to planning and idea generation. Researchers have held that children’s written language is typically less complex at the sentence level than their spoken language, and the crossover usually does not occur until early secondary school years (Scott & Windsor, 2000). Adolescent struggling writers may be somewhere on the spectrum of this crossover. They may be more likely to produce longer oral language productions than written language productions, if they have not fully grasped the mechanical aspects of writing.

Because students do not have to be concerned with the mechanical aspects of writing when speaking about a topic, oral language production is considered an easier task than written language production for young students (Bourdin and Fayol, 1994; Grabowski, 2010). The same may be true for tenth grade students who struggle with writing. In addition to the possibility of oral language enhancing the productivity of written language, are tenth grade struggling writers more likely to express more ideas in their oral language production than in their written language...
production? Are students likely to express these ideas in syntactically complex sentences? Moreover, it would be important to know if these students demonstrate more lexical diversity in their oral versus their written language production or vice versa. Lexical diversity is the total number of different words (i.e., root words) used by the student in his or her oral or written production (Dockrell, Lindsay, Connelly, Mackie, 2007; Scott & Windsor, 2000). For example, if the student says "take", "taking" and "takes," he or she will receive credit once for the root word, “take,” which then yields a frequency of three. Lexical diversity allows one to measure the range of a speaker’s vocabulary. Additionally, from the words students choose to put in their written language production, how accurate are they at spelling the words correctly? These characteristics of productivity, number of expressed ideas, syntactic complexity, lexical diversity, and spelling accuracy have implications for classroom writing instruction.

This study addressed two purposes. The first purpose was to determine what factors influenced the written language performance of 10th grade adolescent writers on impromptu writing tasks similar to the ones used for high-stakes testing situations. The second purpose was to address the relationship between oral language and written language production in 10th grade adolescents by comparing whether or not students’ oral language production about a topic promotes their written language production of the same topic and vice versa. Specifically, if students are allowed to orally discuss a topic first, will the number of written words, number of ideas expressed, and the syntactic complexity of the ideas increase? Secondly, do students use more lexically diverse words in their oral language production than in their written language production? Finally, do the choices in words that students put in their writing reflect their ability to spell these selected words correctly?

Therefore, the following research questions regarding the relations between oral language and written language production were investigated: (1) How do 10th grade struggling writers perform on an oral language production versus a written language production task when examining measures extracted from language sample analysis (number of ideas expressed, number of syntactically complex sentences, lexical diversity, and word productivity)? Our second research question asks: (2) How does ordering of an oral language production versus a written language production task affect tenth grade struggling writers’ performances on measures extracted from language sample analysis (number of ideas expressed, number of syntactically complex sentences, lexical diversity, word productivity, and spelling accuracy).

In high-stakes, timed, essay tests handwriting, spelling, productivity (number of words in an essay), and vocabulary complexity can affect the quality scores that raters assign to an essay (Gregg et al., 2007; Olinghouse, 2008). Understanding the contribution of specific writing characteristics (e.g., spelling, productivity, and vocabulary complexity) to quality scores that raters assign to essays could provide professionals with guidance in determining effective instructional strategies for struggling writers (Greg et al., 2007). In addition, learning more about the relationship between adolescent’s written and oral language abilities may provide educators more insight into ways of helping students who struggle with impromptu writing tasks.

**METHOD**

**Participants**

The participants for this study included 25 students from a high school located in the state of Florida. Participants were enrolled in a writing course for the academic year because they had been identified by their ninth grade teachers as struggling writers at the end of their ninth grade
year. In Florida, students take the FCAT their 4th, 8th, and 10th grade year. Therefore, ninth grade English teachers made the recommendation as to which students would benefit from a writing course. The writing course was designed to provide support in writing for Florida’s Comprehensive Assessment Test (FCAT) Writing test that is given in 10th grade. All students were typically developing, received no special services, had no history of being labeled with a disability, and English was their first language. Participants included 21 African American students and four Caucasian students. Of the 25 students, 13 were male and 12 were female, and the average age was 15.8 years old.

Data Collection

Within six different class sessions of the writing course, participants were assigned a number and then randomly selected to participate in the Oral Language Production-first (OLP-F) group or the Written Language Production-first (WLP-F) group by the first author and a research assistant. On Day One, participants who were randomly assigned to the OLP-F group responded individually to a prompt in a quiet room. The researchers explained to participants that their responses would be audio-recorded. Each researcher read the prompt to the student. The prompt asked participants to explain, “What do you like about being a teenager?” Each researcher informed the participants to orally respond until the participant’s thoughts were complete, although the maximum amount of time the student had to respond was 45 minutes. The FCAT Writing+ allows students 45 minutes to respond to a written prompt. On Day 2, the OLP-F and the WLP-F group wrote on the aforementioned topic. It was the second time the OLP-F group had been exposed to the topic and the first time the WLP-F group had seen to the topic. The written production task was designed to mirror the exact procedures of the standardized FCAT Writing+ prompt for tenth grade. Students were given an FCAT Writing+ practice test but with this particular prompt. The practice test included a page with the prompt, a draft sheet, and a lined-sheet for the final written language production. Participants were given 45 minutes to read the prompt, plan what they wanted to write, and write a response. Participants received no help from the teacher, researchers, classmates, dictionaries, or any other writing aids. After 45 minutes, participants had to submit their written language productions, even if they had not finished. On Day Three, the WLP-F group responded orally to the topic. This was their second time being exposed to the topic. Each participant’s response from both groups was transcribed and analyzed by the researchers.

Transcription of Language Samples

Oral and written language products were orthographically transcribed and entered into the Systematic Analysis of Language Transcripts program (SALT; Miller & Chapman, 2001, 2008) using t-unit segmentation (Hunt, 1970) by a graduate student who was unfamiliar with the purposes of the study. Once the oral and written language products were entered into the SALT program, a variety of standard language production measures were calculated. For the purposes of this study, the following standard language production measures were of interest: Number of different words (NDW), total number of words (TNW), mean length t-unit (MLT-U), and total number of t-units. Inter-rater reliability for transcription of the samples was completed for 11 of the randomly selected oral-written sample pairs between the graduate assistant and the second author. There was 100% agreement for t-unit segmentation and morpheme by-morpheme
transcription for the written samples. Agreement for t-unit segmentation for oral samples was at 98%, with morpheme-by-morpheme transcription at 94%.

**Dependent Variables**

Five dependent variables were analyzed to measure the oral and written language productions from the 25 protocols for the two groups. Productivity was measured by the total number of words written and the total number of ideas expressed. In spoken and written language, these variables are widely used to analyze productivity (Puranik, Lombardino, & Altmann, 2007). The first dependent variable, total number of words written included all words that students wrote. The second dependent variable, total number of ideas expressed included all thoughts that students had. For example, “I can start cooking. I can learn how to drive.” The total number of ideas was calculated by SALT as the total number of T-units produced, which is one main clause with all subordinate clauses embedded in it (Puranik et al., 2007). For example, “I like being a teenager because I don’t have to work, and I don’t have to pay bills.” This example sentence consists of two T-units. The third dependent variable, level of syntactic complexity of the oral and written language products was based upon the MLT-U obtained for each type of product.

The fourth and fifth dependent variables occurred at the word level. All 25 essays, oral and written, were analyzed by SALT to determine the lexical diversity of words used by computing the number of different words (NDW) used by the participants. According to Nelson and Van Meter (2002), NDW is widely used to measure lexical diversity (i.e., number of root words). Finally, spelling accuracy was calculated by dividing the number of correctly spelled words by the total number of words produced and multiplying by 100 to obtain a percentage (Puranik et al., 2007).

**RESULTS**

In this study, we compared how students performed on an oral language production task versus a written language production task. We also counterbalanced the order of the productions to determine if the production of oral language samples prior to collection of the written language samples for the same topic resulted in better outcomes for the measures of interest. We had five variables of interest in better understanding writing characteristics of tenth grade struggling writers.

**Oral Language Production versus Written Language Production**

Descriptive statistics were performed to examine the differences between the two types of language production tasks (oral vs. written) on each of the five dependent variables. For word productivity, the oral sample produced a mean of 146.94 (SD =92.545) while the written sample produced a mean of 108.76 (SD = 70.980). For the number of expressed ideas, the oral sample produced a mean of 15.59 (SD = 3.78) while the written sample produced a mean of 16.91 (SD=4.99). For syntactic complexity, the oral sample produced a mean of 11.20 (SD = 6.65), while the written sample produced a mean of 7.80 (SD = 5.67). For lexical diversity, the oral sample produced a mean of 72.68 (SD =32.04) while the written sample produced a mean of
Spelling accuracy was not included in the comparison of the two language samples because oral spelling was not measured.

Multivariate Analysis of Variance (MANOVA) was performed to determine if there were statistically significant differences between the two types of language samples on each of the dependent variables. MANOVA revealed no significant difference between the two samples on word productivity, $F(48) = 2.676$, $p = .108$, $\eta^2 = .053$ and syntactic complexity, $F(48) = 1.110$, $p = .297$, $\eta^2 = .023$. Lexical diversity was significantly impacted by the type of task, $F(48) = 4.697$, $p = .035$, $\eta^2 = .09$, and the number of ideas expressed was closely impacted by the task, $F(48) = 3.786$, $p = .058$, $\eta^2 = .073$. Spelling accuracy was not included in the MANOVA given that this variable was not assessed via oral production.

**Ordering of Oral Language Production versus Written Language Production**

Descriptive statistics were performed on each variable to make comparisons between the two groups of struggling writers (OLP-F vs. WLP-F). For word productivity, the OLP-F group produced a mean of 117.46 ($SD = 66.34$), while the WLP-F group produced a mean of 139.08 ($SD = 99.74$). For the number of expressed ideas, the OLP-F group had a mean of 15.68 ($SD = 4.71$) while the WLP-F group produced a mean of 16.87 ($SD = 4.12$). For syntactic complexity, the OLP-F group produced a mean of 9.27 ($SD = 5.82$) while the WLP-F group had a mean of 9.75 ($SD = 7.00$). For lexical diversity, the OLP-F group produced a mean of 62.50 ($SD = 28.20$) while the WLP-F group produced a mean of 70.63 ($SD = 31.11$). Finally, for spelling accuracy, the OLP-F group produced a mean of 98.26 ($SD = 2.05$) while the WLP-F group produced a mean of 98.60 ($SD = 2.54$).

MANOVA was performed in order to determine if the order of written sampling context impacts syntactic complexity, lexical diversity, total number of ideas expressed, word productivity and spelling accuracy. The MANOVA revealed that there were no significant differences on any of the dependent variables between the two groups [word productivity: $F(48) = .827$, $p = .368$, $\eta^2 = .017$; expressed ideas: $F(48) = .792$, $p = .017$; syntactic complexity: $F(48) = .906$, $p = .346$, $\eta^2 = .019$; lexical diversity: $F(48) = .139$, $p = .711$, $\eta^2 = .139$; spelling accuracy: $F(48) = .276$, $p = .602$, $\eta^2 = .006$]. Those students who produced an oral language sample and then completed a written sample performed comparably to those children who completed a written sample first and then produced an oral language sample.

**DISCUSSION**

Students’ oral language productions versus written language productions were compared. The first finding was that the only variable that students showed statistically significant differences on was lexical diversity, with ideas expressed closely approaching significance. Struggling writers demonstrated greater lexical diversity for their oral language samples than their written language samples. Perhaps this is due to the fact that students used more diverse words orally because they did not have to be concerned with spelling these words. In the written language production, students used less diverse words. Students’ choice in words selected for the written sample suggests that students, perhaps, used words which they could spell. Researchers propose that students use words in writing which they can spell (Moats, 2005/2006). In this study, this is probable because both groups of students had very high spelling accuracy rates on their written language productions. The OLP-F group had a spelling accuracy rate of
98%, while the WLP-F group had a spelling accuracy rate of 99%. Indeed, these rates suggest that words were included in the written sample that could be spelled by both groups of students.

When comparing the two samples, students expressed more ideas in their written production than in their oral production. Perhaps, the increase in written production can be attributed to the fact that some students may have used prewriting strategies to gather and collect their thoughts before writing, although this may not be common for some struggling writers. In the oral task, students could respond when “they” were ready. Many students, however, may have begun orally discussing their answer to the prompt, without thinking about their answer thoroughly before responding to the prompt. In a previous study conducted by Bourdin et al., (1994) students completed a recall task orally. Completing a recall task is very different from completing an open-ended response.

The next finding suggests that ordering of the language productions did not hamper students from performing comparable to one another. It has been suggested that oral language is a harder task than written language (Bourdin et al., 1994; Lane et al., 1994). For these groups of students, however, students performed similar on both task. Our study is similar to Bourdin et al., (1994), because we gave students both an oral task and a written task. Bourdin et al. (1994), however, had younger students to complete a recall task. It may have been harder to recall the words given to the young students and then spell the words once remembered. Again Lane et al., investigated older students who were classified as learning disabled. These students found it easier to produce an oral language production than a written language production. In this study, responding orally first to the topic, What do I like about being a teenager did not make a significant impact on students written language production on Day 2. Further, writing about the topic first did not promote a great impact on students’ oral language production on Day 3.

**STUDY LIMITATIONS**

Examinations of writing can be a difficult task for researchers (Dockrell & Connelly, 2009). This is particularly true for this study; therefore, several limitations exist. The first limitation is the sample size. The sample size is relatively small, 25 participants, for an empirical study. Based upon similar studies (Dockrell, Lindsay, & Connelly, 2009; Grabowsi, 2010; Mackie & Dockrell, 2004), however, twenty-five participants are an efficient amount to draw comparisons and contrasts of the participants’ results. The second limitation is access data. The study could have been stronger if specific norm-referenced assessments were given to measure the participants’ vocabulary, spelling, and writing development prior to the study. Although all students were typically-developing, as none received special services or had been retained, some students’ literacy levels may be lower on measures such as vocabulary, spelling, and writing based upon a normed sample which may have impacted their written and oral language productions. The last limitation deals with the oral language production task. It is possible that some students may not be able to think as quickly when they were given the oral task. Although the participants were given time to think about what they wanted to say, it is not known whether students mentally organized their thoughts prior to speaking.

**EDUCATIONAL IMPLICATIONS**

Gregg et al. (2007) suggested that vocabulary complexity, spelling and productivity affect quality scores that raters assign to essays. Classroom instruction should focus on helping
students use more diverse words in their writing. Students can learn to expand upon various words which they are using in their writing and providing synonyms of those exact words. Students should be able to use a rich vocabulary, not just in speaking, but in writing, as well. Beck, McKeown and Kucan (2013) suggest teaching students to use Tier 2 words, which are more sophisticated words for mature language users. So a helpful suggestion would be to move students from Tier 1 words, which are basic, every day words, to Tier 2 words. For example, a Tier 1 word is “good”. However, a Tier 2 word for “good” is “excellent” or “remarkable”. Beck et al., offers an abundance of vocabulary building activities in their book, Bring Words to Life (2nd edition). In addition, teachers should allow students to increase their vocabulary by allowing groups of students to discuss the prompt whereas peers can be motivated to extend their thinking, or students can borrow ideas from others, thus increasing their vocabulary and allowing them to increase their choices of words in their written language productions. Activities such as these will allow students from various ages and grades to become lexically diverse.

Moreover, in order for students to build confidence in choosing rich vocabulary words in their writing, spelling instruction should be implemented. Instruction in orthographic spelling generalizations and word origins can give students opportunities in spelling more diverse words in their writings. Moats (1995), Henry (2010) and Templeton, Johnston, Bear, & Invernizzi’s (2008) offer orthographic spelling and word origin instruction that teachers can utilize in their classrooms. The texts offer resources that teach the science of spelling or why words are spelled the way they are. For example, when teaching word origins, if a student knows that in the Greek language, the /k/ sound is spelled with “ch” (ache, choir, chemistry) instead of the letters k or c (English) and in French, the same spelling of “ch” is pronounced as /sh/ (i.e., chandelier and chauffer), they will be able to spell those more sophisticated words, in which English borrows from other languages such as Latin and Greek based words. Once teachers are armed with this knowledge, they will be better equipped to teach students how to spell Tier 2 words.

Also, for productivity, writing instruction should focus on helping students to understand how to express different ideas about a topic. Modeling brainstorming strategies used before writing can help students to generate different ideas. Brainstorming ideas can include: webbing, story starters, and various graphic organizers. For example, a student can take a word, such as teenager and write down all the thoughts that come to his or her mind about that word. The student can then eliminate or develop thoughts about the topic. Once the student has selected the thoughts he or she wants to develop, he or she can expand those thoughts. This simple exercise of webbing will give students some baseline ideas to use while writing, which will help with their expressed ideas. Additionally, instruction should focus on taking those ideas and writing them in syntactically complex sentences. Instead of using just one thought, students should be taught how to combine two thoughts into a compound sentence or a complex sentence. A variety of sentence structures exist for students to use. Therefore, teachers should equip students with the various sentence structures so that students’ writings can be more syntactically complex. Teachers can demonstrate this knowledge by modeling or thinking aloud about how they, the teachers, use a variety of sentences and varying the length of such sentences.

Finally, teacher preparation programs must provide pre-service (undergraduates) and in-service (graduates) teachers with instructional techniques for improving the writing performance of students. Teachers’ knowledge of the overall understanding of writing from the mechanics to the ideas will greatly enhance the teachers’ confidence in teaching writing to PK-12 students.
CONCLUSION

Research involving struggling writers performance on oral- and written language productions is very limited. More research needs to be conducted on this topic to help determine where the breakdown in writing occurs for struggling writers. An oral language production allows researchers to understand if the student has the knowledge but has problems with the mechanics of writing and/or writing his thoughts down onto paper. Given the low proficiency performance of students on the NAEP, teachers have to gain the knowledge to better assist students in improving their writing performance. Teacher preparation programs have to equip teachers with such knowledge so that the pipeline that runs from teacher preparation programs to teachers to students allows for all entities to be successful.

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A TRAVES DE NUESTROS OJOS, THROUGH OUR EYES: OVERCOMING PERSONAL AND ACADEMIC OBSTACLES IN HIGHER EDUCATION FOR FIRST GENERATION LATINO COLLEGE STUDENTS

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ABSTRACT

This study examines the different types of family responsibilities that exist among the Latino college student population and how these responsibilities have impacted their college experiences. A collection of structured interviews were conducted with 12 first-generation Latino students in order to identify some of the key factors that have impacted their success in higher education. The results point to three key emergent themes in the area of academic achievement and success: 1) the need to establish a balance between family, work and school responsibilities, 2) the need to finance their education, and 3) the need to navigate the communication maze between them and the university faculty, staff and personnel. The findings of this study are discussed within the context of Latino students’ adjustments to the demands of college/university requirements and the overall retention rate upon graduation attainment.

Keywords: Family responsibilities, academic achievement, retention rate, communication maze, graduation attainment.

BACKGROUND

The current growth in our present day student population has brought about the need to change the way many universities and businesses conduct their recruitment, training and even structure work group assignments. This is necessary to ascertain that the needs of customers are met, that production equates to profit, and that individuals are prepared to meet the demands of the social order in the work place.

Purpose of the Study

During candid conversations with students, they revealed leading an almost double life between their school and cultural life environment. They also shared the need to express themselves to others (especially their instructors) in order to provide a small glimpse of what their life is like, as they navigate the uncharted waters of academia. The purpose of the study was to examine the different types of family responsibilities that exist among the Latino college student population and how these responsibilities have impacted their college experiences in an effort to reach a balance between the demands of family, work, and academic studies.
Research Questions

The following questions were utilized (within the context of Latino students’ adjustment to the demands of college/university requirements and the overall retention rate upon graduation attainment) in an attempt to guide this study:

- How does the role of family responsibilities impact the academic life of first generation Latino student populations?
- How have financial challenges impacted the higher education experience of first generation Latino students?
- What role does communication play in the successful transition of first generation Latino students enrolled in higher education?

LITERATURE REVIEW

History of the Latino Student Experience

The literature suggests that first-generation Latino college students are faced with several challenges that impact their enrollment and retention rates, such as “university fit” (Gloria, Castellanos, & Orozco, 2005; Torres, 2006), home-to-school transition difficulties (Zurita, 2004-2005), academic self-efficacy, and perceived lack of finances (Longerbeam, Sedlacek, & Alatorre, 2004), but very little research has specifically focused on how to improve the higher education experiences for first generation Latino students; therefore, the current study attempts to more fully understand the life experiences of Latino students in a holistic fashion.

Maestras, Vaquera and Zehr (2007) examined some key factors that have impacted the students' sense of belonging at a Hispanic-serving institution. The researchers’ findings indicated various variables measuring academic and social integration. They found that the impact of a sense of belonging was an important and positive part of their experiences in higher education. In addition, the finding also confirmed the idea that campus diversity may need to improve this sense of belonging in order to ultimately improve the retention rates of Latino students (Maestras, Vaquera, Zehr, 2007). Stephens, Fryberg, Markus, Johnson, and Covarrubias (2012) arrived at a similar conclusion, stating that a welcoming, community atmosphere was extremely critical to the creation of positive attitudes and success among Latino students on campus, and was more important than instilling the social capital of an independent academic culture on students in order to have them blend in with those who grew up with that culture.

The current literature of Latinos in higher education reflects the idea of Sobreviviendo la universidad (surviving university life) is a challenge for most Latinos attending higher education in the U.S. (Gloria, Castellanos, Schull and Villegas, 2009). The researchers found that fitting in and cultural self-esteem were always a challenge faced by Latino students.

Mayo, Murguia, and Padilla (1995) discussed the relationship of social integration and academic performance of minority university students. Latino students are in need of “cultural capital” which will assist them in the process of academic achievement; however, the authors emphasize that “social capital” will only benefit Latino university students as they make connections with faculty and fellow students outside of the classroom. Bernhardt (2013) also stresses the importance of cultural capital, and states that significant others in the students’ lives may need to be educated in such a way that they can help the student navigate the college
environment, including choosing classes. This can be achieved by offering the parents workshops as early as possible, so that their home involves a “college-going culture” (p.211). By the time students are transitioning to college, this type of intervention may not be possible, so the faculty and advisors may be the student’s best source of college information. This can be achieved by creating significant others who can provide that cultural capital for the students. (Deil-Amen, 2011).

Thornton, Bricheno, Iyer, Reid, Wankhede, and Green (2011) agree; their research showed that face to face interactions facilitated social integration much more than flyers, notices, and other ways of disseminating information. Razfar & Simon (2011) also discuss social integration in the context of mainstreaming and mobility, and suggest that students are more successful when they have mainstreamed. These students should be encouraged to do things with the mainstream culture, instead of face to face activities with faculty that isolate them as a group. The classroom environment gives students an opportunity to interact with faculty; nevertheless, the research confirms that building relationships outside the classroom is a higher level of learning and teaching for both faculty and students. An example of this type of informal social interactions is sharing coffee, or attending extracurricular activities with students. Perhaps it may include attending birthday parties, or visiting students in the hospital, all outside of the classroom setting.

The qualitative data were analyzed and clustered into themes according to the challenge the students faced in each of the three hypothesized areas.

Family Responsibilities and Challenges

The existing research that has focused exclusively on Latinos’ college experiences suggests that a key component to the educational success of Latino students is their family connections and responsibilities (Sy, 2006; Zambrana & Zoppi, 2002). In the two studies just mentioned, the authors first reviewed and synthesized the literature that points to the central role of family responsibilities during the transition to college among Latinos, and then they presented the current qualitative data on Latinos’ college and family experiences. Finally, they suggest possible mechanisms by which the enrollment and retention rates of Latino students can be improved.

According to Brown, Santiago and Lopez (2003), a large number of Latinos in higher education are also nontraditional students. They are older, work, attend college part-time, and often are also caring for a family. These variables are all characteristics that influence the decisions Latino students make in participating in and completing higher education. In the current study, it is hypothesized that first generation Latino college students would have unique stressors making the educational process especially challenging. Balancing school and family, financing their education, and communicating with university professors and administrators are the predicted areas that students mentioned when asked about their personal experiences. Therefore, a qualitative interview-based study was designed to measure the self-reported challenges of those students.

Scholars have found that “a feeling of obligation” to contribute to the family income is a very important factor that contributes to the challenges Latinos face in higher education. It is evident that culture defines this responsibility and the family expects Latino students to meet this expectation. Sy and Romero (2008) found that there were different types of family responsibilities among Latina college students and these responsibilities affected their college
experiences. The researchers' findings in this study confirmed that the role of the family responsibility was an important part of their journey into higher education. The researchers suggested that more support on behalf of the university environment regarding this role contributes toward the Latinas’ college adjustment and retention (Sy & Romero, 2006). Even with this support, there is still a feeling of obligation, but it is an obligation that stems from cultural background and upbringing, rather than from direct demands made by parents. The researchers found that many of their respondents indicated they did have a financial obligation to the family, and mentioned the resulting pressure to maintain a job while in college (Sy & Romero, 2008).

Financial Challenges

Receiving a bachelor’s degree also carries financial obstacles, and often this variable has affected the success of Latino students. O’Connor, Hammack, & Scott (2010) found that Latino students were overrepresented at community colleges and underrepresented at baccalaureate institutions for financial reasons. This would likely be a reason that many students assume they will not be successful in a college program: They know that finances will be a barrier to finishing their education. Montalvo (2012) stressed the importance of providing economic capital to recruit and retain low-income Latino students who do not enter with the economic capital that other students may have. In addition, England-Seigert (2011) found that Latino students are one of the ethnicities less likely to borrow money for college. Although many Latino students obtain loans at their institutions, schools in general may not be appealing to many Latino students because borrowing may be necessary for them to attend. This may lead to some of the atmosphere issues that some students have with universities.

According to scholars, it is perceived that a lack of finances is a reason Latinos who make it through high school are less likely to enroll in a 4-year program (Longerbeam, Sedlacek, & Alatorre, 2004). Furthermore, the studies show that family obligations are an important part of the responsibilities of Latino students (Fuligni & Pedersen, 2002) and the Latino culture that typically defines the financial obligation to the family (Cammarota, 2004). The expectations for Latino students to help their parents financially are important especially for female students. As nearly all of the interview participants used in the current research were female, this information was essential to this study. Latino cultural values prioritizing family needs and the self-sacrificing role of women represents a double challenge for Latina students who want to complete a college degree (Sy & Romero, 2008).

Although the significance of family values could be a supportive factor, the expectations and demands of family obligations could also increase stress and compromise academic outcomes; therefore, the current study focused on examining the challenges of balancing family, work and school of Latinos as they were completing their last two years at the university. Since very little research has been done on the transition into college, the goal was to learn as much as possible from both male and female students by using the qualitative interview process. (see Appendix A)
Communication

The current student population is comprised of diverse learners including Latino students; therefore, it is important for universities to develop a variety of communication systems in order for faculty to deliver an inclusive and effective face-to-face instruction. Several studies illuminate the understanding of the interaction between student and environmental factors. Rendón et al. (2007) devised a best practices model, which was developed from a teleconference of educators around the nation. Participants suggested that stressing assessment and accountability, affirming diversity in and out of the classroom, and creating inclusive classrooms and campus climate can increase student persistence. Some studies examine the influence of university context on student success. Another study by Castellanos and Gloria (2007), suggests that the psychosociocultural framework promotes the need for greater “cultural congruity. . . which prompts their interpersonal connectedness and subsequent cultural validation within their university environment.” (p. 391).

In addition, the results of these studies found that collaborative learning helped students engage in active learning, bond to broader social communities and that student persistence was positively influenced by their perceived need to reject past (negative) attitudes, parental support and their values (Arana, Castañeda-Sound, Blanchard & Aguilar, 2009).

According, Dr. Albert Mehrabian, professor emeritus at the University of California-Los Angeles, face-to-face communication can be broken down into basically three elements, including nonverbal (55%), tone (38%), and words (7%), (Mehrabian, 1971). This breakdown in communication provides a framework that could be considered by administrators and faculty when developing online programs, courses, and instructional strategies. (see Figure 1)

**Figure 1**
Mehrabian’s Breakdown of Face-to-Face Communication
Pie Chart Coding: (7% = Words, 39% = Tone, 55% = Non-Verbal)

Since the patent of the telephone in 1876, advancements in telecommunications and technology have greatly transformed communication. Even Colleges and Universities have made great advances in the development of course content delivery. For example, in an online
education course, much like a call center, body language in the traditional sense disappears over the telephone, mobile phone, and “live” synchronous classes unless there is access to video. Therefore, it is critical that faculty and staff understand the breakdown of communication when incorporating voice options into program development, course design, and instruction.

Moreover, training and professional development is needed so that faculty and students can optimize course management system tools that support engagement and foster communication. According to Mehrabian (1971), “tone accounts for 86% of the total communication, words accounting for the remaining 14%.” (see Figure 2).

**Figure 2**

Mehrabian’s Breakdown of Telephone/Mobile Phone/VoIP Communication

Pie Chart Coding: (14% = Words, 14% = Tone)

![Pie Chart](image)

Adapted from: K. Betts (2009)

Another form of communication between faculty and students can also be written form. According to Ober (2005), “Tone in writing refers to the writer's attitude toward the reader and the subject of the message. The overall tone of a written message affects the reader just as one's tone of voice affects the listener in everyday exchanges” (p. 88). In online education, written communication is a primary form of communication between the institution and students as well as faculty and the students. Consequently, it is important for administrators and faculty to be cognizant of “tone” in writing so the message being sent is not misinterpreted or lost in translation. In addition to cognitive aspects of instruction, features related to instructor–student relationship and personal traits of the professor were commonly positively valued by students. Themes identified in this study associated with the style of relationship that effective instructors foster with students were helping, respectful, builds relationships, being available; therefore, friendly, effective teachers characteristically respect students and build personal relationships with them. Similar to prior research, professors labeled exceptional in the current study were also noted for personal qualities, themed understanding, caring, flexibility, positive attitude, patience, fair, open-minded, fun, listening and creativity (Slate et al., 2009).

In general, teacher immediacy is important when working with any population, yet it becomes increasingly important when working with Hispanic students who are the first in their
families to attend college. It is particularly important to know each student’s name and to be able to express how much we care about them as human beings. Eye contact, smiles, and other positive nonverbals are essential in creating a safe communication climate for these students. Verbally we affirm their participation, and we get to know their stories, their opinions, and their challenges (Saavedra and Saavedra, 2007).

**METHODOLOGY**

**Participants**

In order to better understand the family responsibilities faced by Latino university students, the current investigators utilized a semi-structured, qualitative interview that attempted to tap into these challenges faced by participants as they complete their university degree. The researchers expected the interviews to expose similar challenges that have been found earlier, such as family obligations, financial, and communication issues, but in such detail that a plan can be created to better serve these students through future research. Archival data were collected during a research meeting of colleagues (from two universities) with students sharing information on a qualitative questionnaire, about their higher education experiences. A total of 12 students from a mid-sized southwestern university were interviewed. From the 12 students, two were males (27-35 years of age), and ten were females (33-45 years of age). The two groups were categorized as first-generation, Latino students that had been admitted to the university’s education program, some currently in their senior year and nearing graduation, and some were in a graduate program in Education.

**Materials**

A set of 13 open-ended, faculty-constructed interview questions were used in order to establish the Latino students’ university experiences. Sample questions encompassed the following areas of challenge: *transition difficulties, helpful resources, and, overall climate.* A few specific questions included the following: What could be done for entering Latino students that would help them well academically? What facilities could be improved to make the university a better place to obtain a graduate degree? What could be done to make the climate of the university (even) more inviting to entering Latino students? (see Appendix A).

**Procedure**

Participants were surveyed utilizing a qualitative questionnaire composed of 13 open ended questions. The responses were transcribed and printed for the purpose of analyzing emerging themes. At the end of the survey, students were also asked to add any additional information that they thought would be beneficial to the study: What challenges face first-generation Latino university students?
RESULTS

The qualitative data were analyzed and clustered into themes according to the challenge the students faced in each of the three hypothesized areas. The results concurred with previous research: Family responsibilities were a factor, as they were in the research of Sy (2006) and Zambrana and Zoppi (2002). Many students recognized work conflicts, in concordance with Brown et al. (2003). (see Figure 3 and 4)

Figure 3
Proposed Interview Themes

The three themes listed above were those emerged from the qualitative survey. Under Family Responsibilities (Balancing Home, School, and Work), two subthemes emerged, namely family obligations and time, which includes work schedule. The Financial Challenges included paying back loans and securing financial assistance. The communication cluster involved individual communication from faculty, as well as communication with the university staff. The details from the interviews are depicted as follows and organized into the three clusters.
Balancing School, Family, and Work

Balancing school and family was exceptionally problematic for these students because they had to navigate a university setting, based in a mainstream culture, while at the same time, not turning their backs on their family’s Latino culture. According to Student A (Male, age 34), “Challenges that I faced were time, money, and how I was going to support my family (three kids and wife—who always took care of our children). I come from a small community…so you know… that was the big issue—time and money.” Student B (Female age 28) said, “The challenge was time, because I am the wife, so when will I contribute to my home if I go to school and have to spend a lot of my time doing my homework or assignments?” Student C (Female age 32) said, “The most difficult thing… is finding time to do everything on time. I work 40 hrs. a week, a regular full-time position.” A 44-year-old female (Student D) said “working full time is a major challenge for me…I am raising kids as a single parent and coming to school full-time.”

While analyzing the data, “the balancing act” was the biggest challenge/obstacle mentioned by the graduating seniors. When asked about fellow students from junior college, and why they did not transfer with them to complete a four-year degree, the students reported that the “balancing act” was too much for them. For example, Student B reported, “they are at a point in the life where they have a family, they buy a new house, they have to work, and they just
Financing Their Education

Financing education is a huge issue for first-generation college students. Parents who did not attend college might not be saving for their children’s education, as those who did attend college. A study by Richard Fry (2002), found that Mexican-origin Latinos have the lowest average household income among the native born at $42,000; therefore, the social and cultural capital needed to creatively finance college is often not available to Latino first-generation college students. According to Student A, “For me the biggest issue was money, because if I get a loan, the government is going to want their money back…knowing that part, if I cannot get any financial help, maybe there is somewhere I can go to get some money management skills…that is something that would also have helped me.” Above, England-Seigert (2011) mentioned that Latino students are less likely to procure loans than students of other ethnicities, a concept supported by some of the students: “It was tough at times. I hate loans.” (Student E; female age 27); a Student D said, “Difficult. I was only offered loans.” The availability of loans to Latino students did not solve all their financial issues, as not everyone was open to borrowing money.

Students A and B both discussed the cost of their education. They commented on the cost of books; which they cannot always afford them and the fact that the tuition was reasonable compared to other schools, but even so, they still needed more financial resources. Student B also mentioned that her husband had to work extra hours, and she had to ask close family for loans. She said she did not do it on her own, “…just getting some assistance was very helpful.” This was quite a challenge for first generation college students, because saving for college is usually not a priority for their families. These students need to find other ways to gain social and cultural capital, and they often have to pay for more of their education than their non-first-generation counterparts. “Today, the tuition is more expensive,” explained Student F, a 35-year-old female. Even though some students acknowledged that their school had low tuition, it was still difficult to have enough money for school.

Communication With University Professors and Administrators

When asked what did work, and what the university could do for students, much of what the students reported focused on communication. Two types of communication were discussed: Communication with faculty (with an academic purpose) and communication with the staff (to learn about working the university system). They needed the university faculty and staff to communicate with them. Student A discussed needing more information about the workings of the university: “During the orientation process, the university spells out the expectations for the student and what the deliverables are and what the university is also gonna [sic] hold itself accountable for…when I was at another university, we had deliverables and we delivered them, but I did not feel the university or sometimes the staff where [sic] held accountable for what they should have deliver to me in the process.” The “two-way street” was mentioned as an emerging theme in that survey questionnaire, as well: “o.k., you do your part, but I’m also going to meet you halfway and I am going to do my part and I think in the orientation process if that is laid out you are going to automatically have some ownership.” They discussed not learning enough
when they entered college and how a better orientation would have been helpful, which is mostly lack of communication from the staff. One of the graduate students, Student F (female, age 31) said “I needed better communication and clear degree plans or expectations.” Many students asked for more communication in advising. A lot of them seemed not to know which courses they could take without step-by-step help from a familiar advisor, but it is important to understand that students who are not first-generation may be having frequent conversations with family about these topics.

On an academic level, communication with the faculty was mentioned by the students. When asked about good things they encountered, they shared about the librarian helping them to learn to find their sources and favorite professors who communicated with them, giving them attention, and contributing to an inviting atmosphere. For example, Student B described how one professor made her feel welcome and helped her achieve success: “…she was just very nice, very helpful, kind and just provided whatever resources I needed. I would just go to speak with her whenever I could…she would just understand and provided me with the tools necessary to complete my assignments.” These relationships were so important to the students’ success, as Student B said, “It was kind of like two different worlds…my school life and then my family or personal life and if professors and staff could understand this someday, they would understand that there is not as much family support as they would think there is…” Student D requested “more interaction with the faculty.” A 34-year-old female (Student G) stated that what she valued most were her positive interactions with professors: “Dr. X [sic] was very encouraging and I really appreciated the feedback on assignments that she gave, which is something other professors mostly didn’t do.” This extra communication is needed even more by students who do not get supplemental supportive academic information from their families.

The communication with the professors that understood this helped make the students feel like part of the university community. To better emphasize the point that positive communication is important to students, Student B said, “I do not really know, how to clearly state it, but my life was not at that academic level, it was a little bit below, you are the professor, I am the student, I am not a master teacher, but if you could just see it from my own eyes, just from my simplistic view as a student, you would understand…” By communicating with students, as if they are not outsiders to the academic world, the faculty and staff will be able to provide them with the necessary motivation to succeed. This type of student experience and voice is evident today as it was in Fiske’s publication in 1988 entitled “The Undergraduate Hispanic Experience,” which depicted the experiences and voices of Hispanic students in higher education and referenced by Brown, Santiago & Lopez, (2003).

Students’ perceptions of university professors regarding communication and support were also shared in the questionnaire responses. Student B said, “Based on my prior experience of when I began, I just decided to come here because I was not being successful at another university, I just applied and started…the difference between then and now is that I always maintained open lines of communication with my professors which helped out a lot…like the little ‘tidbits’ of information that my professor shared about the advantages of joining a student organization. I now know that this information helped me to maintain a higher GPA… so if students know this important information as they come in, they will have an advantage.”
DISCUSSION

Given the results of this study, it is evident that students are in need of a variety of sources in order to navigate through the many obstacles that they may face in obtaining their higher education degree. The goal is for them to be successful in accomplishing a goal that will take a balance of family, work and academic life that will in turn produce a life-long benefit. The results show that students report being most supported by help balancing family and school, financial aid and financial training, and good communication between faculty, staff and other students. First generation Latino college students often arrive in college with less social capital than other students and faculty who have not lived in their shoes might not recognize that right away. Direct input from these students will help the administration best serve them, so that they become as successful as students who come equipped with plenty of social capital.

Furthermore, the success of the first generation Latino college students depends on the university’s ability to give them plenty of attention, communicate with them, work with their schedules, and provide an inviting atmosphere. Because these students are often lacking in the social and cultural capital that other students possess, it is important for the university to step up and provide what is lacking, if it plans to have a large number of successful, first generation Latino graduates. Opportunities that non-Latino and non-first generation college students receive prior to the university experience can be provided in part by the university so that students do not feel such a discrepancy between them and the more traditional students. The communication that the students crave can contribute to networking, which is part of social capital, and offer the much-needed cultural capital as well.

The investigators believe that the success of first-generation Latino students depends greatly on the attitude of the university toward these students. Balancing family and school is a difficult issue, as it is with any non-traditional student, and universities that aid those students by providing flexible scheduling and other perks such as childcare are increasing the chances that those students will indeed graduate. It becomes increasingly difficult with first generation Latino students because of the difference in social and cultural capital that students have gained from their families compared to mainstream students. When universities provide this social and cultural capital, the discrepancy between the success of these students and mainstream culture can be decreased. In addition, finding creative ways to help these students finance their educations and helping them to uncover those ways will tear down some difficult roadblocks.

Lastly, communication from the university, from both faculty and staff will go a long way in helping these students feel welcome. Current culture states that to help these students the most, universities should provide training so that first generation students have a way to learn successful university ways; however, according to the research by Stephens, Fryberg, Markus, Johnson, and Covarrubias (2012), students are more successful if the solution is a “two-way street”. The university should expect to learn from the students and provide them with an environment that is welcoming because in doing so; it will not only change the lives of students, but work to see the world through their eyes: a través de sus ojos.
LIMITATIONS OF THE STUDY

This study does have a few limitations. Only thirteen students from one university (School of Education) were surveyed and at this point, it is unknown whether the findings will generalize to students outside of the field of education. A larger sample size would be more advantageous to include students pursuing other disciplines besides education. In addition, because the students in education classes must be observed in teaching situations before they graduate, they may have more opportunities to create positive relationships with university professors than students in other programs. It would be interesting to know what students in other programs report when asked what kinds of things would help them transition into college. In the future this study could be expanded and more students could be interviewed.

SUGGESTIONS FOR FUTURE RESEARCH

The next step for this research would be to involve more participants in various programs across the university. In addition, there are several aspects of transitioning to college that could be emphasized. The analysis of available and desired university resources could be considered in the future, along with university support to include orientation programs and student mentoring which would aid in the Latino student transition to college or university. Programs that facilitate the faculty and staff’s understanding of the issues of first-generation Latino students could go a long way in making the students feel welcome. Stephens, et al. (2012) discussed the importance of cultivating a positive university culture and how students succeed when they feel like part of that culture. Those ideas could also help universities attract and better serve our first-generation Latino population.

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**Appendix A**

**Participant Survey Questionnaire**

**Introduction**

We are interested in learning more about the various responsibilities that first generation Latino students have while attending College or University. You will be participating in an open ended survey questionnaire about your roles or responsibilities in your family and how you balance the home, school and work environment while attending school. Please note that there are no wrong or right answers. The survey will take approximately 30 to 45 minutes and your written answers will be transcribed in order make sure we accurately record all of your responses. You will also be asked to add any additional information at the end of the survey in case the questions did not cover some of your experiences, as a first generation college student.

1. What were the challenges that you faced when you decided to apply and begin your university studies?
2. What do you think are the challenges that have kept other students, not just you but other students that you know, who completed two years of college elsewhere, or some other community college, from applying to begin university work?
3. What do you wish you knew then, that you know now about how to do well at the university level?
4. What could be done with entering students that will help them to do well academically?
5. What can be done to make the university climate more inviting to future entering students? How can facilities be improved to make the university a better place to obtain a baccalaureate?
6. What do you think the faculty found most enthusiastic about being professors at the university?
7. What was the most challenging thing for you to learn about using the library and/or the internet in order to write your class papers?
8. What kind of summer orientation topics would be beneficial for incoming students to be familiar with, before starting classes at the university?
9. Who was the most helpful person to you, which contributed in you doing well academically at the university? (List the position/title held and how they helped?)
10. Were other students helpful to you in successfully navigating university academics and if so, did they enter at the same time you did, earlier or later than you? How much of a challenge was it to afford all the tuition and fees etc. at the university?
11. If you worked while attending the university, how much of a challenge was it and how many hours did you work while attending the university?
   Please write additional comments below...

Appendix B
Participants’ Responses by Themes

Family Responsibilities
“I was worried about finding a job that was flexible with being a full-time graduate student.” (F24)
“I work about 34-40 hours a week, at times it was challenging but what isn’t…it wasn’t harder than I expected.” (F23)
“The most difficult part of grad school is finding the time to do everything well or on time. I work 40 hours a week, a regular full-time position.” (F32)
“I am balancing work, school and life again...how much time would it take?” (F33)
“I work 20-30 hours a week...it was a challenge getting to class on time, but juggling the schedule was not hard, since I had only a one year lapse between undergrad & grad school” (F33)
“Working full time is a major challenge for me...I am raising kids as a single parent and coming to school full-time.” (F44)
“I am employed full-time. It was a great challenge because most classes ended late at night. I had a lot of homework.” (F45)
“I am a full-time teacher, sometimes it was hard, but overall it was kind of feasible.” (F27)

Financial Challenges:
“It’s less expensive here...” (F37)
“Today, the tuition is more expensive...” (F35)
“Financial issues” (F27)
“It was tough at times...I hate loans.” (F27)
“Financial challenges? ...financial aid...” (F32)
“The fees were reasonable...but the financial aid office needed to be more communicative with students about their scholarships and grants, etc...” (F32)
“Answering the financial aid questions were the first challenges.” (F33)
“It was a challenge taking on more debt because I had just started paying back my undergrad.” (F33)
“Not a challenge for me. I am wiser about borrowing this time...” (F43)
[about finances] “It was difficult for me. I was only offered loans.” (F44)
“Financial aid was very helpful.” (F44)
“It was a great challenge, didn’t qualify for Fin Aid so had to get student loans & will owe a lot when I graduate.” (F45)
“For me the biggest issue was money, because if I get a loan, the government is going to want their money back...knowing that part, if I cannot get any financial help, maybe there is somewhere I can go to get some money management skills...that is something that would also have helped me.” (M34)
“...just getting some assistance was very helpful.” (F28)
Communication Challenges:

“I would like to have professors who teach… I do not want professors who instill their opinion or even insult graduates from other universities.” (F33)

“I would like to make this university more inviting with knowledgeable professors who are fair and consistent with students. Students expect professors to follow their own expectations… they need to be fair with all students.” (F45)

“I would of [sic] loved to be guided by a personal mentor/advisor and meet with them a minimum of two times per semester” (F24)

“…some people guided me who had started prior and were like ‘make-shift’ advisors at times.”

“I miss communication about the Alternative Education Program and requirements along the way.” (F27) “I would have liked to have been assigned an individual advisor who you could go to when you have questions.” (F27) “I wished we had an Advisory Center.” (F27)

“What I did have problems with understanding how the professor wanted the paper written.” (F27)

“I wish I was better informed about the programs offered at this school.” (F33)

“I believe making the information desks/area more inundated with information would have helped.” (F36)

“I needed better communication and clear degree plans or expectations.” (F31)

“I believe encouraging networking among students is important. At times I think we need that extra push. In one of my classes everyone wrote their name/email/phone# on a sheet of paper & the professor made copies for everyone.” (F35)

[what is needed] “…more communication between students and professors.” (F32)

“During the orientation process, the university spells out the expectations for the student and what the deliverables are and what the university is also gonna [sic] hold itself accountable for… when I was at another university, we had deliverables and we delivered them, but I did not feel the university or sometimes the staff where held accountable for what they should have deliver to me in the process.” (M34)

[educational plan] “…o.k., you do your part, but I’m also going to meet you halfway and I am going to do my part and I think in the orientation process if that is laid out you are going to automatically have some ownership.” (M34)

“…she [my professor] was just very nice, very helpful, kind and just provided whatever resources I needed. I would just go to speak with her whenever I could… she would just understand and provided me with the tools necessary to complete my assignments.” (F28)

“…improving Blackboard, email...” (F28)

“Yes, I had a friend who was helpful and he entered before I did and now is graduating.” (F32)

“The fees are reasonable… but financial aid needs to be more communicative with students about their scholarships/grants, etc.” (F28)

“I would tell someone else trust it, I have watched it grow. The people who are here to help us will.” (F33)

[in reference to problems with campus account] “I still do not get e-mail” (F33)

[why attended?] “To have an advisor who really sat w/ me and discussed my options w/ a B.A. in Psychology. (F33)
[what they could have told me] “I would have gone and taken content in Science, Math, or even concentrate in Spec. Ed.” (F33)

“Have advisors to give a better view of degree plans for students to decide where they want to go.” (F33)

“Lack of information. Advising was confusing.” (F34)

“Dr. X [sic] was very encouraging and I really appreciated the feedback on assignments that she gave, this is something other professors mostly didn’t do.” (F34)

[wish I knew] “...how to work with the Alternative Education Program” (F44)

[what I needed] “...to have department instructors advise them properly throughout their educational interaction.” (F44)

[wish I knew] “...about other degrees offered or let me know about my other options.” (F45)

[what I needed] “...having more interaction with the professors.” (F44)

[wish I knew] “...how to work with the Alternative Education Program” (F44)

“It was kind of like two different worlds…my school life and then my family or personal life and if professors and staff could understand this someday, they would understand that there is not as much family support as they would think there is…” (F28)

“I do not really know, how to clearly state it, but my life was not at that academic level, it was a little bit below, you are the professor, I am the student, I am not a master teacher, but if you could just see it from my own eyes, just from my simplistic view as a student, you would understand…” (F28)

“Based on my prior experience of when I began, I just decided to come here because I was not being successful at another university, I just applied and started…the difference between then and now is that I always maintained open lines of communication with my professors which helped out a lot…like the little ‘tidbits’ of information that my professor shared about the advantages of joining a student organization. I now know that this information helped me to maintain a higher GPA... so if students know this important information as they come in, they will have an advantage.” (F28)

*Special Coding: (M = Male, # = Age) (F= Female, # = Age)*
ABSTRACT

Financial statements analysis is an integral and important function of any manager’s job. A manager needs to analyze effectively and efficiently the company’s business environment, its strategies, and its financial position and performance. In this paper, we examine how an enterprise resource planning (ERP) based simulation approach can be used to teach financial statements analysis for managers. ERP-Sim is a simulation game, designed by researchers at HEC Montreal that runs on the SAP platform. The purpose of the game is to simulate a business and its different processes to enable students to learn by making strategic business decisions. Students work in collaborative teams of four with each team operating a firm. Each team interacts with customers and suppliers by sending and receiving orders, delivering products, determining pricing strategy, cash flows, credit management, using business intelligence, reporting in successive quarters and completing cash-to-cash cycles. The game relies on the information, transactions and reports provided by SAP, an industry-standard ERP system. After administering the approach, student opinions were surveyed as a measure of teaching effectiveness and found to support the simulation pedagogy.

Keywords: ERP, SAP, simulation, financial statement Analysis

INTRODUCTION

Business schools around the world are prioritizing the integration of real life examples, case studies, and technology into their curricula. In addition, professional business and industry organizations such as the American Institute of CPAs (AICPA) and the Chartered Financial Analysts Institute (CFA), among others, emphasize the integration and recognition of the importance of financial statements and financial statement analysis in business curriculums (Antonucci, et al., 2004; Hayen and Andera, 2003). According to Faria et al. (2009), business simulations provide for dynamic business decision making where students formulate a strategy and then carry out a series of decisions to implement the strategy. In addition, the feedback received from the simulations enables them to evaluate their strategy and change it if necessary. This paper examines ERP-Sim, innovative simulation software developed by researchers at HEC Montreal to teach financial statements analysis for undergraduate business students. The ERP-Sim is a team-based simulation that allows students to run a business, make strategic decisions, forecast sales, and monitors market trends to determine pricing strategy. In addition, by
analyzing the cash flows and the expected need for financing, students can arrange for credit (Leger et al., 2011). This paper provides a novel approach on how to use the ERP-Sim to make strategic business decisions and assess the impact of those decisions on the firm’s profitability through the analysis of the financial statements. The previous literature related to ERP-Sim focused on the ERP side of the simulation without emphasizing the financial statements analysis side. This paper has two important and innovative contributions to the existing literature. First, this is the first paper that explores the applicability of ERP-Sim for financial statements analysis. Second, the paper provides a comprehensive approach to link strategic decisions to the financial statements.

Financial statements are the language of business. It is imperative for any business graduate to have a strong understanding of financial statements and the ability to analyze the health of a business through its financial statements. The ERP-Sim software provides convenient and up-to-date financial statements of the simulated company. Students fine tune the running of their business by analyzing these financial statements.

Innovative technology in business education allows students to integrate information in their decision-making processes and learn skills better than in typical lecture based classes. Moreover, innovative technology as a learning tool helps students to define their goals, make decisions, and evaluate progress. The use of innovative technology makes students active recipients of information transmitted by a teacher, textbook, or seminar. Thus, the teacher's role changes from being the center of attention as the dispenser of information to a facilitator who sets learning goals and provides guidelines and resources (Stallings, 1997).

SAP is a worldwide leader in Enterprise Resource Planning (ERP) software. Headquartered in Germany, SAP’s ERP systems are used by the majority of Fortune 500 companies to integrate their business processes with their information needs. SAP allows organizations to seamlessly integrate their operational and functional units and provides management the capability to monitor and control the operations on a real-time basis. One of the most important characteristics of SAP’s ERP software is its capability to customize and integrate numerous business processes allowing organizations to configure the ERP system to satisfy their unique needs without major changes in the core ERP system (Hejazi et al., 2003).

The remainder of the paper is organized as follows: A literature review of previous studies related to innovative technology usage in business schools is presented. Then the ERP-Simulation software is discussed. Next, the financial statements analysis project using ERP-Sim is described. Then the students’ perceptions about ERP-Sim and the simulation exercise and the student opinion survey are presented. Finally, some of the limitations and shortcomings of this research are provided and the paper is concluded.

LITERATURE REVIEW

The literature related to ERP-Sim is somewhat limited since this simulation software was first introduced in 2006 and it was until 2009-2010 period that it became widely used around the world. However, numerous studies addressed the use of technology in the classroom. For example, Anderson, Getz, and Siegfried (1997) stated that if institutions of higher education do not adopt innovations in a timely manner, their productivity will stagnate. Based on a survey of 238 U.S. colleges and universities, they found that innovations in libraries and computing have occurred twice as rapidly as in other educational settings. They concluded that using innovative teaching tools is crucial to the strategic and economic growth of such institutions.
Fuchs and Wobmann (2004) found a positive relationship between using computers in education and student achievement. However, they did not distinguish between the types of computer presence as teaching tools: computer-based presentation and computer-based instruction. Computer-based presentation involves a multimedia presentation or using computers to enhance the conventional classroom delivery method and to make it more appealing; while computer-based instruction diminishes the traditional role of the teacher in favor of the computer.

Euliano, Lefebvre, and Principe (1998) maintained that computer-based presentation alone does not improve the learning environment but serves as a faster and more accurate way to present material. They asserted that this type of learning environment increases the distance between the professor and students by making students more passive thus hindering understanding and retention. Yet, Diwan et al. (2001) found that exposure to Internet-based learning enhances the learning environment and increases student enjoyment.

In response to this continued criticism, business schools have been implementing several pedagogical strategies such as capstone project, integrated case studies, team teaching, information technologies/tools (Seethamraju, 2007) and developed learning environments such as workplace learning, experiential learning, experimental learning, collaborative learning, problem-based learning, blended learning and simulation games. The need to focus on learning outcomes that incorporate industry-relevant skills is forcing business schools to develop innovative, new, and effective teaching and learning methods and pedagogy and simulation is one of them.

Bristow and Dunaway (2012) explored the benefits of deploying an ERP system within the organization. They find that ERP systems make information readily available for the proper users, all data is kept in a central repository, data redundancy is minimized, and there is a greater understanding of the overall business picture.

Fuß, et al. (2007) compiled the benefits of ERP systems from numerous sources and found that ERP systems increase organizational flexibility, improve security and reduce costs. Also, ERP systems provide higher return on investment, and make the business processes more efficient with higher integration among the difference business processes. Finally, ERP systems provide better information transparency and quality and higher compliance with legal requirements and frameworks.

Cronan, et al. (2012) studied the impact of ERP systems on business organizations. They found that these systems offer opportunities for companies regarding the integration and functionality of information technology systems; thus providing them a competitive advantage that is necessary in today’s global companies. Furthermore, they also found that training for the incorporation and use of ERP systems is difficult and challenging. Therefore, they proposed that a good strategy for effective training include the use of business simulations. Seethamraju (2007) studied students’ perceived knowledge gain after incorporating SAP instructional materials into a business curriculum. His analysis revealed that students perceived that they had gained a significantly high level of knowledge using SAP software. Hodgkinson and Healy (2008) explored the importance of decision-making under time pressure and found that only an expertise in business administration is no longer sufficient for getting adequate jobs. They concluded that companies are looking for both methodological and social competences from their job candidates as key competences.

Leger et al. (2013) studied the commercial use of ERP systems in organizations. They found that most of the world’s largest organizations have already adopted an ERP system, and
many mid-size organizations are turning to them as well. Their results showed that organizations devote significant portions of their implementation budgets to training and organizational change management interventions. Therefore, they concluded that if business schools produce graduates with knowledge and hands-on experience about ERP systems, their value will increase in the job market.

The benefits provided by ERP systems cannot be more emphasized, therefore it seems imminent that business students should be exposed to ERP systems while still in college in order to be able to understand the different business processes and how these processes should be integrated for the overall profitability of a business organization. Furthermore, such expertise in ERP systems provides an edge in the job market. ERP-Sim is an innovative learning tool developed on the SAP ERP platform that uses the simulation approach. This simulation package combines the learning-by-doing pedagogical approach. Students are exposed to the modern ERP system, its functionality and processes, and at the same time, they participate in teams to run a company and make strategic decisions. This approach enables students to enhance their business skills through exposure to the SAP ERP system.

**ERP SIMULATION GAME**

The ERP-Sim is a simulation environment on the SAP ERP software designed by a research team led by Pierre-Majorique Léger and Jacques Robert of HEC Montreal. The simulation game is best implemented when students are divided into teams of 4 to 5 students, with each team operating a different firm and making its strategic and financial decisions (Leger, 2007).

The simulation game has three variations that can be used depending on the learning outcomes outlined by the instructor.

1. The distribution game
2. The manufacturing game
3. The logistics game

In addition, the manufacturing game and the logistics game have three different setups related to the length and complexity of the simulation that are the introductory version, the extended version and the advanced version respectively.

The distribution game, which is free of charge, is the simplest version of the simulation game; teams do not have the full capability to make decisions and changes in the game. The manufacturing game and the logistics game are more sophisticated versions of the simulation game, where students have the ability to perform more decisions and implement different strategies.

The common characteristics shared among the three versions of the simulation can be summarized as follows: each team will make decisions related to customers and suppliers by forecasting an expected sales and receiving orders, delivering the products, determining pricing strategy, analyzing the cash flows and the expected need for cash, arranging for credit if necessary, using business intelligence and reporting in successive quarters and completing cash-to-cash cycle. The game relies on the information, transactions and reports provided by SAP, an industry-standard enterprise resource planning (ERP) system (Leger et al. 2007; Seethamraju, 2007).

The distribution game consists of selling bottled water in 3 flavors and 2 different sizes. The product is already manufactured, so the teams make only decisions regarding their expected
sales and forecast the quantities and types of bottled water they need to purchase. The second
decision teams can make is the pricing strategy. Each team decides the selling price of the
bottled water, however, for this simulation game; the purchase price is the same for every team
in the game.

The manufacturing game consists of the manufacturing and distribution of muesli cereals.
Each company can produce up to six different muesli cereals, each with its own distinct flavor.
The six different varieties are: Muesli Original, Nuts Muesli, Strawberry Muesli, Blueberry
Muesli, Raisins Muesli and Mixed Fruit Muesli. The raw materials to produce the six varieties
are wheat flakes, oats, strawberries, blueberries, raisins and nuts. Each team can create its own
recipes for each of the flavors in their product line. In addition, cardboard boxes and plastic bags
are needed to package the cereals. All grains are bought on a spot market, thus during the
simulation the price of the raw materials can fluctuate based on their availability and market
prices (Leger, 2006).

The logistics game, the newest simulation product in the family of ERP-Sim, focuses on
the stock transfer logistics and the sales process. Each team must choose their stock distribution
logistic amongst three regions and set prices in order to maximize sales revenues (Leger et al.,
2013).

The major characteristics of the three different variations of the simulation are shared.
The simulation game is set up in Germany. Each company tries to sell their products in the
German market. There are three types of distribution channels that companies can accommodate:
1) independent grocers, 2) grocery chains, and 3) hypermarkets. The buying behavior of the
retailer is driven by end customer needs and may be influenced to various degrees by prices and
marketing investments.

Each team uses a real-life Enterprise Resource Planning tool, SAP R/3, to run their
businesses and make decisions. The business processes incorporated in the simulation are actual
SAP processes: the material management (MM), production planning (PP), sales and distribution
(SD), financial accounting (FI), cost accounting (CO) and business intelligence (BW) modules.

The simulation has been developed in such a way that participants do not have prior
experience with SAP R/3 and do not need to configure the system in advance. The simulation
uses a fictional company already configured in R/3: IDES (Internet Demonstration and
Evaluation System) (Leger, 2006).

The simulation can be run over successive business quarters during which plants receive
orders, procure the necessary materials and produce the goods before shipping them to the
customer and billing the customer for them. Within each business cycle, each team has to make
several business decisions that will influence its profitability. Teams can decide which market
segment they wish to target and determine their pricing strategy and the level of marketing
investments. These decisions are uploaded into the simulation software, which determines, based
on a market algorithm, the number of orders that each plant will receive. This software generates
a script that is imported into SAP R/3, automatically triggering the sales process associated with
each order obtained. After every business cycle, students must use the ERP system to analyze
their financial situation (Leger, 2006).

Using standard SAP reports, teams can analyze their financial statements and perform
ratio analysis on a quarterly basis to determine their profitability, operating efficiency and
liquidity. Also, teams can decide whether their pricing and marketing strategy is optimal or needs
to be changed for the next quarter. Finally, teams have to keep track of their cash flow with a
standard report in the SAP treasury module. Should they run out of cash, they have to negotiate a line of credit with the bank and pay interest on the loan (Leger, 2006).

DESCRIPTION OF FINANCIAL STATEMENT ANALYSIS PROJECT

The primary goal of the project is to develop technical, analytical and critical thinking skills of students. In addition, the project enhances their ability to work in teams. In the different steps of the project, students are required to: analyze key aspects of a company’s financial statements as generated by the SAP software while playing the ERP-Simulation game; evaluate their company’s financial decisions; discuss non-financial items that affect a company’s ability to be successful; compare their company’s performance to the other company’s playing the game; and make and defend strategic decisions.

In addition, the project also develops the students’ ability to work as a team and interact with each other to make strategic decisions that affect the profitability of their company. By incorporating the project of financial statements analysis within the ERP simulation game, a solid pedagogical tool is created that incorporates and assesses the impact of business decision making in the simulated company’s accounting statements.

SAP based simulation software in itself gives students an edge in understanding integrated business processes, while the project emphasizes the importance of financial statements analysis and strategic business decision-making ability of the students.

Project Requirements

Teams of four students run their own company and make strategic decisions over three quarters. Each quarter represents an actual 30 day time period, which is simulated in the game over a 20-minutes period.

The strategic decisions that the students can make affecting the financial position and statements of their company are the following:

1. Product Planning and Forecasting
2. Investing in fixed assets
3. Product Pricing
4. Advertising

Product Planning and Forecasting

In the simulation game, each company can produce up to six different types of muesli cereal. Each team can decide the types of cereals they will produce and can specify the composition of the cereal; also, each team can decide the box size of the cereals.

In deciding the type and box size of the cereals, each team can strategically target a particular niche market. In addition, this decision will also affect the investment required to purchase the raw material that will be needed to produce the cereals. In order to place the order for the raw materials and start the production process, each team needs to forecast the expected demand for each cereal box planned.

The forecasting process is very important because the company cannot sell any product unless it is in inventory. Also, forecasting will affect the liquidity of the company and its cash
position because the company has to pay its suppliers regardless of whether they sell the products or not.

**Investing In Fixed Assets**

Each company has a fixed capacity to produce a certain amount of cereal boxes per day. The fixed capacity can create bottlenecks in the production process and does not give any strategic advantage to the teams playing the simulation game.

Each team can decide whether to make additional investment in the production facilities. This decision entails two aspects: either investing in the production capacity thus increasing the amount of cereal boxes produced per day or decreasing the setup time of the production process. The setup time is the amount of idle time where the production is halted when the company switches from one type of cereal to another.

The decision to increase capacity or reduce setup time will affect the financial statements of the company by reducing the cash balance or requiring the company to borrow additional funds from the bank. Also, this decision will increase the fixed assets that the company owns.

**Product Pricing**

The most important aspect of the simulation game is to price each type of cereal box that the company has for sale. The competitiveness and profitability of each company depends on the pricing strategy that each team uses to try to gain the largest market share possible.

Each team can use the cost estimating capabilities of the SAP system to estimate each product’s costs based on the current value of the raw material, labor and overhead expenses. Also, every 5th day during the simulation, the simulation game will produce average market prices for each product available in the market. Teams can use the average market prices to make adjustments to their pricing strategy.

**Advertising**

The last strategy that each team can use to increase their sales is the marketing option. Each team can decide if and how much they can spend on marketing and advertising. Also, they can decide the geographical area where they can advertise.

**SIMULATION RESULTS ANALYSIS**

To illustrate the functionality of the simulation game and its pedagogical value, in particular for financial statements analysis purpose, the actual output from the simulation is provided in Figure 1. Figure 1 shows that each team will start the game with a certain amount of cash in their cash account and a certain amount of inventory. The value of the fixed assets reflects the value of the plant and equipment that the company owns at the beginning of the game. A depreciation expense can be allowed by the instructor which will decrease the value of fixed assets over the life of the simulation.
Figure 1
A Typical Company’s Financial Statement at the Beginning of the Game

Figure 2 illustrates the financial statements of the company at the end of the first quarter. The change in each of the accounts can be used to analyze the impact of each of the strategic decisions made by each team playing the simulation game. Also, the instructor can provide the total sales and revenue numbers per team to estimate each team’s market share.

Similar financial output is available at the end of each quarter. Using the financial statements, a team can perform financial analysis by calculating their profitability, liquidity and operating efficiency ratios and comparing them over each quarter. The importance of this ratio analysis lies in the fact that each strategic decision made by the team, such as pricing strategy or advertising strategy, can be analyzed using its appropriate ratio and compared to the other firms to assess the impact of each team’s strategy during the game.
METHODOLOGY

In order to assess the effectiveness of the ERP-Sim as a pedagogical tool and the simulation approach as value-added learning experience, a survey was administered to students enrolled in a junior level small business finance course in Fall 2012 at the University of Houston - Downtown to gather their opinion about the usefulness of the ERP-Sim, the simulation exercise, and the ERP systems. Twenty students participated in both the simulation game and the survey. Students were divided into five teams, each composed of four members. Students were surveyed about their understanding of simulation exercises in general and their knowledge of ERP systems prior to the ERP-Sim simulation. Table 1 provides the students’ perceptions about the usefulness of simulation.

Table 1 displays the responses to the questions related to usefulness of simulation exercise and the knowledge of ERP systems. As Panel A shows, the students had mostly positive perception about simulation. The majority of the students either agreed or strongly agreed that simulation enhances the learning experience (74%), help them be more involved in the classroom (69%), help them work within a team environment (78%) and prepare them better for the real world (61%). The students did not agree with the statements that simulation exercises create...
stressful or intimidating environment or will not help them in learning and retaining new information. Panel B shows that the majority of the students had solid understanding of ERP systems and business processes. This result should not be surprising since all the students surveyed are business majors. The majority of the students either agreed or strongly agreed that business processes are integral part of any organization (74%), ERP systems integrate business processes (69%), ERP systems facilitate information sharing within an organization (74%) and had solid knowledge of SAP environment.

Table 1
Pre-Simulation Survey Results

<table>
<thead>
<tr>
<th>Survey Questions</th>
<th>Agree or Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A: Perceptions about simulation exercise</strong></td>
<td></td>
</tr>
<tr>
<td>Simulation enhances the learning experience.</td>
<td>74%</td>
</tr>
<tr>
<td>Simulation will help me feel more involved in the class.</td>
<td>69%</td>
</tr>
<tr>
<td>Simulation will help me work within a team.</td>
<td>78%</td>
</tr>
<tr>
<td>Simulation will prepare me better for the real world.</td>
<td>61%</td>
</tr>
<tr>
<td>Simulation creates a stressful and intimidating learning environment.</td>
<td>11%</td>
</tr>
<tr>
<td>Simulation will not give me enough time to learn and retain the information covered.</td>
<td>27%</td>
</tr>
<tr>
<td><strong>Panel B: Knowledge of SAP and ERP systems</strong></td>
<td></td>
</tr>
<tr>
<td>Business processes are integral part of any organization.</td>
<td>73%</td>
</tr>
<tr>
<td>A business can grow and prosper with separate and isolated business processes.</td>
<td>41%</td>
</tr>
<tr>
<td>ERP systems integrate business processes.</td>
<td>69%</td>
</tr>
<tr>
<td>ERP systems facilitate information sharing within an organization.</td>
<td>74%</td>
</tr>
<tr>
<td>SAP is one of the leading ERP solution providers.</td>
<td>78%</td>
</tr>
<tr>
<td>SAP provides easy access to accounting data similar to any other accounting software.</td>
<td>68%</td>
</tr>
</tbody>
</table>

Table 2 provides the responses to the survey questions asked after the students completed the ERP-Sim simulation game. The questions are related to ERP-Sim’s usefulness and value as a simulation exercise and the functionality of the SAP environment. As Panel A shows, the students had extremely positive reaction after completing the simulation. The majority of the students either agreed or strongly agreed that ERP-Sim enhanced their learning experience (81%), made them more involved in the classroom (76%), enhanced their ability to work in a team (79%), and provided similar decision-making process as the real world (75%). In addition, the students found ERP-Sim easy to use and learn and its functionality logical. Panel B shows that the majority of the students had an overall good experience with the SAP environment. The majority of the students either agreed or strongly agreed that SAP’s functionality is easy and simple, and the operations are intuitive.
Table 2  
Post-Simulation Survey Results

<table>
<thead>
<tr>
<th>Survey Questions</th>
<th>Agree or Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A: Perceptions about ERP-Sim</strong></td>
<td></td>
</tr>
<tr>
<td>ERP-Sim enhanced my learning experience.</td>
<td>81%</td>
</tr>
<tr>
<td>ERP-Sim made me get involved more in the classroom.</td>
<td>76%</td>
</tr>
<tr>
<td>ERP-Sim enhanced my ability to work in a team.</td>
<td>79%</td>
</tr>
<tr>
<td>ERP-Sim provided similar decision-making process as in to real world.</td>
<td>75%</td>
</tr>
<tr>
<td>ERP-Sim is easy to learn and use.</td>
<td>86%</td>
</tr>
<tr>
<td>ERP-Sim functionality is logical.</td>
<td>84%</td>
</tr>
<tr>
<td><strong>Panel B: Perceptions about SAP</strong></td>
<td></td>
</tr>
<tr>
<td>SAP provides easy handling of the procurement process.</td>
<td>67%</td>
</tr>
<tr>
<td>The financial reporting function of SAP is simple to follow.</td>
<td>68%</td>
</tr>
<tr>
<td>SAP provides simple handling of the production process.</td>
<td>64%</td>
</tr>
<tr>
<td>Operational transactions are not intuitive in the SAP system.</td>
<td>23%</td>
</tr>
<tr>
<td>Learning my way through the SAP system was not easy.</td>
<td>21%</td>
</tr>
<tr>
<td>SAP does not provide any value-added functionality.</td>
<td>17%</td>
</tr>
</tbody>
</table>

What do these findings suggest about the administration of simulation game and the SAP ERP system? The results show that students find simulation exercises very useful, giving them an additional learning dimension, and providing them with real world experience. In addition, the students had a positive experience with the SAP environment and the ERP-Sim simulation environment.

**LIMITATIONS AND RECOMMENDATIONS**

This paper provides an overview of the ERP-Sim distribution game. Two potential limitations may exist in this study. First, the students’ survey opinion is based on the distribution game only. The two other simulations were not used yet: the manufacturing game and the logistics game. Therefore, the conclusions drawn based on the students opinion cannot be generalized to all the three simulations from the ERP-Sim. Second, the sample size is relatively low; only twenty-two students participated in the simulation exercise and completed the survey.

In order to gain a complete picture about the usefulness and the pedagogical value of the ERP-Sim, this paper can be extended by analyzing the other two simulations from ERP-Sim, namely the manufacturing game and the logistics game. Furthermore, the students’ opinions would be collected and analyzed on the other simulations as well in order to assess the usefulness and the pedagogical value of the whole family of simulations from ERP-Sim. This is a substantial amount of work that may take several semesters to be completed successfully. In order to minimize the biased sample selection process, it would be optimal to administer the survey to students from different universities after using the ERP-Sim simulations in several different courses. This approach would provide a sample of students with broader educational background and characteristics and the survey results would be more generalizable.
CONCLUSION

The simulation was run during two successive academic semesters of the same course, where the majority of the students had limited exposure to ERP systems in an earlier course. Based on our discussions with the students and their written comments, we can assert the following:

- Students who played the simulation game appear to have better assimilated the ERP concepts and the integration of the business processes.
- Students were able to analyze the financial statements, interpret the ratios, and link them to their strategic choices.
- The simulation approach was more engaging and allowed the students to work closely with each other by using a team approach.
- The simulation provided the students an opportunity to run a business and make decisions affecting their company’s profitability and position in the market.

Overall, the results suggest that the simulation approach can be an effective pedagogical tool for teaching financial statements analysis. This simulation provided the students a “real company” to run and make strategic choices. Further, students were able to analyze and assess the impact of each of their strategic choices on the company’s financial statements and profitability.

There were also other related benefits from using the simulation based approach. Students were far more engaged in dealing with financial topics since their decisions directly impacted the health of their company. There was intense competition among teams to earn the highest profit in any given quarter. Ongoing ERP reports could be monitored to make corrections as the quarter progressed. Learning from mistakes and making adjustments was the key to improving financial performance. Students really saw the impact of their choices reflected in the balance sheet. This tied the financial theory students have learned to actual practice and demonstrated the importance of informed decision making based on ERP reporting.

Understanding the linkages between different business processes and knowing how they interact with each other is a primary skill required by managers. By exposing students to this type of decision making, instructors can give their students additional insight into the intricacies involved in running a business, which goes far beyond any one functional area.

Therefore, although limited in scope, this research demonstrates that pedagogically, there is a place for business simulations such as ERP Sim in the classroom. Simulations can be an effective means for both engaging students and driving home financial theory and practice.

REFERENCES


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JAGUAR CAMP…MAKING A DIFFERENCE FOR AT-RISK STUDENTS IN A COMMUNITY SETTING THROUGH GRADUATE EXPERIENTIAL LEARNING PROGRAMS

Mishaleen Allen
Shelley Harris
Texas A&M University–San Antonio

ABSTRACT

Developing and refining strategies for effectively working with at-risk students are essential skills for general and special education teachers in diverse classrooms. Through a multiagency collaborative experiential learning program, faculty and graduate students provided an academic enrichment camp for at-risk, underserved, low-income students on the West Side of San Antonio. The program that was designed and developed by university professors to teach pre-service teachers how to differentiate instruction, work in small groups and create successful learning opportunities for at-risk students and English language learners is called Jaguar Camp. This paper discusses the theoretical framework behind the experiential program as well as preparation for the summer Jaguar Camp and its benefits to both the graduate students and community. Information gleaned from this article will benefit existing teacher preparation programs interested in implementing experiential learning opportunities as well as those communities who are searching for such academic assistance.

Keywords: Experiential learning, educator preparation, collaboration, at-risk students, academic enrichment

INTRODUCTION

Many students today are struggling in school. At-risk students are those who might not be on grade level, fail at standardized tests, have limited English proficiency or come from a low income home thus resulting in a greater chance of not being successful and dropping out of school. The recent National Center for Educational Statistics (2012) Condition of Education report showed that since the early 1900’s, the Hispanic-White achievement gap for public school students has not narrowed for fourth- or eighth-graders on the NAEP in either reading or mathematics, nationally and for almost every state. Oftentimes, these students just need the individual attention where s/he can receive a one-on-one or small group multimodal instructional strategy on the concepts in order to comprehend the concepts and have a successful learning experience. Unfortunately, this is not prevalent in many classrooms today as novice and beginning teachers report struggling to work with at-risk and English language learners (ELL) due to gaps in their preparation programs (Chesley & Jordan, 2012; Cuddapha & Burtin, 2012). As university professors, it is our charge to not only enforce the notion that teaching is individualized and personal, but to model these behaviors so that pre-service teachers are able to experience personally how to effectively teach struggling students. One such program that was designed and developed by university professors to teach pre-service teachers how to differentiate instruction, work in small groups and create successful learning opportunities for at-
risk students is called Jaguar Camp. This paper discusses the theoretical framework behind the experiential program as well as preparation for each summer Jaguar Camp and its benefits to both the students and community.

**LITERATURE REVIEW**

Effective teaching practices are those strategies and models that are research-based and proven to positively affect student outcomes. As professors, it is tantamount to model these behaviors so that the students will not only learn the content and strategies, but also apply the content and strategies to their students. One concept that mirrors effective teaching is reflective teaching (Lupinski, et al, 2012). Preparing and conducting lessons are only as effective as the one who delivers it. Therefore, thinking about what worked, what did not work, and what can be done differently next time, are key components in reflecting on one’s teaching. Based on the works of John Dewey from the 1920’s and 1930’s, reflective teaching provides the educator an avenue through which to “…collect data about teaching, examine their attitudes, beliefs, assumptions and teaching practices, and use the information obtained as a basis for critical reflection about teaching” (Quing, 2009, 36).

Research supports that reflection can take on a variety of forms including peer/faculty observation, written accounts of experiences, self-reports, teachers’ diaries, recording lessons, and reflective inquiry groups (Farrell, 2011; Qing, 2009). Reflective teaching is not limited to an in-class situation rather, reflection occurs in all aspects of teaching: planning, instruction, assessment, communication, and management. Being able to understand instructional decisions is a fundamental piece in effective teaching.

Another key component to effective teaching is Experiential Learning. Experiential learning is the notion that learning can be developed through personal interaction (Kolb, 1984). This is where the concept of theory to practice derives from. Kolb and Yeganeh (2011) contend that there are four processes within the Experiential Learning Cycle, including concrete experiences, reflective observation, abstract conceptualization, and active experimentation (Figure 1; 4). While traditional classrooms might use the cognitive approach to deliver necessary information, an experiential learning opportunity takes the classroom out into the field, using hands-on techniques and real world experiences making theories applicable. Thompson (2008) affirms that experiential learning is adaptable for individual style, preferences, strengths, directions, etc. As such, it is more likely than conventional prescribed training or teaching to produce positive emotional effects, notably confidence, self-esteem, and a sense of personal value and purpose.

Many examples of experiential learning include learning a physical activity, games and exercises, drama and role-play, authentic assessment activities, teaching others, and sharing hobbies (Hickcox, 2002). Implementing these strategies in the classroom is the foundation of experiential learning for they expose students to the connection of practice as well as the foundational theories of how individuals learn best and experience success. Additionally, through faculty serving as role models and facilitating reflective practice on the experiential learning activities graduate students further develop the individual self-reflection skill sets necessary for effectively teaching at-risk students.
Purposefully taking the classroom outside is the basis of experiential learning. Many would argue that you learn the most while in the field or on the job. This is what experiential learning does: it allows students to get a guided, hands-on approach to help prepare them for their own classroom. Ingersoll (2001) states that teachers attrition rate is mostly due to lack of preparation. The classroom can fulfill the knowledge and content requirement to learning but the actual experience of teaching can connect the concepts learned to authentic situations. Using this model to better prepare students and contributing to the community by working with struggling students is a recipe for success.

DEMOGRAPHICS

The population that encompasses the one-square mile that American Sunrise represents is considered low socio-economic and academically/educationally at-risk. School district data for the area show that 92% of the students attending high school are identified as economically disadvantaged (Texas Education Agency, 2012). This means that students living in this area have a greater risk of being unsuccessful at school and potentially dropping out, as compared to other areas of the city. Therefore, it is imperative that these students become successful in school so that they will be successful as working adults. American Sunrise was created to help and support the community and make it successful. The mission started with the children, and has now reached out to both early childhood kids and adults to help them learn basic skills, the English language, and how to communicate effectively in today’s society through the use of technology.

As a non-profit organization, American Sunrise must raise the money each year to stay in operation. Grants are provided by local, state, and national organizations who believe in what American Sunrise has to offer. Additionally, the professors have contributed to the foundation by writing and receiving grants for camp expenses as well as continued academic support through
technology-based learning programs. This venture is a work in progress but continues to flourish each year through the hard work of many individuals.

EXPERIENTIAL LEARNING PROGRAM

The preparation for the summer Jaguar Camp begins almost as soon as the previous camp ends. The early stage of creating a Jaguar Camp was mainly getting the proper approvals by both interested parties. Professors had to make sure courses aligned with the vision of the camp, from both the university’s position on course integrity in conjunction with American Sunrise’s vision of bringing increased rigor to a limited, academic-rich environment for after school and summer programming at the Learning Center. Meetings were held with professors, potential students, leaders of American Sunrise, and their constituents. The idea of bringing graduate students to American Sunrise Learning Center (ASLC) was a win-win situation: graduate students would learn first-hand the most effective teaching strategies for working with at-risk ELLs and use them with a small group of students; and the campers would be able to experience an individualized approach to learning to improve upon their knowledge and skillsets in a summer camp atmosphere.

Annually, the ASLC Executive Director submits a letter of commitment and willingness to host the Jaguar Camp in early Fall to the TAMU-SA school head of Education and Kinesiology in preparation for the upcoming summer’s camp. This collaborative partnership between a non-profit community agency and university has occurred since the first camp in 2010 and continued each summer as we prepare for the 4th TAMU-SA Jaguar Camp at ASLC. ASLC provides the facility for the graduate course delivery, camp, snack/lunch support, and student population while TAMU-SA provides the graduate students to teach the morning/afternoon sessions for the 3 week Jaguar Camp. The event is also highlighted each Fall semester at the American Sunrise Gala event where video and pictures are shown of student activities and the “Jaguar Camp Teachers and Faculty” as well as TAMU-SA administration are recognized for their contribution to the community. Additional information regarding the collaborative partnership and videos can be seen at the American Sunrise SA YouTube website (http://www.youtube.com/watch?v=P7GSfW_HUxU) as well as the university website (http://www.tamusa.tamus.edu/universitycommunications/newsletters/summer-2011/jaguar-camp.html).

Program Design

Preparation for the Jaguar Camp continues to occur as it is an ever-changing system. With increased input from the leaders of American Sunrise and prior camp experience, professors were able to design a summer program that not only focuses on teaching strategies, but includes authentic learning opportunities within the community it serves. This focal point now drives the camp to where it is today.

In order to prepare for the Jaguar Camp, the professors work closely to first determine which courses would “fit” for the camp and include an experiential component to them. This includes analyzing the current data of student enrollment, where students are in their respective programs, as well as appropriate graduate courses for this type of intense setting. Two courses are selected from two different programs (i.e. Education, Special Education, and/or Reading). Once determined, the courses are then unpacked to look at content, book selection, and
assignments, and how it would “look” in a five week, on-site setting with an experiential learning component.

Adjusting to meet the needs of the community as well as the graduate students the five week program allows for Intensive Graduate Course Delivery during weeks 1 (preparatory) and 5 (reflective) and Combined Graduate Course Delivery with Structured Experiential Learning Activity with K-12 Students (graduate courses = 1 hour per class/2 hours per day; experiential learning = 1.5 hours per class/3 hours per day) during Weeks 2, 3 and 4 (see Appendix A for sample graduate student schedule). A key element of the camp has become the “Working Lunch” between the morning and afternoon sessions with campers where graduate students and faculty view picture/video slideshows from the morning sessions and reflect on what is working and what is not while sharing lunch. This time allows for immediate reflection and feedback during the teaching cycle for adjustments within the experiential learning activities, increasing the overall process impact on graduate student development.

Program Recruitment

After the courses are selected, the task of Jaguar Teacher recruitment begins. Emails, personal conversations, advising, and previous Camp graduate students spread the word about the upcoming Camp and look for potential recruits. Additionally, in-class discussions and video presentations are held in order to pique the interest of potential participants. An application process was implemented for years 3 and 4 to look at those interested in Jaguar Camp and select the best suited for this experience. The application consists of questions about their program, GPA, goals, flexibility and time commitment for the entire Camp as well as a written essay on why they think they would be a good fit for the Camp. Once applications are received, the professors conducting the Camp review them and collaborative decisions are made quickly in order to prepare for the upcoming Camp (See Appendix B).

Camper recruitment consists of faculty and administration attending an ASLC parent meeting at the end of the Spring K-12 school semester where programing is reviewed and presentations made for upcoming events. ASLC maintains all parental permissions and insurance documentation since the Jaguar Camp is part of their summer academic enrichment program. At the parent meeting a video/slide show is presented as well as a student calendar and informational brochure disseminated to the parents in both English and Spanish to accommodate cultural needs within the ASLC community (See Appendix C).

Course Design

Since two content classes are covered, the delivery of the material is paramount in order to not compromise the integrity of the courses. Multifaceted lesson plans designed collaboratively by the professors include the content of each course, connect theory to practice, assess the learning, and reflect on the teaching, all while creating a fun, high energy authentic environment. Graduate students are assigned a small group of students for the morning sessions focusing on Literacy development and enrichment, providing similar activities experienced during tiered level interventions for students in the K-12 classroom. During the afternoon the graduate students are paired in a co-teach arrangement where they develop math/science hands on units which can be tailored for the lower elementary, upper elementary, and secondary levels.
to larger groups of students. This format allows graduate students to step out of their “comfort zone” and teach a variety of student ages in a supportive co-teach environment.

Camp lessons and activities are designed with engaging opportunities for both content delivery and team work. Each day, students arrive at the Camp to discuss assessment of content literacy skills, differentiated instruction or student management techniques as well as participate in a group teambuilding activity. Using these two deliveries engages students, creates meaning for their content as well as establishing a safe learning environment. The campers, then, experience the same types of techniques in order to have a positive learning experience coupled with feeling safe and valued by their group leader. This rapport brings students to the camp and keeps them coming back to the camp year after year.

Integrated Technology and Pilot Study Results

A key component to the camp and academic enrichment program is the integration of scientifically research based technology proven to effectively increase reading and math skills for at-risk learners. The leaders of American Sunrise were fortunate to receive several computers for their facility from LULAC creating a computer lab experience. The professors wrote pilot grants to secure online, academic rich learning programs in reading and math. These ongoing programs not only make a connection to the students by using technology, but diagnoses and remediates their challenges in the areas of fluency, comprehension, and math skills. American Sunrise continues to use these programs throughout the year so that students will have a chance to reach grade level and be successful in school. Data from the pilot programs indicate that a significant gain in student knowledge was achieved.

During Jaguar Camp 2010, 36 ASLC students participated in the summer enrichment program with 15 graduate students in the experiential learning program and in 2011 there were 43 ASLC students and 13 graduate students. During year 2 Jaguar Camp (June 2011), 41 participating ASLC students began using the Reading Plus! software under the supervision of TAMU-SA 10 graduate students and faculty.

In July 2011 ASLC hired a retired certified teacher to facilitate student use of the online programs and individualized small group interventions during the remainder of the summer and school year programs. During Fall 2011 Lexia was added to address literacy needs of lower elementary age students followed by Ascend Math for all students in November. The following information provides a brief synopsis of each program’s purpose and data collected during the pilot grant phase documenting effective intervention and student success through December 2011. A current TAMU-SA IRB is on file providing permission for data results publication.

Reading Plus! (June 2011–January 2012)

Program Purpose – Reading Plus! provides intensive visual skill and literacy development for increased fluency and silent reading, comprehension, vocabulary and overall reading proficiency. Through varied individualized programming, students increase vocabulary and reading rate simultaneously while raising overall comprehension levels on silent reading processes. A proven, established research-based innovation, Reading Plus! integrates technology and implementation strategies for upper elementary through post-secondary level students to improve and increase reading skills necessary for personal, academic, and real-world success. The initial Reading Placement Assessment identifies independent reading rate levels placing
students in individualized programming to increase visual perception skill building while reading, independent reading rate, vocabulary level, and comprehension.

Pilot Data Results – Thirty seven students participated in Reading Plus! reading between 451-49,097 words during the pilot period. The following information details student growth in reading rates (independent and guided reading fluency skills) and overall reading level gains (comprehension skills).

Initial Reading Rates showed 73% (27 students) below norm, 16% (6 students) at norm, and 11% (4 students above norm). December 2011 data shows that in terms of Current Independent Rate (sustained independent silent reading) 62% (23 students) below norm, 11% (4 students) at norm, and 27% (10 students) above norm with an Average Independent Rate Gain of 13%. In terms of Current Guided Rate (sustained guided silent reading) data shows 38% (14 students) below norm, 16% (6 students) at norm, and 46% (17 students) above norm with an Average Guided Rate Gain of 25%.

In regards to overall reading comprehension improvement 24 of the 37 students increased from 1-7 reading levels during the pilot period with an Average Reading Level Gain of 2.6. It is important to note that initial reading placement of all students showed 1 student reading at or above level (3%), 5 students reading below 1 level (14%), 3 students reading below 2 levels (8%), and 28 students reading below 3-5+ levels (75%). December 2011 data shows 5 students reading at or above level (14%), 6 students reading below 1 level (16%), 5 students reading below 2 levels (14%), and 21 students reading below 3-5+ levels (57%) with an Average Level Gain of .9.

[NOTE: The above Reading Plus! data includes some elementary students who have now been moved to Lexia to address early literacy development skill needs as well as 12 secondary students who have accessed the intervention program at least once since the Summer Camp in June 2011. Collaboration between ASLC and KIPP academy is ongoing to develop a system through which the intervention programs can be integrated into the extended day schedule for secondary students who come to ASLC 1day/week during the school year.]

Lexia Learning (October 2011-January 2012)

Program Purpose - Lexia provides explicit, systematic, and structured practice on the essential reading skills of phonemic awareness, phonics, fluency, vocabulary, and comprehension. The online program provides three levels of support targeting specific Early Reading Levels support literacy development for ages 3-5, Primary Reading Levels support language development for lower elementary ages, and accelerated reading skill development for grades 4-12. Norm referenced to state standards, Lexia meets the scientifically-research based expectations for effective intervention programming and has been shown to significantly increase literacy skill development for English Language Learners of all ages.

Pilot Data Results - Of the 14 students on the Early and Primary reading levels 4 students have mastered 3 skill levels and 7 students have mastered at least 1 skill level. After the initial assessment 5 of the 14 students in grades K-2 were placed at the Early Reading Level 2 (Beginning Kindergarten) and December 2011 data shows 1 student has progressed to Primary Reading Level 3 (Mid 1st), 2 students have moved to Primary Reading Level 2 (Beginning 1st), 1 has progressed to Primary Reading Level 1 (Mid Kindergarten).
Ascend Math (November 2011-January 2012)

Program Purpose – Ascend Math provides individualized study plans for students to remediate skill gaps and building math skills necessary for academic success. With pre/post assessments for each level, the online program develops individualized study plans for each student through a variety of audio/video instruction as well as targeted skill practice to increase individual skill mastery.

Pilot Data Results - Of the 34 students enrolled in November and December 2011, two students have mastered 3 skill levels, five students have mastered 2 skill levels, and twelve students have mastered at least 1 skill level within their individualized study plans. In the last 6 weeks of the semester (some attending 1 day/week) nineteen students mastered one or more skill levels in their study plans.

NOTE: After the completion of the pilot grants professors continued to work with ASLC administration and staff through grant writing and presentations to attain funding for the academic enrichment program Spring 2012-Fall 2012. As such, during Jaguar Camp 2012, 41 ASLC students participated in the summer enrichment program with 7 graduate students in the experiential learning program focusing on hands on literacy, math/science, and social studies activities creating the “Jaguar City” and Inaugural Readers Theater. Full funding for the technology programs was attained Fall 2012 and ASLC resumed integrating the technology based academic enrichment program during the after school program with a certified teacher. Jaguar Camp 2013 will fully integrate the literacy and math technology into the camp schedule with students completing two sessions of math and two sessions of reading each week. Additionally, faculty will continue to work with ASLC staff to track and analyze student progress in each area through the use of individual student portfolios developed by the Jaguar Camp Teachers and maintained by staff throughout the year.

RECOMMENDATIONS AND LIMITATIONS

Each camp offers new and intriguing questions on teaching strategies and effective programs. Since the summer camps vary immensely, from the campers, administration, potential faculty members, and funding, it is almost impossible to decipher which research angle to approach. However, consistently, the demographics of the students remain the same. Academic correlations between the camp and school year, progress within the camp, as well as year-long online learning can gauge camper and program success. Additionally, looking deeper into the impact of the program on ELLs compared to other programs is also a consideration. Therefore, it is the recommendation of the researchers for future camps to continue to focus on meeting the needs of the at-risk students, learning how to best serve them and reach their full potential.

The only limitation of this study is that it is a small sample size, usually consisting of about 50 campers each summer. It is fortunate that many campers do return each summer, but there is a significant number that do not. Tracking the same students to determine short or long term growth on a consistent basis is a challenge. Using a small sample size may not seem significant, but looking at the camp in a longitudinal manner with its growing demographics speaks to many communities nationally as well as globally and offers potential solutions for reaching the needs of low income, at-risk communities.
CONCLUSION

Dating back to a pragmatic approach to learning, the progressive education movement initiated by John Dewey in the 1920s and 1930s gave rise to experiential learning programs throughout the latter two-thirds of the twentieth century. Past and current research by Kolb on Experiential Learning Theory (1984) is solid in the positive benefits for teacher and student success. Experiential learning programs, courses, and tasks create new opportunities for faculty and students to interact. Faculty roles may include one-on-one consulting, visits to off-campus sites to observe student work, and reflective inquiry small groups. In addition to discipline content, dialogue with students regarding their reactions to the experience, student anxiety over learning in new ways, doubts about their competency to do well, and other personal concerns provide multiple opportunities for faculty to role model effective teaching through reflective practice.

Due to low retention rates and increased licensure requirements, teacher preparation students are not as successful or prepared for the classroom using a traditional model approach. The current structure isn’t fair to new teachers, nor is it fair to the students they teach. No educator should have to face a roomful of students without the knowledge and skills to engage them and support their success. Revamping teacher preparation and licensure will be difficult, but state policy makers must take on the challenge if they are serious about building an effective system ensuring that teachers can be successful within their certification areas and prepared to teach the diverse learners who walk into their classrooms. Through the experiential learning program and continued support of the Jaguar Camp by TAMU-SA administration, faculty and students are able to give back to the community in which they work and serve providing at-risk, underserved economically disadvantaged students an intensive, fun academic enrichment summer camp. Additionally, through faculty serving as role models and facilitating reflective practice on the experiential learning activities graduate students further develop their individual self-reflection skill sets necessary for successfully teaching at-risk and ELLs while refining effective teaching skills.

REFERENCES


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**Mishaleen Allen** (Ph.D, Texas Woman’s University) has been an Assistant Professor at Texas A&M University-San Antonio since 2009 and provides pro bono consultation and grant writing for the ASLC academic enrichment program and was the recipient/primary investigator for the 2011 San Antonio Area Foundation Fund $5000 grant for Jaguar Camp. She teaches undergraduate and graduate courses for teacher preparation, educational diagnostician, and specialized Masters of Education in Special Education. Areas of research and specialization include assessment, program development/evaluation, integrated technology for UDL, and experiential learning.

**Shelley Harris** (Ph.D, University of North Texas) has been an Assistant Professor at Texas A&M University-San Antonio since 2008. She teaches undergraduate and graduate courses in learning theory, instructional strategies and methodology. As a professional in the education community, her teaching experience includes working as an elementary, middle and secondary education teacher. In addition to teaching and research, she offers a Jaguar Camp each summer for graduate students hosted at American Sunrise Learning Center. Her areas of research and specialization include multimodal teaching, experiential learning, affective teaching, and effective instructional models.
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<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
</tr>
<tr>
<td>Week 2</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
</tr>
<tr>
<td>(June 11-14)</td>
<td>(2 hr class instruction)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
</tr>
<tr>
<td>Week 3</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
</tr>
<tr>
<td>(June 18-21)</td>
<td>(2 hr class instruction)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
</tr>
<tr>
<td>Week 4</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
</tr>
<tr>
<td>(June 25-29)</td>
<td>(2 hr class instruction)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
</tr>
<tr>
<td>Week 5</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
</tr>
<tr>
<td>(July 2-5)</td>
<td>(2 hr class instruction)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
</tr>
<tr>
<td>Week 6</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
<td>EDED 55667, 9:30-11:30</td>
</tr>
<tr>
<td>(July 9-13)</td>
<td>(2 hr class instruction)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
<td>(1 hr class instruction, 1.5 hour w/ students/class)</td>
</tr>
</tbody>
</table>

NOTES:
- **JAGUAR CAMP 2012 (FACULTY/GRADEATE STUDENT CALENDAR)
- **SUMMER BEGINS**
APPENDIX B: GRADUATE STUDENT APPLICATION

2012 Jaguar Camp
(Graduate Experiential Learning Application: Deadline MAY 3, 2012)

Student Name: _________________________ Cell Phone: _________________________
K#: __________________________________ Anticipated Graduation Date: ___________

Check one of the following:
☐ Master of Science in Reading Candidate
☐ Master of Arts in Bilingual Candidate
☐ Master of Education in Early Childhood Candidate
☐ Master of Education in Special Education Candidate
☐ GTPC Candidate (certification area _________________________)

COMPLETED Graduate Level Hours – Circle ALL completed courses:
☐ Master of Science in Reading Candidate - EDRG 5372, 5373, 5376, 5332, 5348, 5314
☐ Master of Arts in Bilingual Candidate – EDBL 5320, 5338, 5358, 5367, 5377, 5386, 5387
☐ Master of Education in Early Childhood Candidate – EDEC 5335, 5316, 5318, 5359, 5333, 5369, 5351, 5349
☐ Master of Education in Special Education Candidate – EDSE 5360, 5313, 5362, 5365, 5373, 5361, 5364
☐ ACP Candidate - EDED 5304, EDED 5307, EDED 5310, EDED 5363/5364, EDSE 5360 and/or those above

Jaguar Camp Application: This is considered to be a capstone learning experience opportunity for students at or near the end of their graduate program. Attach a one page essay describing how Jaguar Camp will expand your knowledge in working with at-risk student populations and benefit your overall development as a lifelong learner and professional educator. Completed application should be signed below by student and submitted to Dr. Allen, Jaguar Camp Director by MAY 3, 2012. Participating faculty and the Department Chair will review applications and select candidates for the program based on qualifications and essay responses. A maximum of 12 graduate students will be selected for the 2012 Jaguar Camp Cohort.

STUDENT AGREEMENT: (Review and Check the following for agreement.)
☐ I understand that I will need to meet all specified times on the attached schedule for the experiential learning program. This means I must be committed to attend every day and must take both classes to participate in the program.
☐ I understand that enrollment in the 2012 Jaguar Camp constitutes a full course load for Summer I. [EDED 5366/5367 Instructional Strategies and EDSE 5323 Curriculum Adaptations for Exceptional Bilingual Students]
☐ I understand that EDSE 5323 & EDED 5366/5367 may be used as support classes on my master’s degree plan if they are not listed as a required course or in lieu of the graduate research project for the Non-thesis graduation plan.

Student Signature   (date)

Director/Faculty Signature   (date)

Department Chair Signature   (date)

NOTE:
Acceptance into this Jaguar Camp is contingent on faculty approval.
Graduate students will be enrolled in 2 courses – total of 6 hours.
Students will not be able to take any other graduate courses in the selected summer session except one (1) Summer 3 evening course.
Students must be able to meet with faculty and American Sunrise for information sessions in the semester prior to the camp and adhere to the following camp calendar.
APPENDIX C: INFORMATIONAL BROCHURE
(Provided in English and Spanish)

This three-week Summer Academic Enrichment Camp is designed to help students develop their reading/writing and math/science skills to their maximum potential in a hands-on learning environment. American Sunrise partners with Texas A&M University and San Antonio graduate faculty to engage students for a fun three-week Academic Enrichment camp focusing on college and school readiness and cultural acceptance skills.
THE CYBER CAFÉ  
BRINGING DIGITAL INNOVATION TO ACADAME

Dennis Elam  
Leonard Love  
Texas A&M University–San Antonio

ABSTRACT

This paper addresses the 2013 SWTLC Conference Theme of Classroom Innovations: Making a Pedagogical Shift in Teaching and Learning. Three innovations are developed through original writing and research. First an examination is made of weblogs to extend the classroom to a 24/7 experience. Second, use of YouTube© to create a Cyber Café for Student Organizations as an extension of the traditional student club is explored. Third, the tablet explosion brings new tools like Doceri which can be used to demonstrate problem solutions either on-line or in real time format.

Keywords: Flipping classroom, higher education, paradigm, cyber, weblog, MOOC, video

INTRODUCTION

“When a paradigm shifts, everyone goes back to zero.”  
- Joel Barker, Paradigms: The Business of Discovering the Future

It is widely recognized that higher education is currently facing several paradigm shifts (Fritz, 2012; Rodgers, 2000). Public universities in the U.S. face declining public funding, increasing student debt loads, and more global competition. But there is probably no greater paradigm shift facing institutions of higher education than that presented by technological innovation (Allen & Seaman, 2010; Rodgers, 2000). Advances in informational and educational technologies offer traditional universities both a large number of challenges, but also many opportunities. Just as the technological advances made possible by the internet displaced and ultimately destroyed market leaders such as Borders Books (Sidhu, 2011; Frazier, 2011), many predict a similar fate for established universities. It is important, however, to recognize that although Borders (and others) succumbed to the new competition that resulted from technological innovations, other market leaders such as Barnes & Noble and Wal-Mart have adapted and continue to prosper by taking advantage of the new opportunities offered by these technologies. Higher education now faces a similar set of challenges brought about by many of the same technologies that created Amazon and destroyed Borders Books. Much like successful organizations who found that they needed to add web-based selling to previously successful business models, established universities can improve their ability to deliver knowledge by adapting new technologies to the many proven strengths they already possess. We argue, therefore, that the future will belong to those higher education institutions that take advantage of those opportunities, and discuss the potential benefits of four important new opportunities for universities.
LITERATURE REVIEW

While many educators are now using technology to “flip” the classroom (Anonymous, 2011), a growing number of innovative entrepreneurs are “flipping” the entire university (Orgill & Hervey, 2011; Noer, 2012; Stengel, 2012). Instructors who flip the classroom use technology to replace traditional lectures with videos and other online activities, while flipping the university sometimes means doing away with the classroom entirely (Orgill & Hervey, 2011; Stengel, 2012). In fact, the largest university in the world – in terms of student enrollment – is now a private, not-for-profit, online university, named Khan Academy (Noer, 2012). Moreover, students are increasingly demonstrating a preference for online educational delivery systems, versus the traditional classroom and in-person lecture. Professor Sebastian Thrun, founder of Udacity – an online school of science, engineering, and entrepreneurship – began offering online classes, while remaining a tenured faculty member at Stanford University (Anders, 2012; Kessler, 2012). While the online classes were popular with students, he was surprised to find that his online students actually performed better on his examinations than the students in his traditional lecture-format classes, although all students took exactly the same examination (Anders, 2012; Kessler, 2012).

Even for traditional universities that are not quite convinced that virtual classrooms should replace lecture halls, there are ways to use developing technologies to facilitate and enhance the educational experience for students. We suggest that, by utilizing new technologies and thinking innovatively about what we do in higher educational institutions, we can build on inherent strengths that newer competitors, such as Massive Open Online Courses (MOOCs) and for-profit universities cannot match. We offer four approaches for traditional colleges and universities to utilize new technologies to better serve students and better achieve institutional missions. These suggestions include (1) video lectures, which are already popular with students and currently employed by MOOCs, (2) Weblogs, which are already widely written and read by students, (3) the creation of “Cyber Cafes” that use technology to create virtual classroom and student meetings, and (4) Doceri, which creates a virtual chalkboard for the electronic classroom. In the sections that follow, we discuss paradigm shifts in higher education, including the growing popularity and advantages of professor weblogs, using technology to create cyber connectivity in student organizations, and finally, making the case for the use of these new technologies to enhance the classroom experience for both real-time, in-class, and virtual students.

Video Lectures

The current college cohort has been termed the “Millennial” generation (Strauss & Howe, 1991), and is a generation born between 1982 and 2000, that has almost literally “grown up digital” (Tapscott, 2009). They have never known a world without the internet or net-based personal communication devices. As a consequence, this most-recent generation is very connected electronically, sending and receiving dozens of messages, and posting nearly everything that happens to themselves online (Erickson, 2008; Stein, 2013). They are accustomed to a world where it is possible to shop or participate in online activities at any time or in any place. They have been described as having an “always-open mindset” (Papp, 2010).

Members of the millennial-generation create online content on a regular basis and consume online content on a continual basis (Erickson, 2008; Stein, 2013). Their attitude often seems to be that if something matters, it will be online. Conversely, if it’s not online, then it
doesn’t matter (Stein, 2013). When surveyed, researchers have found that students overwhelmingly prefer more use of technology by educational institutions, and that this preference appears to be increasing (Buzzard, Crittendon, & McCarty, 2011; McCorkle, Alexander, & Reardon, 2001). This puts a great deal of pressure on educational institutions to make educational content both more accessible and more relevant (Stein, 2013) by making content available online. Well-known, established universities, such as Texas A&M, Ohio State, James Madison University, and Hong Kong Polytechnic have responded by creating virtual universities using a 3-D virtual community, called Second Life (Papp, 2010). Here, students see a virtual representation of the physical campus, with virtual replications of physical classrooms, where students are taught by a professor, represented by an avatar, and where students create their own avatar, who attends the virtual class. Still more universities use “college fairs” in Second Life as a recruiting tool.

One area where traditional higher educational institutions excel over both for-profit universities (and to a lesser degree MOOCs) is that the professors at traditional schools not only disseminate knowledge (by teaching), they also create new knowledge (through research). The problem is that it can be difficult for that knowledge to reach its intended audience (i.e. students and/or the professional community). Because research is generally distributed through academic journals, and then only later translated to textbooks and only occasionally to the popular media outlets, it can be a lengthy process for this new knowledge to reach an audience beyond academia.’ The exception is when the researcher presents their research directly to students in their classroom. What if it was possible for the researcher to quickly reach a wider audience and thereby disseminate new knowledge?

Since traditional universities have this advantage, why not use technology to build on this advantage? One easy way to do this is through the creation of recorded lectures that can be distributed through existing online video outlets such as YouTube. Students (and indeed most everyone who has access to a computer) are already enthusiastic online video consumers, which is a primary reason for the popularity of MOOCs. Moreover, most professors are experienced presenters and eager to profess their area of expertise and their own personal research. Placing their lectures and presentations online in a video format is not any more challenging than a conference presentation or a classroom lecture, but can reach a much wider audience.

WEBLOGS PROVIDE A 24/7 REAL WORLD EXPERIENCE

Not long ago it was thought that professors would maintain their own web pages. Indeed some do and there are templates for creating a web page. But the creation and maintenance of web pages can be time-consuming and may be beyond the technical capabilities of some faculty. Today, an alternative has emerged which makes original writing for the internet easier than creating websites. A weblog may be defined as follows: “a weblog, sometimes written as web log or blog, is a web site that consists of a series of entries arranged in reverse chronological order, often updated frequently with new information about particular topics. The information can be written by the site owner, gleaned from other Web sites or other sources, or contributed by users.” (Rouse, 2013). Faculty weblogs provide an ideal opportunity for the faculty to disseminate knowledge quickly and widely, thereby increasing the emphasis on professing as professors. Deceivingly

Blogging is becoming ever more popular as time passes. Nielsen McKinsey tracked over 181 million blogs around the world by the end of 2011, up from 36 million in 2006 (Nielsen).
Nielsen goes on to note that a majority of bloggers are women with half in the 18 – 34 age range. Seven out of ten bloggers have attended college and the majority hold degrees. Moreover, business is adopting the use of blogging. Corporations, and even many individual CEOs have found it worthwhile to maintain blogs to influence stakeholders (Kaplan, Pisken, & Bol, 2010; Wyld, 2008). Marketers use blogging to generate “buzz” around products and services, and organizations sometimes find blogging to be an efficient way to communicate with employees.

Blogging is also becoming more popular in Higher Education Circles. An article from Inside Higher ED suggests using weblogs to share research interests and ask for feedback (Silva, 2013). Such a large number of accounting professors now maintain blogs that Masters of Accounting has recognized the Top 50 Accounting Blogs in America. One of the authors of this article (name withheld to protect anonymity) garnered an award from Future Advisor in the Unbiased Personal Blog category. Moreover, students may be more likely to read instructor blogs than instructor e-mails, not only because they are more used to reading blogs, but also because blogs are less likely to get caught in spam filters or accidently deleted (Froomkin, 2006). Because blogs are more in the form of a conversation than traditional academic articles (Froomkin, 2006), their use in education may be more Socratic than most of the currently used forms of communication between instructors and students.

It has been the observation of one of this article’s authors that students lack contextual understanding of cognitively complex subjects, such as accounting. The concept of equity versus retained earnings, for example, frequently causes difficulty. This professor’s weblog was initiated in September, 2006 (Citation withheld to protect author anonymity). The weblog features links to articles on topics under study in class. For example, the recent battle for control of Dell has offered a rich discussion across many sites of equity issues as well as voting control (Sorkin, 2013). The first blog has proven so popular, that a second, more general weblog was initiated in March, 2009.

A classroom weblog can serve a variety of functions. It can be a bulletin board for announcements to both current and former students. This distinguishes it from Blackboard or other class management technologies which are only available to those enrolled in class. Since photos can be displayed it also serves as a sort of scrapbook of what happened during the semester for the class and various school events. As with the Dell example, it provides an up to the minute information link on things that are happening right now. In this fashion the weblog keeps the class current in a way that no previously printed textbook can. Links can be displayed on sidebars to take students to other sites of interest. The author’s blogs have linked to international newspapers, business sites, and other accounting blogs. Graphic displays can be utilized to demonstrate trends in stock prices or business developments. A blog site will be used to display a College of Business On Line newsletter for our school.

Better yet, the students can respond via mobile devices that access the internet. To date students have posted some 2,576 comments. The weblog provides overview statistics. Table 1 demonstrates the number of posts and viewer activity for the two blogs, the original professor blog and the more general blog over the business environment. The bottom line, pageviews over the last 120 days, demonstrates just how much activity even a modest weblog can generate.
Table 1
Weblog Statistics for One Accounting Professor

<table>
<thead>
<tr>
<th>Item</th>
<th>Original Professor Weblog</th>
<th>New (Broader) Weblog</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pageviews</td>
<td>94,922</td>
<td>80,292</td>
</tr>
<tr>
<td>Pageviews/Day</td>
<td>39.14</td>
<td>36.46</td>
</tr>
<tr>
<td>Total Posts</td>
<td>3068</td>
<td>1,069</td>
</tr>
<tr>
<td>Total Comments</td>
<td>2,576</td>
<td>343</td>
</tr>
<tr>
<td>Pageviews Last 120 Days</td>
<td>6,005</td>
<td>19,196</td>
</tr>
</tbody>
</table>

Links can be provided to Facebook, Linked In and other social media. In addition there are widgets that provide additional tracking information. Revolver Maps 2.0 features a globe which displays the location of viewers around the world. It also features a list of locations for readers.

As you can see from these tables, weblogs have allowed a single accounting professor to reach thousands of readers interested in the topics discussed and eager to learn more. Additionally, these blogs reach readers in dozens of states and seventeen different countries far beyond the borders of the United States, where he and his school are located. While classroom students are often passive and sometimes disengaged, the readers of these blogs become actively engaged in the conversation. In other words, blogs may be a way to reach more students with greater potential educational impact.

Table 2
Individual Weblog Visits by Country

<table>
<thead>
<tr>
<th>No.</th>
<th>Country</th>
<th>Date of Last Visit</th>
<th>Percent &amp; Number of Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>United States</td>
<td>May 14, 2013</td>
<td>76.86% 34,429</td>
</tr>
<tr>
<td>2</td>
<td>Canada</td>
<td>May 14, 2013</td>
<td>7.80% 3,492</td>
</tr>
<tr>
<td>3</td>
<td>United Kingdom</td>
<td>May 14, 2013</td>
<td>4.15% 1,857</td>
</tr>
<tr>
<td>4</td>
<td>Netherlands</td>
<td>May 13, 2013</td>
<td>1.35% 604</td>
</tr>
<tr>
<td>5</td>
<td>France</td>
<td>May 6, 2013</td>
<td>0.83% 370</td>
</tr>
<tr>
<td>6</td>
<td>Australia</td>
<td>May 14, 2013</td>
<td>0.78% 348</td>
</tr>
<tr>
<td>7</td>
<td>Singapore</td>
<td>May 8, 2013</td>
<td>0.68% 304</td>
</tr>
<tr>
<td>8</td>
<td>India</td>
<td>May 1, 2013</td>
<td>0.49% 221</td>
</tr>
<tr>
<td>9</td>
<td>Hong Kong</td>
<td>May 6, 2013</td>
<td>0.47% 209</td>
</tr>
<tr>
<td>10</td>
<td>Jersey</td>
<td>May 13, 2013</td>
<td>0.44% 197</td>
</tr>
<tr>
<td>11</td>
<td>New Zealand</td>
<td>Feb 4, 2013</td>
<td>0.44% 197</td>
</tr>
<tr>
<td>12</td>
<td>Germany</td>
<td>May 5, 2013</td>
<td>0.40% 180</td>
</tr>
<tr>
<td>13</td>
<td>Greece</td>
<td>May 14, 2013</td>
<td>0.39% 173</td>
</tr>
<tr>
<td>14</td>
<td>Mexico</td>
<td>May 13, 2013</td>
<td>0.38% 168</td>
</tr>
<tr>
<td>15</td>
<td>Sweden</td>
<td>May 13, 2013</td>
<td>0.33% 150</td>
</tr>
<tr>
<td>16</td>
<td>Taiwan</td>
<td>Apr 28, 2013</td>
<td>0.29% 130</td>
</tr>
<tr>
<td>17</td>
<td>Europe</td>
<td>May 1, 2013</td>
<td>0.27% 122</td>
</tr>
<tr>
<td>18</td>
<td>Philippines</td>
<td>May 8, 2013</td>
<td>0.23% 101</td>
</tr>
</tbody>
</table>
Students will soon be managing their own portfolios at our university to demonstrate learning outcomes. The reality of assessing student learning outcomes is at hand for universities. It seems logical to conclude that social media, like a weblog, could be used to accumulate a daily dairy of student learning and experiences. One interesting study demonstrated that the adoption of Twitter (which may be thought of as a microblog) as an educational tool increases student engagement and enhances student GPAs (Junco, Heibergert, & Loken, 2011; Rinaldo, Tapp, & Lavarie, 2011).

One of the other authors of this paper has begun requiring the students in their classes to blog over the content to be discussed in upcoming classes. Before the class meeting, they are required to post a (200 word minimum) blog over the chapter in the text (and any other readings) by midnight the day before that material will be discussed in class. The result has been that, not only do students actually read the material before class, but have in many cases posted insightful blogs and raised important questions. Moreover, students see and sometimes respond to each other’s blogs, creating a real learning community. As might be expected, some students take the assignment more seriously than do others, but overall the experiment has been successful in increasing student preparation and engagement. A variety of blogging sites are available including BlogSpot and Typepad. In addition there are explanatory books and YouTube videos on how to use the programs.

Academia has continually transitioned to new media forms. The written paper supplemented Socratic dialogue and lecture, and has been a staple of academia for several centuries. Today, however weblogs and other social media offer easy to use platforms which can also utilize video, photos, and music. It is not a stretch to suggest that original authorship will be displayed on these new forms in addition to the traditional paper format. Blogging can help academics to more-directly influence policy and practice in their respective fields – particularly as a new form of academic research translation (Masket, 2010). In fact, a blog by a not-particularly-well-known economist was responsible for attracting attention to that economist’s theories, which became the basis for the most recent actions by Ben Bernanke and the Fed (Greeley, 2012). Moreover, blogging can help academics to build social capital with both practitioners and with students (Ko, 2012).

**CREATING A CYBER CAFÉ FOR THE SCHOOL CLUB**

Another advantage that traditional colleges and universities have over newer competitors, such as MOOCs and for-profit universities, is the sense of belonging to a college community. This sense of community is social, as well as academic, and is an important part of the overall “college experience.” A school club with a special interest focus has long been a staple of departments within a College. Large universities with substantial numbers of in-resident students on campus usually find it easy to gather the students needed for such organizations. Local speakers are a regular feature of such club meetings. This is not the case, however, for the commuter campus composed of non-traditional students. As described by Hintz (2010), “it can be difficult to help students establish a feeling of belonging or loyalty without a strong physical presence and the accompanying buildings.” This is compounded by the fact that most students at such a campus work and many have family responsibilities, as well. Trying to find a suitable time for a meeting is difficult to schedule. Brain Track (2013) notes that “Online students can get isolated and discouraged online…” It is widely accepted that such students are more likely to drop out and less likely to finish their degrees. This leaves educational institutions struggling to
find ways to make these students feel connected to the university, as a whole. The solution may well exist via online opportunities, such as YouTube and Second Life (Brain Track, 2013; Hintz, 2010; Kolowich, 2010).

One of the many benefits of a virtual approach to student organizations is that it increases opportunities for guest speakers to participate in student clubs. Guest speakers can be invited to participate virtually, or in-person. Either way, the recorded presentation remains available to both the members of the club, as well as other members of the university community and even the public at large. If the speaker visits in-person, the presentation can be easily and inexpensively recorded. It is now possible to purchase High Definition camcorders with an external microphone input for as little as $300. In addition more DSLR (Digital Single Reflex Lens) or ultra-zoom still cameras are now equipped for video. The solution then for a club meeting is to meet on line at the Cyber Café.

The equipment needed for such an enterprise consists of the following:

• A high Definition video camera with microphone input
• A wireless microphone for table top or lavaliere to place on the speaker
• A suitable backdrop that lends a professional appearance to the interview
• Some fixed lighting using umbrella reflectors or possibly LEDs

This will allow the speaker to be interviewed and recorded for later broadcast. The broadcast can be put on YouTube, Blackboard, the school website, or other convenient locations. This allows students 24/7 access to the message. In the event that the speaker cannot attend in person, they can create their own presentation for the club, which can then be uploaded to YouTube. If the speaker desires, they can also participate virtually as an avatar at a virtual club meeting.

Recent research suggests that people are more likely to watch videos of a shorter length online (Metacafe, 2011), than longer videos. This suggests that a three part video presentation could be very effective. In Part One, the speaker is introduced. His or her background, professional experience, and interests can be introduced to the audience. In the second section, the speaker is interviewed as to his or her experiences right now, what is happening in the field, and why this is of interest to the speaker and therefore potentially to the audience. Part Three concludes with a ‘where do we go from here’ theme. What does the speaker see happening in the future, what trends are emerging, what should students be considering as a career path? In this way each segment runs about five minutes.

Additional advantages include the following:

• The videos become a permanent record for a speaker’s library.
• The speaker can reference others to his performance.
• The school exhibits a community interest by putting this on the internet.
• The information is available at a time convenient for all students on a 24/7 basis. And it may be viewed multiple times by both current and future students.

**DOCERI – ETCH A SKETCH GROWS UP**

Perhaps the most troubling aspect of on-line education – particularly for quantitative classes - is the inevitable ‘where did that number come from’ type of question. If a student cannot understand how a concept originated, or where a number was determined that may well end the on-line learning experience. The popularity and sales of electronic tablets has spurred the
development of new software that helps address such problems. One of the latest is Doceri (Doceri). Doceri is a software program used for drawing on an iPad. The drawing then appears on an accompanying computer screen. A Doceri app can be downloaded for free to the iPad. The Doceri computer program is purchased and downloaded on line. The instructor then uses Doceri as an electronic chalk board and is able to work problems and do calculations while the student watches on their own tablet.

The program provides a variety of writing tips for a stylus. Many options are available including different colors and shapes. Perhaps the best feature is the record button. This allows the user to record voice-over as the problem is explained. A quantitative problem can be shown on the computer while the teacher explains the solution process. It can then be uploaded to a variety of social media including blackboard, Facebook, YouTube, etc. This is essentially how Salman Khan began his highly successful Khan Academy. Doceri improves over earlier programs in that one can see the writing as it is put on the tablet.

Doceri may also be used in the classroom. The teacher can put the solution on the tablet while it develops on the screen via computer in the classroom. The advantage is that once the instructor writes a solution, it can be saved and then posted for homework review. The student can review the problem as many times as necessary. The teacher, via the net, then works the problem many times but only has to record it once. Although Doceri also offers an electronic stylus, one of the authors purchased it and does not recommend it. The main reason being that if the stylus is plugged into the iPad, recording for later broadcast is not possible. To this writer, that defeats the main advantage of the product. I found that a $10 Targus stylus worked just as well while allowing voice recording.

CONCLUSION

There are many paradigm shifts for universities – both in terms of technologies and changing preferences and attitudes among students. We have described how new technologies present real opportunities for universities to better serve changing student needs and preferences. Weblogs are an extremely popular but often overlooked segment of social media. The platform works well for professors to supplement class or for students to post their experience for assessment. The development of high quality camcorders as well as audio equipment at affordable prices has provided a new means of offering visiting speakers to students. Universities are already embracing this idea by recording class lectures. The development of the Cyber Café is happening across a variety of disciplines and meetings to deliver 24/7 content. Doceri offers a way to record and explain individual problems. These can be made available across a variety of platforms.

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Southwest Teaching and Learning Journal, Volume 3, Number 1, Fall 2013


Doceri, http://www.doceri.com


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ENHANCING STUDENT ENGAGEMENT AND LEARNING OUTCOMES USING AN EXCEL® BASED TEACHING CASE IN INTRODUCTORY FINANCIAL ACCOUNTING

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ABSTRACT

This case provides teaching resources constructed to enhance students’ active engagement in the learning process. Students record journal entries in an Excel® template and use the Excel® data filtering tool to extract and then post selected entries to corresponding general ledger accounts (T-Accounts). Data filtering establishes a concrete, visible link between the detailed journal and extracted entries specific to each T-Account. Students then populate a blank trial-balance worksheet: unadjusted, adjusted and post-closing trial balances. Moving from tedious paper-based to web-based practice sets allows students to create and enter journal entries online where software classifies and posts automatically. However, using web-based practice sets where trial balances and statements are generated behind the screen, results in a missing link in learning about flow of data in the accounting system and the interconnectivity of entries to General Ledger accounts, to trial balances and to financial statements. It is imperative that students have hands-on experience in how the accounting data is recorded, aggregated, categorized and how data flows in the accounting system. Results of students’ surveys and quizzes confirm differences in performance on specific topics between students who used this Excel® based case and students who used only a web-based exercise covering similar entries and financial reports.

Keywords: Excel® filtering function, journal entries, posting, ledger accounts normal balance.

INTRODUCTION

The instructional case is based on completing pre-designed and formatted Excel® worksheets. It is used as an exercise to enhance student’s knowledge of recording journal entries, posting to ledger accounts utilizing the Excel® data filtering tool, and summarizing the accounts’ balances in the trial balance (TB). An added objective of the case is to boost students’ exposure to Excel®, an electronic spreadsheet used by business majors, engineers, and other professionals. The instructional approach focuses on the chart of accounts (COA) order and classification, linking journal entries to ending account balances, analyzing and evaluating normal balances for different types of accounts, and tracing the integrative data flow resulting in the TB which is the main foundation for financial statements.

The case does not create a new wave of journal entries; these journal entries are very common in any introductory accounting textbook or on web-based practice sets. The major contribution of this case is providing a tool to get students actively engaged in the introductory course; for students to experience integration of accounting information from journal data entry to ledgers, then to TB and finally to financial statements; and for students to critically think about “debits” and “credits” role in producing the ending balance in each account when
creating, for example, a formula in Excel® to calculate the ending balance. This case is a hybrid of manual paper-based environment (where the student has to record, subtotal, post, aggregate, calculate, and produce TBs and financial statements, which is all done in this case with basic automation technology relieving calculation and duplication) and a web-based environment (where the students is detached and not involved in creating the T-Accounts, TBs or the financial statements; other than recording entries, students are not involved in creating all other statements which are produced by the system). Another added value of this case is the opportunity to learn more about accounting transactions, aggregations, and classifications of income statement and balance sheet accounts. This case also allows students to work with Excel® and better understand the role of electronic spreadsheets in accounting, business and other intellectual/analytical environments (similar applications are used in Finance, Engineering and other similar activities).

**LITERATURE REVIEW**

Introductory financial accounting is usually a required part of the business core curriculum and the majority of students taking the course are not accounting majors. In fact, the majority of the students typically do not understand the work of accounting and many are not particularly interested in the course (Matherly and Burney, 2013). However, the concepts and practices taught in the introductory course serve as a foundation in subsequent studies of management, finance, and other business courses (Warren and Young, 2012). The use of active learning techniques is strongly encouraged to provide students an enhanced opportunity for learning and also to provide students with a better sense of the work of accountants (Warren and Young, 2012; Carter and Hogan, 2013; Matherly and Burney, 2013). Recent studies have shown that active learning techniques effectively increase student engagement and knowledge retention (Bloemhof and Christensen, 2013). Transaction analysis, preparation of journal entries, recording of journal entries to the general journal and proper posting to the general ledger are critical components of generating quality financial statements. Establishing a learning structure that assists students in developing skills centered on these critical components provides a better foundation for developing a more complete understanding of the importance of the process and contributes to transfer of knowledge to similar activities (Johnson and Slayter, 2012). The learning structure in the instant case also supports the core functional competencies of measurement, decision modeling, and critical thinking recommended by the American Institute of Certified Public Accountants (AICPA, 2002).

In addition, AICPA core functional competencies include the effective and efficient use of technology tools in accounting and business applications (AICPA, 2002). The Microsoft Office Suite is a commonly used platform for many accounting and business related work activities. Exposure to Excel® in the instant case supports the students’ development of skills that translate directly to the business world.

**THE EXCEL® BASED TEACHING CASE**

This exercise represents transactions for a new Company and encompasses regular daily business operations and transactions of that Company. In the accountant role for this company, students are required to analyze these business transactions (provided in a narrative, sequential and dated list), record them in journal entries (Journal worksheet already formatted with headers
To complete this exercise, students download from the course Blackboard (Bb) page the “PDF” file having the narrative description of business transactions and instructions to complete the exercise (see Table 1). In addition students need to download the Excel® template or workbook (see Table 2) where they record transactions in journal entries (JEs), post and complete the required steps for this exercise. The Excel® workbook has six worksheets labeled: Chart of Accounts (COA), Journal Entries, General Ledger, Trial Balances, Income Statement, and Balance Sheet. The first four worksheets are preformatted but students must format and create the two financial statement worksheets. Although the COA is provided with the instructions to this case, the first Excel® worksheet “Chart of Accounts” is reproduced so the student can copy exact account descriptions to maintain standardization of each account description and number; it also limits keying of account titles. The second worksheet is the “Journal Entries” where the student, in the role of accountant, records the daily transactions which occur during the Company’s operations. This worksheet is very pivotal and is the initial record of transactions and constitutes the backbone and data holder of all transactions relevant to the operations of the Company (this step and worksheet reiterates to students that the journal is the first record entered into the system and is the basis from which information flows into the other system components).

Table 1
Sample of Narrative Description of Business Transactions

<table>
<thead>
<tr>
<th>The Company had the following transactions and events in October, November and December of this year 20YY:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Oct. 1</strong></td>
</tr>
<tr>
<td><strong>Oct. 2</strong></td>
</tr>
<tr>
<td><strong>Oct. 3</strong></td>
</tr>
<tr>
<td><strong>Oct. 5</strong></td>
</tr>
<tr>
<td><strong>Oct. 6</strong></td>
</tr>
<tr>
<td><strong>Oct. 8</strong></td>
</tr>
<tr>
<td><strong>Oct. 9</strong></td>
</tr>
</tbody>
</table>
Posting is the second major step after recoding JEs. Posting is extracting transactions affecting one account and posting these specific JEs to that account holding area called General Ledger/T-Account. These T-Accounts are pre-formatted for the student but are not all labeled by account title or name. Students need to get engaged filling in account titles and numbers before posting all JEs affecting each account to its own T-Account box. Filling in account title and number enforces remembering and understanding of account type and order on the COA. Posting process should not be done manually as one JE at a time (or using static cell-references to the journal entry itself as the cost grossly exceeds the benefit). Excel® provides a useful function called “Filtering” (Tables 3-A and 3-B), which can make the posting step much easier. It is very easy to demonstrate how filtering works; the student selects “Data>Filter” from the Excel® menu, then selects the account number header-button; the filtering drop-down prompt appears listing all accounts used in the journal and in number order. This allows the student to start selecting first account listed (cash) and the worksheet displays only the JEs (actually part of the JEs) affecting the cash account (accounting’s dual entry mechanism involves at least two accounts i.e. one part DR to one account and the other part CR to another account for each transaction). Filtering aids the students in remembering the importance of account sequence on the TB and other statements. Student selects the first listed account (cash) then the following account thus associating the order of accounts with presentation on the TB. Posting involves extracting entries for the account being summarized and placing those entries in the T-Account area specified for that account.
### Table 3-A
**General Journal – Detail of All Entries for All Accounts**

<table>
<thead>
<tr>
<th>Date</th>
<th>JE#</th>
<th>Account Titles</th>
<th>Account#</th>
<th>Debit</th>
<th>Credit</th>
<th>Description of Journal Entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Oct</td>
<td>JE01</td>
<td>Cash - Checking Account</td>
<td>1020</td>
<td>55,000</td>
<td></td>
<td>To record initial investment</td>
</tr>
<tr>
<td>1-Oct</td>
<td>JE01</td>
<td>Computer Equipment</td>
<td>1520</td>
<td></td>
<td>20,000</td>
<td>To record initial investment</td>
</tr>
<tr>
<td>1-Oct</td>
<td>JE01</td>
<td>Office Equipment</td>
<td>1510</td>
<td></td>
<td>25,000</td>
<td>To record initial investment</td>
</tr>
<tr>
<td>1-Oct</td>
<td>JE01</td>
<td>Common Stock @par value</td>
<td>3300</td>
<td></td>
<td>100,000</td>
<td>To record initial investment</td>
</tr>
<tr>
<td>2-Oct</td>
<td>JE02</td>
<td>Prepaid rent</td>
<td>1405</td>
<td></td>
<td>3,300</td>
<td>To record prepaid rent for 4 months</td>
</tr>
<tr>
<td>2-Oct</td>
<td>JE02</td>
<td>Cash - Checking Account</td>
<td>1020</td>
<td>3,300</td>
<td></td>
<td>To record prepaid rent for 4 months</td>
</tr>
<tr>
<td>3-Oct</td>
<td>JE03</td>
<td>Computer Supplies</td>
<td>1330</td>
<td></td>
<td>1,420</td>
<td>Purchase of supplies on account</td>
</tr>
<tr>
<td>3-Oct</td>
<td>JE03</td>
<td>Accounts Payable</td>
<td>2000</td>
<td></td>
<td>1,420</td>
<td>Purchase of supplies on account</td>
</tr>
</tbody>
</table>

### Table 3-B
**General Journal- Filtered Cash Account Entries**

<table>
<thead>
<tr>
<th>Date</th>
<th>JE#</th>
<th>Account Titles</th>
<th>Account#</th>
<th>Debit</th>
<th>Credit</th>
<th>Description of Journal Entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Oct</td>
<td>JE01</td>
<td>Cash - Checking Account</td>
<td>1020</td>
<td>55,000</td>
<td></td>
<td>To record initial investment</td>
</tr>
<tr>
<td>2-Oct</td>
<td>JE02</td>
<td>Cash - Checking Account</td>
<td>1020</td>
<td>3,300</td>
<td></td>
<td>To record prepaid rent for 4 months</td>
</tr>
<tr>
<td>5-Oct</td>
<td>JE04</td>
<td>Cash - Checking Account</td>
<td>1020</td>
<td>2,720</td>
<td></td>
<td>To record 1 year prepaid insurance</td>
</tr>
<tr>
<td>7-Oct</td>
<td>JE07</td>
<td>Cash - Checking Account</td>
<td>1020</td>
<td>1,420</td>
<td></td>
<td>Payment of accounts payable</td>
</tr>
</tbody>
</table>

After completing the posting to all T-Accounts used in business transactions and JEs (reminder not all COA accounts are used in this exercise), the next step is to create the unadjusted TB. The TB follows the sequence of the COA where assets are listed first (account numbers starting with 1nnn), then liabilities (account numbers starting with 2nnn), followed by equity accounts (account numbers starting with 3nnn), and so on. Students can also use the T-Account order if they followed the filter command listing of accounts; this will also enhance their learning of sequence and classifying order of the accounts. It is imperative that accounts are kept in sequential order as it will facilitate closing entries and comprehension of which accounts are permanent accounts that do not close (balance sheet accounts #1, 2 and 3) and which are temporary accounts that close at the end of the accounting period (income statement accounts starting with accounts numbers 4 for revenues and then 5 for cost of sales and 6-9 for expenses).

The unadjusted TB has to be in balance where total debits equal total credits (total for accounts with debit balances has to equal the total for accounts with credit balance; sum formulas are already built in for all TBs). The unadjusted TB has to be adjusted to reflect additional information given at the end of the accounting period (adjusting entries [a] through [g]).
are provided in instructions and displayed in Table 4). Adjusting entries must also be recorded in the journal worksheet and represented on the “Trial Balances” worksheet (instructor can ask that T-Accounts be updated or relieve students of this step). In today’s environment, most JEs are done automatically at the point of sale or point of service. End of period account analysis and identification of required adjusting entries is a major part of the accountant’s job. The student’s attention is focused on understanding how making adjustments to a few accounts impacts the adjusted TB, which is the key ingredient in preparing the financial statements.

### Table 4
**List of Adjusting Entries**

<table>
<thead>
<tr>
<th></th>
<th>The following additional facts are collected for use in making adjusting entries prior to preparing financial statements for the company’s first three months of operations [Use unadjusted trial balance numbers at the end of December to complete most of the following adjusting entries]:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>The December 31 inventory count of computer supplies shows $580 still available.</td>
</tr>
<tr>
<td>b.</td>
<td>Three months (OCT-DEC) have expired since the 12-month insurance premium was paid in advance.</td>
</tr>
<tr>
<td>c.</td>
<td>Three of the four months’ prepaid rent has expired.</td>
</tr>
<tr>
<td>d.</td>
<td>As of December 31, Mary Lisa has not been paid for four days of work at $125 per day.</td>
</tr>
<tr>
<td>e.</td>
<td>The company’s computer is expected to have a four-year life with no salvage value.</td>
</tr>
<tr>
<td>f.</td>
<td>The office equipment is expected to have a five-year life with no salvage value.</td>
</tr>
<tr>
<td>g.</td>
<td>Allowance for Doubtful accounts (will discuss in class and as covered in chapter of textbook) was determined to be $600 for the year ending on December 31, 20YY.</td>
</tr>
</tbody>
</table>

Closing the accounts at the end of the accounting period (the quarter ending on December 31st in this exercise) is the next step. Class discussion explains that closing is the process of making temporary account balances zero to prepare for collecting the next period data while also updating the equity accounts for the current period activity. The textbook used in this course, and many other textbooks, uses two main closing entries: closing revenue and expense accounts to retained earnings (equity account) in one entry and closing dividends (distributions of income) account to retained earnings as a second closing entry (once again the student is required to record these closing entries in the “Journal” worksheet and also represent these closing line items or amounts on the “Trial Balances” worksheet). The temporary accounts which are closed are the accounts used to generate the Income Statement (Revenues and Expenses), which measures the operating performance of the business.

The resulting TB after the closing entries is the post-closing TB. This post-closing TB is the basis for or is used to generate the Balance Sheet. The Balance Sheet contains the permanent accounts which do not close and continue with ending balances into the new accounting period (where ending balances of prior period become beginning balances in the current new accounting period). Students need to construct both the Income Statement and Balance Sheet financial statements so they are familiar with components of these statements and, hence, the type of
information provided by these two main financial statements. In constructing these two basic statements, using the adjusted and post-closing TBs, students can remember and associate the bottom part (Revenue and Expense temporary accounts) with Income Statement (for one period), and the upper part (accounting equation accounts: Assets, Liabilities and Equity accounts) with Balance sheet (permanent accounts which continue into next period).

CASE LEARNING OBJECTIVES AND IMPLEMENTATION GUIDANCE

This case is intended for undergraduate and first introductory financial accounting courses. The case functions to provide an activity for students that encompasses multiple (3 months) accounting periods and to provide a direct link between journal entries and general ledger balances, elements missing from most web-based cases. If students are also required to complete a web-based (computerized) exercise, faculty may choose to ask students to record the same set of transactions in the Excel® template provided. However, most web-based exercises (computerized practice sets) have predetermined beginning balances for each accounting period based on information not available to instructor or students. The process of starting from zero balances, as done in this case, then incorporating the web-based exercise entries may result in an inability to balance the accounts and may create confusion for students. Optimally, faculty would use the separate set of transactions for this exercise or construct their own transactions from the textbook used in their introductory course (The case materials are available upon request from the author). The transactions in this case are either modified or directly adapted from Introductory Financial Accounting textbooks (Wild 2013; Phillips, Libby and Libby 2011; or Horngren et al 2013). The advantage for faculty and students of using the transactions included in this exercise is that the transactions cover a consecutive three-month time frame. Most textbooks do provide transactions for multiple periods but are separated and spread out on multiple chapter assignments. In addition, as students frequently prefer to work together, the exercise may be assigned to a team of two students as this will make the exercise less time consuming, especially if given along with another web-based exercise. Use of teams encourages more constructive cooperation and may reduce copying and unethical sharing of data and files. Student feedback indicates that the completion of all the worksheets requires on average between 15 – 24 full hours.

The main purpose of this case is for students to experience firsthand how JEs are recorded, directly linking entries to posting to General Ledger accounts (T-Accounts) and, most important, how a TB is created based on the preceding activities. Few textbooks used to have transparencies showing different parts of a worksheet which demonstrated how the TB evolves from unadjusted format to adjusted format to post-closing format (very helpful tool in learning the data flow in the accounting system). The exercise in this case mirrors exactly what those transparencies show with more value added learning opportunities where students are engaged in doing the recording, the posting, the adjusting and building the TB. The use of Excel’s filtering function makes the posting process more transparent and meaningful. This aspect of accounting is not available on prepackaged web-based basic practice sets due to the limited functionality of the applications. Other purposes of this case are for students to experience analyzing business transactions and recording those transactions in journal entry format in a chronological journal, emphasize the focus on COA classifications, the order and sequence of accounts on the TB and financial statements, having a good comprehension of temporary and permanent accounts, and understanding the sequence of events and processes in the accounting cycle.
The learning objectives have been mapped to the learning processes of the revised Blooms’ taxonomy of cognitive objectives (BCO): remembering, understanding, applying, analyzing, evaluating and creating. The learning processes are considered to be of increasingly ‘higher order’, in that each of the succeeding processes encompasses all of the activities of the preceding orders as well as more difficult activities (Anderson and Krathwohl, 2001).

The exercise in this case complements and adds to textbook material and lectures by emphasizing the following learning objectives:

- **Allow students on first-hand basis to get actively involved in coding, dating, numbering and describing journal entries recorded (writing in words what the entry is for adds opportunity for analysis).** Using a spreadsheet in recording transactions focuses on basic learning and is considered a low-order tool at this phase of the project (Bryant and Hunton, 2000). These activities map to BCO learning processes of remembering, understanding and applying.

- **Posting entries to corresponding general ledger accounts from original source and through an extraction method (filtering) where students establish an apparent link between JEs and T-Accounts.** Using filtering function of the spreadsheet involves and promotes high-order thinking skills (Bryant and Hunton, 2000) by requiring students to recognize and confirm which account to extract first, in what order, and how to summarize JEs for each account without scrolling down to find every related transaction (this manual search is demonstrated in class to accentuate the difference between journals and ledgers; entries for one account all over the journal whereas it is contiguously and chronologically summarized in ledger). These activities map to BCO learning processes of understanding, analyzing and evaluating.

- **Differentiate between entries posted to an account and the account’s balance.** This is achieved on the third worksheet labeled “General Ledger T-Accounts” where students are required to insert a formula to calculate the running balance for each account. Faculty may emphasize a few issues about the formulae:
  - Instructor may point to the alternative (paper based) method of calculating general ledger account balance by totaling debits and credits at the bottom of the T-Account page (labels provided in the spreadsheet) and then finding the difference to arrive at the ending total for the specific GL account.
  - When creating account balance formulas for assets and liabilities accounts, for example, faculty may ask students to be aware of the difference in formulae for calculating balances of accounts whose normal balance is a debit balance (left side) and those accounts whose normal balance is a credit balance (right side). This is very important as it helps students recognize how a debit increases an asset account whereas a credit reduces the asset account; of course the opposite holds for liabilities. When working on the formulae, students re-emphasize the concept when creating formulae for equity, revenue and expense accounts. The active creation of formulae and linking columns’ contents in the formulae promotes high-order thinking skills and analyses.
  - Another approach is to use the same formula for the ending/running balance for assets and liabilities to allow the students to see that one total
comes out as a positive number and the other as a negative number. This supports classroom discussion of normal balances: debit (positive) for assets, credit (negative) for liabilities.

- Another tool to remind students of normal balances and the effects of a debit or credit entry on an account, is to label the debit and credit columns with a [+] or [-] to emphasize how the type of account increases or decreases to debits or credits. This is done on the T-Accounts columns/box itself.

These activities map to BCO learning processes of understanding, analyzing, evaluating and creating.

- Create unadjusted TB from a blank sheet. This helps students learn the order of the accounts on the TB, which follows the COA ordering and demonstrates how this ordering links to the balance sheet (top part of TB) and then to the income statement order/sequence (bottom part of TB). These activities map to BCO learning processes of understanding, analyzing, evaluating and creating.

- Using unadjusted TB to create and understand the reason for and purpose of adjusting entries (this complements or can precede the regular approach of creating adjusting entries on the “Journal” entries worksheet and then represent those on the “Trial Balance” worksheet). These activities map to BCO learning processes of understanding, analyzing, evaluating and creating.

- Understand the timing, purpose and effect of adjusting entries (visualizing the before and after balances of the adjusted accounts). Focusing on the balance of each adjusted account on the T-Account worksheet complements the learning of the effect of the adjusting entries on the newly adjusted account balance. These activities map to BCO learning processes of understanding, analyzing and evaluating.

- Comprehend the concept of closing entries and how the income statement temporary accounts roll into retained earnings account on the Balance Sheet part of the TB (revenues and expenses balances on the bottom part of the post-closing TB are now equal zeros). These activities map to BCO learning processes of understanding, analyzing, evaluating and creating.

- Develop basic Excel® skills and expand the comfort zone of working with Excel. Excel® is regarded as a very important tool for accountants (and other disciplines) by most CPA firms, business and scientific communities. Using filtering function at this stage can help prepare students to better understand database concepts and cross-tabulation (Pivot tables) introduced later in the accounting information systems course. These activities map to BCO learning processes of remembering and understanding.

When the learning objectives are also compared to the knowledge dimension of Bloom’s revised cognitive objectives, it is apparent that the emphasis on the higher level learning processes enhances the students’ ability to develop not only basic factual knowledge but also conceptual knowledge and procedural knowledge (Arel, et al 2011).

Faculty can have multiple parts of the exercise due at different times (first month entries, then the second month, etc…). The case can be used along with topics covered in chapters of the textbook in addition to or in lieu of exercises at the end of each chapter. Faculty can encourage students to bring their laptops to class or to print the blank worksheet labeled “Journal Entries”
and bring a couple of blank pages to class so students can write in answers to JEs as discussed in class. Following guidelines in Bryant and Hunton (2000) for using Educational Technology in delivering instructions, students are always encouraged to ask questions about each and every entry and feedback is given to students to reinforce positive behavior. Solutions to JEs can be demonstrated in class, as practicing with JEs and recording those JEs is still a secondary and important objective of this exercise. The main purpose of the exercise is to see how data from JEs flows into T-Accounts and eventually the balances of these accounts end up on the TB.

**SAMPLES AND METHODOLOGY**

Groups of students enrolled in one section of the introductory financial accounting course are assigned two exercises: web-based and Excel exercises. At the conclusion of the exercises, students are surveyed using a five point Likert-type survey: strongly disagree SD=1, disagree D=2, indifferent I=3, agree A=4, strongly agree SA=5 (Survey and quizzes were all cleared by Institutional Review Board (IRB) and compliant with the Collaborative Institutional Training Initiative (CITI) human research training program). The survey (Table 1) was designed with questions listed in order of material covered in the course; the objective is to reduce response bias by encouraging the student to read questions in same order as all other students.

In addition to the survey, responses on specific quiz and exam questions are tabulated to support students’ perception and performance on those specified concepts and learned outcomes. Two other groups, in different and following semesters, are given one of the two exercises; the group given Excel® is considered the “treatment” group and the one given the web-based exercise is considered the “control” group. The responses of both groups on Introductory course exam questions and on the Intermediate Accounting-I assessment/review quiz are also captured and tabulated (Table 2). Not all students are accounting majors and not all continue or take Intermediate Accounting-I. There is a survivorship issue but it does enhance randomness of the control group as new students who used only web-based exercise are included in control sample. Student observations are ordered in numeric equivalent corresponding to order on Likert scale. Frequencies and descriptive statistics are used to perform data analyses.

**EVALUATION OF CASE EFFECTIVENESS**

To provide extemporaneous validation of the efficacy of the Case, students were asked after completing the Excel® exercise for this case and the web-based exercise to evaluate the pros and cons of each exercise. The survey questions and students’ responses are represented in Table 1 (‘Web-module’ refers to the computerized web practice-set used in class). Survey results indicate that the students who used Excel® and were more engaged in creating T-Accounts and TBs perceived that they learned more about posting, the link between journals to general ledgers, construction of TBs, the accounts types and order in the COA, closing of temporary accounts, and financial statements preparation.

Student Survey Numbers in Table 5 represent Frequencies in each category, N=66. Questions 1 through 8 apply to Web-Module; Questions 9 through16 apply to Excel® Exercise. Students were to check the option which closely reflects their experience and answer.
### Table 5
Students Evaluation of Web-Module and Excel® Exercise

<table>
<thead>
<tr>
<th>NO</th>
<th>Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Indifferent</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Using Web-Module, I learned more about accounting transactions and journal entries</td>
<td>18</td>
<td>20</td>
<td>6</td>
<td>22</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Using Web-Module, I learned more about computerized journal entries</td>
<td>20</td>
<td>18</td>
<td>15</td>
<td>13</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Using Web-Module, I learned more about POSTING journal entries to General Ledger accounts (T-Accounts)</td>
<td>8</td>
<td>15</td>
<td>15</td>
<td>24</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Using Web-Module, I learned more about NORMAL Balances of GL Accounts</td>
<td>18</td>
<td>16</td>
<td>12</td>
<td>20</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Using Web-Module, I learned more about General Ledger accounts and completing UNADJUSTED Trial Balances (TB)</td>
<td>6</td>
<td>13</td>
<td>20</td>
<td>27</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Using Web-Module, I learned more about adjusting entries and ADJUSTED TB</td>
<td>12</td>
<td>19</td>
<td>9</td>
<td>26</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Using Web-Module, I learned more about CLOSING entries and POST-CLOSING TB</td>
<td>-</td>
<td>11</td>
<td>17</td>
<td>38</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Using Web-Module, I learned more about CLOSING entries, Temporary and Permanent GL Accounts</td>
<td>9</td>
<td>13</td>
<td>14</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>Using EXCEL Exercise, I learned more about accounting transactions and journal entries</td>
<td>38</td>
<td>28</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Using EXCEL Exercise, I learned more about computerized journal entries</td>
<td>16</td>
<td>25</td>
<td>25</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>Using EXCEL Exercise, I learned more about POSTING journal entries to General Ledger accounts (T-Accounts)</td>
<td>35</td>
<td>22</td>
<td>6</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>Using EXCEL Exercise, I learned more about NORMAL Balances of GL Accounts</td>
<td>30</td>
<td>25</td>
<td>10</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>13</td>
<td>Using EXCEL Exercise, I learned more about General Ledger accounts and completing UNADJUSTED Trial Balances (TB)</td>
<td>38</td>
<td>22</td>
<td>3</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>14</td>
<td>Using EXCEL Exercise, I learned more about adjusting entries and ADJUSTED TB</td>
<td>35</td>
<td>22</td>
<td>6</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>15</td>
<td>Using EXCEL Exercise, I learned more about CLOSING entries and POST-CLOSING TB</td>
<td>35</td>
<td>19</td>
<td>9</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>16</td>
<td>Using EXCEL Exercise, I learned more about CLOSING entries, Temporary and Permanent GL Accounts</td>
<td>34</td>
<td>23</td>
<td>5</td>
<td>4</td>
<td>-</td>
</tr>
</tbody>
</table>

The frequencies measure indicates variance in performance between the two learning tools. This is supported by the descriptive statistics of the ordinal numbers assigned to the five-point Likert-type survey (Mean=4, Median=4 and Mode=3.9 for Excel group versus 3.3, 3.4 and 2.9 respectively for the Web-based exercise group). For Likert-type data the Median and Mode are the best measures of central tendency while frequencies support variability between exercise and web-case (Kalambokidia, 2011). A t-test was run on the two sets of questions and the difference in means between the two groups was significant with a t-value of 4.13 ($p=0.01$). Two teaching assistants (TA) who completed only the web-based exercise in their introductory financial accounting classes were selected and asked to complete the Excel® exercise as part of their TA job assignments. Both TAs have indicated that they previously did not fully
comprehend or learn how the TB is formed, but doing the Excel® exercise helped to explain the
effect and purposes of adjusting journal entries, and most importantly how the post-closing TB
comes into existence and flows into the formation of the Balance Sheet. The aforementioned two
TAs were compared to two other TAs who completed the Excel® and not the web-based
exercise and the feedback confirmed that they learned more when engaged in creating the T-
Accounts and TBs in blank worksheet when compared to students who had only performed the
web-based exercise.

To further evaluate the learning outcomes of this case, a professor teaching the first
Intermediate Accounting class was asked to quiz her students on key aspects of posting, normal
balances, and phases and types of TBs (Quiz questions are presented in the Appendix). The quiz
was delivered prior to review of the material (in Intermediate Course) to measure retention of
knowledge from the prerequisite financial accounting course. In addition, responses of students
on the same questions embedded in the first exam of the introductory accounting course were
tabulated. Students were identified and separated as those who completed the Excel® exercise
(With Excel®) and those who did web based case without Excel® (Without Excel®). The quiz
was administered to confirm any differences in comprehension and learning about TB (all types),
normal accounts, closing process and concepts of temporary and permanent accounts. The results
and responses of students are summarized and presented in Table 6 representing selected
questions from Introductory Course first exam and intermediate-I Accounting quiz.

Table 6
Evaluation of Student Performance on Related Topics

<table>
<thead>
<tr>
<th>NO.</th>
<th>Question Topic</th>
<th>Survey Question(s)</th>
<th>With Excel (n=74)</th>
<th>Without Excel (n=61)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Correct</td>
<td>Incorrect</td>
</tr>
<tr>
<td>1</td>
<td>Temporary (nominal) and permanent accounts</td>
<td>8</td>
<td>61</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>Normal balances and unadjusted trial balance</td>
<td>4, 5</td>
<td>31</td>
<td>43</td>
</tr>
<tr>
<td>3</td>
<td>Normal balances, adjusting entries, unadjusted and adjusted</td>
<td>4, 5, 6</td>
<td>57</td>
<td>17</td>
</tr>
<tr>
<td>4</td>
<td>Adjusting entries and Adjusted trial balance</td>
<td>6</td>
<td>54</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>Normal balances, adjusting entries and adjusted trial balance</td>
<td>4, 6</td>
<td>33</td>
<td>41</td>
</tr>
<tr>
<td>6</td>
<td>Normal balances, temporary and permanent accounts and post-closing trial balance</td>
<td>4, 7, 8</td>
<td>49</td>
<td>25</td>
</tr>
<tr>
<td>7</td>
<td>Normal balances, temporary and permanent accounts and post-closing trial balance</td>
<td>4, 7, 8</td>
<td>42</td>
<td>32</td>
</tr>
<tr>
<td>8</td>
<td>Adjusting entries and Adjusted trial balance</td>
<td>6</td>
<td>40</td>
<td>34</td>
</tr>
<tr>
<td>9</td>
<td>Normal balances, temporary and permanent accounts, adjusting entries and post-closing trial balance</td>
<td>4, 5, 6, 7</td>
<td>55</td>
<td>19</td>
</tr>
<tr>
<td>10</td>
<td>Normal balances, temporary and permanent accounts, and post-closing trial balance</td>
<td>4, 7, 8</td>
<td>51</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Total Answers</td>
<td></td>
<td>473</td>
<td>267</td>
</tr>
</tbody>
</table>

Results indicate that students who completed the Excel® case had a relatively better
understanding of the specific items tested in the quiz (Appendix). The t-test results on students’
answers for the two groups indicate significant performance difference (48% more correct
answers) between the two groups of students with t-value 5.19 (p=0.01). The difference between the two groups in number of incorrect answers was 8% lower for Excel group but was not significant. Although there are many factors involved in learning, and performance may be attributed to students’ diverse experiences and skill levels, the basic results of a large random sample show a sizeable increment in performance on the items specifically covered in the Excel case and which relate to specified accounting concepts.

**LIMITATIONS AND FUTURE RESEARCH**

Using this case has a few limitations. Most significantly, students have different computer literacy levels and some of them are not familiar with Excel®. Although very basic computer skills are required, and although the formulas and filtering function are demonstrated in class and easy to apply, there may be confounding difficulties hindering the learning process for a few students. Another limitation related to the evaluation results is the time gap between taking Introductory Financial Accounting and Intermediate Accounting courses. This gap may vary from one to two semesters or longer. In addition, the results may be subject to self-selection as most students taking Intermediate Accounting are accounting majors.

In upcoming semesters, the authors will gather and analyze data linking VARK© learning approaches to computerized introductory accounting packages and to this Excel® exercise. The objective of the planned experimental study is to assess the connection between the two exercises and the various learning styles in order to further understand student comprehension and performance in introductory financial accounting.

**TEACHING NOTES**

The students’ instructions, the Excel® blank template along with the completed workbook are available from the authors to full-member subscribers to *SWTL journal*. A few issues and questions which students may have difficulty answering are as follows:

- Narrative description of events which do not include any transfer or exchange of goods i.e. no entry required.
- Differentiating between personnel department function of hiring and accounting function when paying employees after working and not simply after being hired (no entry event).
- Concept of dividends declared and not yet paid where students forget to record actual payment of dividends in the following month (instructions have a reminder which can be kept or removed by instructor).
- Understanding where the information used in adjusting entries is coming from and when it is available (sequence of events) so accountants can make adjusting entries.

Students’ curiosity is enhanced by *posing questions and opening situations* (Loewenstein, 1994) about approaches to summarize entries for each account before posting to T-accounts. Manual sorting and copying are demonstrated followed by data filtering to confront the gap in knowledge about posting and account types, running balances, structure and order of accounts on the COA. Students are more engaged when narrative instructions evoke action and images (concrete manifestation on screen) or when something is novel (immediate list of only cash account entries; “now you see all entries, now you see only cash entries” then posting to cash T-accounts.
Account) which is more likely to attract students’ interest, especially if it saves them time and effort as compared to paper-based environment.

In generating the Income Statement and Balance Sheet, students can refer back to these two financial statements which can be heavily utilized by the instructor when covering future topics such as allowance for doubtful accounts (how it is represented on the Balance Sheet under Accounts Receivable account) and Accumulated Depreciation representation on Balance Sheet under the related Fixed or Long-term Asset accounts. The instructions to this case also include (on instructions last page- not provided here) the suggested grading scheme for different parts of this exercise. The exercise is worth around 15% of the course grade with several faculty members making it worth 25% part of the course grade.

REFERENCES


**About the Authors:**

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**Anita Reed** (Ph.D., CPA) is an assistant professor of accounting at Texas A&M University – Corpus Christi. She teaches both undergraduate and graduate courses in accounting. Her research interests include ethics, student engagement, enterprise risk management and behavioral research.

**Appendix A**

**Course and Quiz Title**

Student Name: ____________________________

1. Which of the following is a temporary (nominal) account?
   a. Unearned Revenue.
   b. Salary Expense.
   c. Inventory.
   d. Retained Earnings.

2. Which of the following is NOT a principal purpose of an unadjusted trial balance?
   a. It proves that total debits and credits of equal amounts are in the ledger.
   b. It is the basis for any adjustments to the account balances.
   c. It supplies a listing of open accounts and their balances.
   d. It proves that debits and credits were properly entered in the ledger accounts.

3. Which of the following statements best describes an adjusted trial balance?
   a. Adjusted trial balance has only balances for permanent accounts.
   b. Adjusted trial balance has only balances for temporary accounts.
   c. Adjusted trial balance has only balances for permanent and temporary accounts.
   d. Adjusted trial balance has only balances for assets, liabilities and equity accounts.
4. Which of the following is true about the process of posting?
   a. The process of posting transfers the journalized entries to their respective accounts in the ledger.
   b. The process of posting transfers accumulated debits and credits to the trial balance.
   c. Journalized entries should be posted in account number order and not in journal entry date order.
   d. None of the above.

5. Differences between and unadjusted trial balance and adjusted trial balance include:
   a. Balances are different by the amounts of adjusting entries.
   b. There are no revenue and expense account balances on the adjusted trial balance.
   c. The unadjusted trial balance has more accounts listed than the adjusted trial balance.
   d. All the above are true.

6. Which of the following statements best describes the purpose of closing entries?
   a. To facilitate posting and taking a trial balance.
   b. To determine the amount of net income or net loss for the period.
   c. To reduce the balances of revenue and expense accounts to zero so that they may be used to accumulate the revenues and expenses of the next period.
   d. To complete the record of various transactions that were started in a prior period.

7. Which of the following statements best describes a post-closing trial balance?
   a. Post-Closing trial balance has only balances for permanent accounts.
   b. Post-Closing trial balance has only balances for temporary accounts.
   c. Post-Closing trial balance has only balances for permanent and temporary accounts.
   d. Post-Closing trial balance has only balances for the balance sheet and income statements accounts.

8. An adjusting entry should never include:
   a. a debit to an expense account and a credit to a liability account.
   b. a debit to an expense account and a credit to a revenue account.
   c. a debit to a liability account and a credit to revenue account.
   d. a debit to a revenue account and a credit to a liability account.

9. An adjusted trial balance
   a. Is prepared after the financial statements are completed.
   b. Proves the equality of the total debit balances and total credit balances of ledger accounts after all adjustments have been made.
   c. Is a required financial statement under generally accepted accounting principles.
   d. Cannot be used to prepare financial statements.

10. Which type of account is ALWAYS debited during the closing process?
    a. Dividends.
    b. Expense.
    c. Revenue.
    d. Retained earnings.
GRADE INFLATION IN A MATHEMATICS CLASSROOM:
AN INVESTIGATION

Anna Lurie
Mary Wagner-Krankel
St. Mary’s University

ABSTRACT

In a longitudinal study over 2000-2012, we investigate whether pre-tenure status of a
professor may be associated with grade inflation. In addition, we consider other factors such as
course level, professor status, and gender to help explain grade inflation. A hierarchical linear
model is used to analyze the data. We observe a positive correlation between SETs (student
evaluations of teaching) and GPAs (grade point averages) as documented in other studies. We
note that grade inflation may be related to the tenure/promotion process which uses student
evaluations routinely in making important decisions. We suggest an adjustment to the way grades
are recorded on student transcripts, and caution in using SETs for administrative purposes.

Keywords: grade inflation, student evaluations of teaching, hierarchical linear modeling

INTRODUCTION

The problem of grade inflation in the United States has been extensively studied and
documented. As Rojstaczer (2010) points out, based on his study of over 230 schools
nationwide, GPAs rise by about 0.1 per decade. He also notes that private schools give higher
grades, on average; and that science departments grades are about 0.4 lower than humanities and
0.2 lower than social sciences.

Most professors would agree that higher grades do not mean more knowledgeable, better
prepared, or hardworking students. In fact, we note and lament the fact that the trend is actually
the opposite. We seem to be getting weaker and less-prepared students every semester. And yet
the grades are rising. Higher grades that are not justly deserved by students are not a healthy
sign. Employers still trust GPAs they see on student transcripts when hiring, students need to
know where they stand compared to their peers, and professors are supposed to report grades as a
trustworthy method of determining student knowledge or lack thereof. Love and Kotchen (2010)
use a model in which they demonstrate, as part of their research, that higher grades may mean
less, not more, effort on the part of the student.

This article examines the problem of grade inflation in the context of a small department
in the School of Science, Engineering, and Technology of a four-year liberal arts Catholic
university. We collected the grades and various factors that could potentially make an impact on
the grades over roughly a decade. SETs are routinely used by our school in making important
decisions on tenure/promotion/salary increases. Thus, we wanted to see if evaluations are
positively associated with grades. We also collected data on professor status, to see if tenure-
track professors grade any differently than their tenured colleagues. Besides getting to the bottom
of the problem of explaining grade inflation, our purpose was also to bring this problem to the
attention of the academic community. In addition, we propose possible ways to mitigate the problem of rising grades.

**RELATED RESEARCH**

We now turn to a brief overview of the abundant research done to discover possible reasons for the phenomenon of grade inflation.

The correlation between SETs and either expected grade or actual final grade is well documented. In his book on grade inflation, Johnson (2003) reports that in numerous observational studies considering individual student GPA and measuring teacher effectiveness found in SETs, the correlation was found to be around .21, on average. He also reports that observational studies that considered the relationship between the average class GPA and average overall measure of teaching effectiveness as part of the SETs for the whole class, had the mean correlation of .31.

Even though the positive correlation between GPAs and SETs seems to be an irrefutable fact does not necessarily mean that higher grades cause higher evaluations. Various researchers attempted to explain this correlation by introducing another, lurking, variable to explain the phenomenon.

One such variable is teacher effectiveness. It is hypothesized that a more effective teacher can teach his/her students better, and as a result, they get higher grades they deserve, and, in turn, appreciate their professor by giving higher evaluations. However, Greenwald (1997) casts doubt on this theory, because, as he points out, there is a positive correlation within each class between individual student grade and the way he/she evaluates his or her professor. But since each student within a class is taught by the same professor, a professor’s own effectiveness cannot be the cause of this correlation.

Another proposed variable is student’s academic motivation (Marsh, 1984). This explanation posits that students who are motivated and interested in the subject would earn better grades by virtue of increased effort, and be more appreciative of their instructor, which they would demonstrate by giving the instructor higher evaluations. According to the academic motivation theory, however, students in classes with higher grades should work harder. However, Greenwald (1997), using a study that was conducted at the University of Washington, observed a negative relationship between workload and student grades. In other words, students seem to work harder in classes with potentially lower grades. So a student’s academic motivation may only partially contribute to the positive correlation explanation between GPAs and SETs, but cannot completely explain it.

According to the grade attribution theory, students who receive higher grades attribute it to themselves, but students who receive lower grades tend to blame everybody else but themselves. Hence, students receiving lower grades are more likely to criticize their professor. Holmes (1972) conducted a study to see if students who received a grade lower than expected would write worse evaluations as compared to students who received a grade they thought they deserved. He concluded that if students were thinking that they were likely to receive an “unfair” grade, they were more likely to rate their professor lower.

As a consequence of the grade attribution theory, a professor who grades more leniently may thus receive less criticism from his/her students. Johnson (2003) conducted an experiment at Duke University during the 1998-1999 academic year by using a special online course evaluation experiment called DUET. His experiment was aimed to provide evidence that student...
evaluations of teaching do have a direct biasing effect on student grades. He argued that, of all the explanations of the positive correlation between GPAs and SETs, an overwhelming reason was grading leniency.

Grade inflation can also be explained by the widespread accessibility of the internet, and the majority of students choosing courses that are graded more leniently as a result. Websites such as RateMyProfessors.com (2013) are now widely used by students in deciding which courses to take. Bar, Kadiyali and Zussman (2009) conducted a study at Cornell University to see if grade inflation can be explained by the university’s decision to publish median grades online. They concluded that if students have the ability to access past median grades by going to the school website, the majority of them will try to choose “easier” instructors. Some exceptions included stronger students who choose to enroll in more challenging classes to strengthen their knowledge of the material. The median grades were published online by the Cornell University for students to see, but were not available as part of student transcripts, so potential employers or graduate school admission administrators were not able to see them. Thus, the university’s decision to provide median grades online, instead of mitigating grade inflation, seemed to have exacerbated it.

So what is the reason professors may be motivated to grade leniently, which, in turn, may translate into higher evaluations by their students? It is well known that SETs are increasingly used by institutions for the purposes of awarding tenure, salary considerations, and promotion. Filetti (2010) conducted research in an English department of a small, public liberal arts university in Virginia by examining the relationship between grade distribution and faculty rank, and found that tenure-track faculty give higher grades than tenured professors, on average, mostly by giving A’s and A-’s.

Since our university also uses SETs for administrative purposes, we were very interested, amongst other things, in analyzing the grades in our department to see if tenure-track status of a professor may lead to higher grades. We also wanted to see if the overall rating of an instructor as recorded on student evaluations of teaching is positively associated with student grades.

**METHODOLOGY AND RESULTS**

The data was collected at the mathematics department of St. Mary’s University, a four-year liberal arts Catholic institution, over the time period from 2000 to 2012. For each class taught, we recorded the average class GPA (grade point average) and the average overall assessment of an instructor from SETs (student evaluations of teaching). We also noted whether the class taught was introductory or advanced. In addition, we recorded the gender of the professor who taught the class and his/her status (adjunct, pre-tenure, or tenured).

Out of all professors in the study, about 70% were males and 30% females. About 50% of all professors were adjuncts, with the remaining 50% split roughly in half between tenure-track and tenured faculty.

To see how grades and student evaluations of teaching changed with time, we constructed the following graphs in Figures 1 and 2 below.
As can be seen from Figure 1, the grades for the department have been rising steadily over the past decade, but seem to have somewhat stabilized over the last couple of years. While there was some seasonal difference between the Fall and Spring semester GPAs, with the Spring semester average GPA of 2.61 exceeding that of the Fall, 2.52, the difference was not found to be statistically significant. Along with the grades, we can also observe (see Figure 2 above) that SETs change with time in a trend very similar to the GPAs. Because the grades and student evaluations of teaching were aggregated at the semester level for the mathematics department in
Figures 1 and 2, the analysis needed to be disaggregated to the professor and further to class level to help explain the phenomenon of rising grades.

Since SETs were shown by other studies to have a positive correlation with GPAs, we wanted to see if that was true for our data. The correlation between SETs and GPAs was found to be 0.75, which indicated a strong positive association between the two variables. If the data is aggregated at a class level, the correlation turned out to be 0.42 (compared to average value of 0.31 found in other studies). This higher-than-average correlation could in part be explained by the fact that our university is private, and thus, is more prone to grade inflation (Rojstaczer, Healy, 2010). Nevertheless, since this correlation is substantial, we were very interested in including the overall rating of an instructor variable in our model to estimate its effect on GPAs.

To analyze the data, we needed to apply hierarchical linear modeling. Since the same professor teaches multiple courses, the data cannot be analyzed using ordinary least squares regression because it assumes independence of errors. This assumption is clearly violated since the observations corresponding to the same professor cannot be considered independent. One way to rectify this problem is to aggregate all data to the professor level and consider the average GPA that he or she assigned for all classes he/she taught. But that would result in the loss of within-group variation, and we would be unable to judge how grades differ for different course levels, for example, which was one of the factors of interest in this study. Thus a more appropriate model is a multilevel model, which takes into account the natural clustering of the data. In our case, the courses (level-one units) are clustered within professors who teach them (level-two units).

The unconditional hierarchical linear model (HLM), which is a model with no predictors, was fit to the data first. It is usually used to see if there is enough variability between level-two units (professors in our case) to warrant the use of HLM. This model has the form

$$GPA_{ij} = \beta_{0j} + r_{ij}, \quad r_{ij} \sim N(0, \sigma^2)$$

$$\beta_{0j} = \gamma_{00} + u_{0j}, \quad u_{0j} \sim N(0, \tau_{00})$$

where i represents the class taught and j represents the professor who taught the class.

The intraclass correlation coefficient (ICC)

$$\rho = \frac{\tau_{00}}{\tau_{00} + \sigma^2}$$

measures the proportion of variability attributed to level-two units. Using HLM 7 software (Raudenbush, 2011), we obtained an estimate of ICC for our data, which approximately equaled to 0.53. Thus, roughly 53% of total variance in class GPAs is associated with professors as opposed to classes themselves. Hence, a linear two-level hierarchical model seemed appropriate.

The following model was found to be a model of best fit to the data:

$$GPA_{ij} = \beta_{0j} + \beta_{1} PreTenure_{ij} + \beta_{2} Advanced_{ij} + \beta_{3} Evaluation_{ij} + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01} Male_{j} + \gamma_{02} Adjunct_{j} + u_{0j}$$

where
• Outcome variable was class GPA;
• PreTenure variable equals one if a professor’s status was pretenure, and zero otherwise;
• Advanced variable equals one if the course was an upper division course, and zero otherwise;
• Evaluation variable was the average overall measure of teacher effectiveness as obtained from SETs, group mean centered to assist in result interpretation;
• Male variable equals one if a professor was male, and zero otherwise;
• Adjunct variable equals one if a professor’s status was part-time, and zero otherwise.

The PreTenure variable was handled as a level-one (class level characteristic) variable as opposed to level-two (professor level characteristic), because the tenure status of some professors changed over the course of the study.

The results are provided below.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>0.36</td>
<td>0.06</td>
<td>&lt; .001 *</td>
</tr>
<tr>
<td>Evaluation</td>
<td>0.19</td>
<td>0.04</td>
<td>&lt; .001 *</td>
</tr>
<tr>
<td>PreTenure</td>
<td>−0.16</td>
<td>0.12</td>
<td>.063</td>
</tr>
<tr>
<td>Adjunct</td>
<td>−0.33</td>
<td>0.27</td>
<td>.223</td>
</tr>
<tr>
<td>Male</td>
<td>−0.28</td>
<td>0.28</td>
<td>.324</td>
</tr>
</tbody>
</table>

As can be seen from Table 1, the course level (introductory versus advanced) was significant. According to the model, all other parameters held constant, the GPA of upper-division courses rises by about 0.36 points, on average. This can be explained by the fact that advanced level courses are usually taken by students who are interested in the subject, and may exert more effort in earning a better grade. It can also be explained by smaller class sizes in upper-division classes, which could contribute to better teacher effectiveness. Also, lower level courses are frequently used as gatekeeper courses, so students who do not drop out and get to the upper level courses, perform better on average.

The Evaluation variable, which was obtained from SETs, was also significant as expected. The resulting estimated coefficient of 0.19 in the model can be interpreted as, all other parameters being equal, there is an average increase of 0.19 points in a class GPA for an average unit increase of teacher’s overall class evaluation. Thus, class grades are positively associated with student evaluations of teaching.

Contrary to our expectations, however, the PreTenure variable estimate shows that, all other parameters being equal, pretenure faculty generally grade by 0.16 points lower than the rest. However, this variable was not found significant in the model. In fact, since student evaluations of teaching are generally used not only in tenure decisions, but also in determining
promotion and salaries, both tenure and pretenure faculty may consider their student evaluation results equally important.

Neither adjunct status of a professor nor gender seemed to have a significant effect on grades as seen from Table 1.

**DISCUSSION**

If something is not done to stop, or, at the very least, slow down grade inflation, grades can become decreasingly meaningful. What, if anything, could be done to rectify this growing problem?

Even though the authors join with other researchers in their belief that there may be some bias present in SETs, Greenwald (1997) argues that, by itself, it is not a good reason to get rid of them, as they do provide the only measure of student satisfaction. It is essential for professors to know what their students think about the course, what could be done to improve it, etc. It is the way that SETs are used for administrative purposes that needs careful consideration.

In a curious experiment mentioned in Johnson’s book (2003), a Dr. Fox gave a lecture to eleven professional psychiatrists, psychologists, and social workers. In his lecture, he talked about some mysterious mathematics game theory pertaining to physician education. He used humor, enthusiasm, and great organization, demonstrating qualities of a great speaker. He received very high evaluations from the audience, but as it turned out later, he was just a professional actor, did not hold an advanced degree in science, and his whole lecture did not have much of a meaning. This example demonstrates quite clearly that student evaluations should not be solely used to judge the level of student learning.

In addition to potentially contributing to grade inflation, the widespread use of SETs can lead to “coursework deflation”, as noted by Crumbley, Flinn, and Reichelt (2010). They point out that too much reliance on SETs for promotion and tenure purposes may lead to some professors “dumbing down” their courses, and result in unethical behaviors in a classroom. Some professors may exclude hard topics from the curriculum, make answers to exams available online, waste a lot of time in class on general discussions, etc. While these behaviors could lead to greater popularity and higher evaluations by students, they can significantly lower the quality of education.

The authors believe that student evaluations should be used by administrators in a limited way as a measure of “customer”, i.e. student, satisfaction. Other measures of teacher effectiveness should be implemented, such as peer review. Another suggestion would be to consider how a student performs in subsequent classes. For example, at St. Mary’s we have classes that students are taking in sequence, such as Univariate Calculus I and II. To judge teacher effectiveness after he or she taught a Calculus I course, we can record how his or her students later performed in Calculus II.

Besides reducing the emphasis on SETs in promotion/tenure/salary decisions by administrators, other measures could be done to mitigate the problem of grade inflation. Johnson (2003) notes that the issue should be brought up in faculty senate discussions, grade policies should be more transparent, a class grade distribution may have to be constrained (which may become a very unpopular measure with some professors). In addition, Johnson (2003) suggests a method of adjusting GPA’s and reporting both GPA and adjusted GPA to account for differences in grading policies.
However, Johnson’s (2003) method of adjusting grades is not that easy to implement in a classroom, since it is based on regression, and an average instructor may find it hard to perform a regression analysis every time he or she records grades. The authors suggest a simpler method, which could at least provide some information about a student’s relative standing in his/her class as compared to other students. Microsoft Excel’s Rank and Percentile option that is available as part of the Data Analysis ToolPak can be quickly used to determine each student’s percentile. This way a student receiving an “A” in a class where an average class grade is a 90 can be differentiated from a student who receives an “A” in a class with an average class grade of a 70.

Publishing percentiles as part of student transcripts, in addition to student grades, may be challenging because of implementation issues. However, the authors believe that providing percentiles and class averages as part of student transcripts is extremely important, and an effort should be made to enact this change. Students should know that not only their grades will be available to potential employers or graduate school admission offices, but also their relative standing in a class. Employers will know that a student intentionally chose mostly courses that were graded very leniently, and consequently decide to employ a person who may have lower GPA, but who chose to enroll in more challenging courses. This could discourage students from taking easy classes, and professors from bounding under pressure and grading more leniently.

Because our study was observational in nature, we cannot claim that the recent grade inflation trend was directly caused by professors wishing to receive higher evaluations for potential promotion and tenure considerations. Other factors, both specific to our university and more general, could have influenced the grades. For example, differences between grading policies, the quality of support of instruction by tutoring centers, professor popularity, ethical issues, and other factors.

Our study was limited by its analysis of just the mathematics department. It would be very important for our university to know if grade inflation is an issue not just for our department, but for the whole school. Subsequently, future research in this area could be expanded to include other departments within the School of Science, Engineering, and Technology, and potentially the entire university. The relevant data could be collected, and a three-level (classes within professors within departments) hierarchical model could be used to analyze it.

REFERENCES


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BUILDING A COLLABORATIVE CLIMATE: 
AN ASSESSMENT OF CONVENTIONAL AND 
CONTEMPORARY COMMUNICATION METHODS

Adrian B. Guardia 
F. Irene Waggoner 
Robert Vinaja 
Texas A&M University-San Antonio

ABSTRACT

Collaborative work requires that participants have both the capacity to communicate with each other, and that the exchange be made in a climate of trust. While these basic tenants for successful collaboration have long been recognized as a principle challenge for efficacy work, 21st century options to conventional face-to-face engagement raise the question whether digital mediated communications adequately replace the qualities of time and place as provided by the shared physical experience of face-to-face communication. To explore this dynamic, this study examined students’ perceptions concerning their individual experiences in group collaboration to assess the utility of communication methods used in the completion of team or group work and student perceptions on communication used and team collaboration experienced. The research sample consisted of undergraduate and graduate Business students enrolled in Human Resource Management courses. Courses consisted of both hybrid (50% face-to-face; 50% online), and 100% online formats. All courses included in the sample required a semester length team project consisting of collaborative work representative and unique to each course. The findings suggest perceived differences in the utility between the communication methods. There was no significant effect of the communication methods on the quality of collaboration.

Keywords:  Student teams, collaboration, communication methods

INTRODUCTION

As defined by Michaelsen, Fink, and Knight (2002), team-based learning is an instructional strategy that utilizes the practice of working in teams in the classroom, and this instructional strategy is extensively utilized by many business programs, in both graduate and undergraduate classes. At the university represented in this study, graduate and undergraduate students are required to complete a variety of collaborative projects as class deliverables, and while working in team environments on semester-long team projects, are required to quickly move through the group dynamics stages of forming, storming, norming and performing. Team formation and development is facilitated by a variety of methods:  a) face-to-face meetings, b) video and audio teleconferencing methods, c) texting, d) email, and f) virtual workspaces available through Blackboard or other web course tool classroom technologies. Previous methods to measure the effectiveness and success of team work include satisfaction and performance measures (Hamlyn-Harris, Hurst, von Baggo, & Bayley, 2006). A successful team project, defined by the resulting team grade, requires finding the right mix of technologies and
methods to allow a team to move quickly through the group development stages and effectively
and efficiently generate the course deliverables.

Keys to successful teamwork include a clear and elevating goal, an effective structure,
and competency among the team members, unified commitment, strong leadership,
collaboration, and good communication (Guardia, 2007; Larson and LaFasto, 1989).
Collaborative work requires that participants have both the capacity to communicate with each
other, and that the exchange be made in a climate of trust. Team trust is directly related to team
member satisfaction (Kline & O’Grady, 2009). While these basic tenants for successful
collaboration have long been recognized as a principle challenge for group efficacy (Zellars,
Hockwarter, Perrewe, Miles, & Kiewitz, 2001; Whiteoak, Chalip, & Hort, 2004), 21st century
options to conventional face-to-face engagement raise the question whether digital mediated
communications adequately replace the qualities of time and place as provided by the shared
physical experience of face-to-face communication. The research focus for this study was on the
last two factors – collaboration and communication methods – and provides an examination of a
variety of communication technologies, and the impact of these technologies, on the perceived
effectiveness of the team with regard to the team project. Motivation and culture of interaction
affect the way in which groups manage information (Bierhals Schuster, Kohler, & Badke-Schaub,
2007).

Team-based work environments, including high-performing work systems, self-regulated
teams, and virtual teams (Hardin, Fuller, & Valacich, 2006, 2012) remain integral to most
industries. Given the pervasiveness of team-related work environments, it is clear that students
who are prepared with essential team concepts and who are practiced in team-related skills, such
as collaboration, leadership, followership, and appropriate communication methods, will have a
greater chance of success as members in future teams within their respective workplaces and
communities. Students in this study were surveyed on their perceptions of the efficiency,
convenience, availability, sufficiency, and cost savings of the technologies available, as well as
their perceptions of perceived quality of collaboration within the team: a) trust in sharing
information, b) compensation of individual shortcomings, c) trust in completing tasks, and d) the
development and acceptance of a common set of guiding values.

Team success is demonstrated by:
- Structural features: differentiated roles, responsibilities, and accountabilities
- Trust
- Honesty/integrity
- Openness: a willingness to share; receptivity to information, perceptions and ideas
- Consistency: predicable behavior and responses
- Respect: treating people with dignity and fairness

Purpose of the Study

The purpose of this exploratory study was to examine students’ perceptions concerning
their individual experiences in group work, with regard to collaboration and communication,
leading to trust and high performance. The authors examined the utility of communication
methods used in the completion of team or group work, and assessed student perceptions on
communication methods used and team collaboration experienced. This study examined
relationships and analyzed differences between communication methods, independent variables,
and the utility of communication methods, dependent variables. Also assessed was whether
communication methods, independent variables, had an effect on the perceived quality of collaboration, dependent variable.

Communications methods for this study examined consisted of: face-to-face, video chat, audio chat, texting, email, and virtual workspace. Utility of communication methods included: efficiency, convenience, availability, sufficiency, and perceived cost savings. Quality of collaboration for this study consisted of: honesty/integrity, openness, consistency, and respect.

**LITERATURE REVIEW**

**Conceptual Definitions**

*Inferences* (relationships and differences) between conventional face-to-face communications and digitally mediated communications – video chat, audio chat, texting, email, and virtual workspace – were examined for their utility in facilitating team work. Utility has been characterized as efficiency, sufficiency, convenience, availability, and perceived cost savings. Further, the quality of collaboration was characterized as: honesty/integrity, openness, consistency, and respect, and its relationship to each of the communication methods. Conceptual definitions for each dependent variable follow:

**Efficiency** - Efficiency can generally be characterized as an accomplishment of the task or job with a minimum expenditure of time and effort. For this study, the issue was the perception of the efficient use of the resource of time for individuals’ participation on the team project, i.e., determining whether a particular communication method added to greater efficiency in the individual team member’s efforts toward the team project. Social-presence theory evolved through research about efficiency and satisfaction in the use of different telecommunications media (Salinas, 2005). Short, Williams, & Christie (1976) introduced the term social presence as the awareness of others in an interaction combined with an appreciation of the interpersonal aspects of that interaction. Building on this construct, efficiency can be viewed as time spent by collaborators in that interaction to finish a task. Gutwin & Greenberg (1999) support this notion that time, as a basic measure of efficiency, assumes there is a relationship between the activities of collaboration and the speed at which a group performs a task.

**Convenience** - This concept relates to the perceived convenience – suitability of the method for the task at hand, simplification or saving of work, or ease of use – in the various communication methods employed by individual team members: face-to-face, video chat, audio chat or teleconferencing, email, texting, or use of the virtual workspace within the Blackboard system. Davis, Bagozzi and Warshaw (1989) originally proposed two beliefs in their technology acceptance model — perceived usefulness, and perceived ease of use. Both are instrumental in explaining the variance in users’ intentions. Perceived usefulness is the degree to which a person believes that using a particular system enhances his or her job performance. Perceived ease of use is the degree to which a person believes that using a particular system will be free of effort. Convenience has an effect on the relational exchange in electronic mediated environments. (Dai, Salam & King, 2008). In addition, perceived usefulness (Wati, Koo, Jung & Lee, 2009), perceived convenience (Al-Hajri & Tatnall, 2008), and trust (Khare, Mishra & Singh, 2012) are the most significant determinants of online banking adoption.

**Availability** - This concept relates to the availability or ease of access to the various communication methods employed by the teams. In other words, were the necessary requirements for face-to-face, video chat, audio chat or teleconferencing, email, texting, or use of
the virtual workspace within the Blackboard system easily available, such as through meeting facilities, hardware (cell phones, computers), software (appropriate programs and capabilities), wireless connectivity, or other methods to make these communication methods easily and readily accessible to individuals on the team. The quality of an information system is determined by its availability (Li & Mäntymäki, 2011). Thomas, Bostrom, and Gouge (2007) note that group participation centers on how members cooperate or express their willingness to work together, how they coordinate information flows or are able to know when to send what, and how they communicate or are able to transmit messages between each other. Information processing capacity centers on having accurate, accessible information in shared information repositories; having information that can be jointly visualized and manipulated simultaneously by dispersed team members; and having information in forms that can easily transfer intact virtually from member to member (Thomas, Bostrom & Gouge, 2007).

**Sufficiency** - Sufficiency for this study is defined as the perception that the communication methods used by individuals in a particular team were sufficient to engage the team members and move the team to a successful conclusion of the team project. Griffin, Neuwirth, Dunwoody and Giese (2004) cite Chaiken’s (1980, 1987) Heuristic Systemic model (HSM) to explain how people receive and process persuasive messages. The model formulation proposes a deeper processing of information, one motivated by one’s desire for sufficiency and moderated by one’s capacity to process the information deeply and critically. Eagly and Chaiken (1993) stated in their sufficiency principle that “people will exert whatever effort is required to attain a ‘sufficient’ degree of confidence that they have accomplished their processing goals” (p. 330). The personal relevance of the message topic to the individual can motivate one to process the message more systematically (Eagly & Chaiken, 1993) This characterization infers that the “relevance” of the message and the amount of judgmental confidence required for individuals to have the “sufficiency threshold” in their own attitudes, satisfies one’s ‘sufficiency’, e.g., Does one believe the message transmitted conforms with the relevant facts?

**Cost savings** - Cost savings is a measure of the perceptions of the saving of costs of time, gas, and effort while the individual team members were engaged in the team project work. McKinney and Whiteside (2006) noted that the potential benefits of remote group work are similar to those touted for telecommuting — including overall cost savings, reduced energy consumption, and greater opportunities for the physically challenged to participate. To some extent, replacing some face-to-face work with virtual meetings seems inevitable, as such measures become a cost-effective strategic alternative to address economic and security issues that make travel more time consuming and problematic. For instance, benefits for wireless technologies are centered on three main areas: time savings, flexibility and quality of work (Vaghjiani & Teoh, 2008). Cost savings drives the adoption of online banking (Al-Hajri & Tatnall, 2008).

**Collaborative Climate** - The quality of the team’s collaborative climate was defined in terms of the individual’s perception of: a) trust in sharing information, perceptions and feedback, b) helping others by compensating for individual shortcomings, c) trust that each team member would perform individual tasks completely and responsibly, and d) the development and acceptance of a common set of guiding values. Two perspectives dominate the literature on trust: rational and social. The rational perspective views trust as a collective intangible asset embedded in the relationship (Fukuyama, 1995). Trust is seen as an interpersonal state when two individuals cooperate rather than compete. Despite the risk of an individual exploiting the cooperation to his or her advantage, the exchange is facilitated and valued on the basis of
cooperation (Deutsch 1958; Mayer, Davis, & Schoorman, 1995; Chen, Wu, Yang & Tsou, 2008). The social perspective views social exchange theory values the interpersonal exchange of intangible social costs and benefits (Kelley & Thibaut, 1978). The reciprocal rewards and the success of a social exchange process depend on the beliefs of the exchange partners (Blau, 1964). For team members to facilitate the exchange, members must have trust in each other. Team trust is a function of perceived ability, integrity, and benevolence as well as the propensity of members to trust each other (Jarvenpaa, Knoll, & Leidner, 1998). Affective trust has a strong positive relationship with team performance (Webber, 2008).

Quality Collaboration

Four themes that help explain how trust fosters teamwork in effectively communicating teams (Guardia, 2007; Larson and LaFasto, 1989):

- Trust allows team members to stay problem-focused. The absence of trust diverts the mental concentration and energy of a team away from its performance objectives and onto other issues. The team becomes guarded and distorted. Alliances and personal agenda begin to take precedence over the team goal. The resulting loss of focus on the common goal is a critical factor. It wounds the team and often renders it ineffective.
- Trust promotes more efficient communication and coordination. Trust not only allows people to stay problem-focused, it promotes a more efficient use of the time and energy devoted to the problem.
- Trust improves the quality of collaborative outcomes. This theme contains an important key to understanding what a collaborative climate is and what it accomplishes. The key involves understanding how two very subtle and potentially antagonistic norms can be maintained simultaneously in an effectively functioning team.
- Trust leads to compensating. One explanation that has been offered for why teams sometimes succeed – even beyond reasonable expectations for success – is that “compensating” arises. Compensating happens when one team member picks up the slack that occurs when another member falters. If a lot of compensating occurs, then a whole team is capable of pulling itself, collectively, to new levels of performance.

This study investigated two research questions:

1. Do different communication methods used in student collaboration have an effect on communication efficiency, sufficiency, convenience, availability, and perceived cost savings?
2. Do different communication methods (face-to-face, video chat, audio chat, texting, email, and virtual workspace) have an effect on the quality of student collaboration?

To understand the relationship and inferences among these variables, collection consisted of an online survey featuring statements and Likert responses. Inferences between conventional face-to-face communications and digital mediated communications (independent variables) for their utility and quality of collaboration (dependent variables) in facilitating team work were examined. A discussion on the research population, instrumentation, and data analysis follow under Methodology.
METHODOLOGY

Research Design

The analysis included five variables: efficiency, convenience, availability, sufficiency, and perceived cost savings and six communication methods which represent the treatments. The data was analyzed using the statistical software SAS and SPSS. All tests were conducted at the alpha = 0.05 level. An online survey was utilized that featured statements operationalizing utility as time spent (efficiency), ease of use (accessibility), required resources (equipment), sufficient direction (sufficiency), and cost savings in travel time and fuel expense (cost savings), and Likert-like responses reflecting levels of agreement.

Participants

Researchers submitted the required study proposal to the Institutional Review Board at Texas A&M University - San Antonio for this research, January 2013. The IRB reviewed and returned the proposal with approval to start the study on January 31, 2013 (proposal log number 2013-08). The participants in this study consisted of 447 undergraduate and MBA students enrolled in one or more HRM courses (online and hybrid) during fall 2012 and spring 2013. The resulting sample studied consisted of 102 respondents, a 23% response rate. Courses included in the study featured a semester length team project and facilitated by a structured project plan.

Instrument

The survey instrument used consisted of four demographic questions, 38 questions on communication technologies, and four questions on collaboration. For questions regarding communication technologies, the participant was asked to rate to what degree a particular technology inhibits or contributes to effective use of time, convenience, sufficient direction for team project contributions, as well as ratings on availability of equipment, the importance of time and expense savings, and device preference. The questions on collaboration measures perceptions of trust in information sharing, compensation for shortcomings of individuals trust in completion of tasks and responsibilities, and development and acceptance of guiding values. The rating scales range from one to seven. The null hypotheses in the study were:

- \( H_01 \): There is no difference between conventional (face-to-face) communication methods and contemporary (video chat, audio chat, texting, email, virtual workspace) communication methods with regard to effects on efficiency, sufficiency, convenience, availability, and cost savings.
- \( H_02 \): There is no difference between conventional (face-to-face) communication methods and contemporary (video chat, audio chat, texting, email, virtual workspace) communication methods with regard to the perceptions of quality of collaboration.

Validity/Reliability Strategies

According to Zachariadis, Scott and Barrett (2013), validity in quantitative research may be established through design validity, measurement validity and inferential validity.
Design validity is accomplished through a) internal validity (observed correlation between variables of interest in a causal effect) and b) external validity (cause-effect relationship can be generalized). Measurement validity rests on a) reliability and b) construct validity (variables indicate what they intend to measure). Inferential validity depends on statistical conclusion validity (appropriate statistics and adequate findings). (p. 860)

RESULTS

Repeated-measures one-way ANOVA was used to compare the mean scores among the communication methods. The assumption of normality was tested based on the standardized skewness. About half of the standardized skewness values indicated departures of normality. Although the Repeated Measures ANOVA test can be robust to moderate departures from normality, each Repeated Measures ANOVA was validated by using a transformation of the variable in an equivalent Repeated Measures ANOVA. In addition, because of the departure from normality, the Friedman non-parametric test was used to confirm the results of the RM-ANOVA tests, because the Friedman test does not require normality. For each ANOVA test the Mauchly’s Test of Sphericity was used to test the sphericity assumption of repeated-measures ANOVA. All tests except the one for Convenience were significant, indicating a lack of sphericity. For this reason, the Greenhouse-Geisser adjustment, Wilk’s Lambda multivariate and the Friedman non-parametric test were used for subsequent results.

Table 1
Rate of Participation Rate Between Face-to-Face and Texting

<table>
<thead>
<tr>
<th>Item</th>
<th>Wilk’s lambda</th>
<th>Greenhouse F</th>
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<th>Kendall's W</th>
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<td>Transformed</td>
<td>Original</td>
<td>Transformed</td>
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<tr>
<td></td>
<td>variable</td>
<td>variable</td>
<td>variable</td>
<td>variable</td>
</tr>
<tr>
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<td>0.265</td>
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<tr>
<td>Convenience</td>
<td>0.365</td>
<td>0.374</td>
<td>0.174</td>
<td>0.221</td>
</tr>
<tr>
<td>Availability</td>
<td>0.011*</td>
<td>0.025*</td>
<td>0.001*</td>
<td>0.007*</td>
</tr>
<tr>
<td>Sufficiency</td>
<td>0.017*</td>
<td>0.028*</td>
<td>0.065</td>
<td>0.104</td>
</tr>
<tr>
<td>Savings</td>
<td>0.071</td>
<td>0.118</td>
<td>0.002*</td>
<td>0.003*</td>
</tr>
</tbody>
</table>

* p<0.05

The data was analyzed using ANOVA in PAWS (formerly SPSS). The following sections discuss the statistical analysis and the results. To determine if a difference exists for H1, an F-Test was used to evaluate the differences in average employment tenure among the generation groups. The ANOVA table results indicate a significant generation level effect on employment tenure (F-value: 32.405, p-value: 0.000). In addition, individual t-Tests were run for each separate year. An F-Test determined that the variances were unequal. As a result, all years were tested using the t-Test two-sample assuming unequal variances. The results of the t-Test are listed in Table 2. Using a hypothesized mean of zero, the test revealed significant differences for all years for average employment tenure between the two generation groups (p-values: 0.0000).
According to Figure 1 and Table 2, e-mail was perceived as the most efficient communication method followed by texting. Virtual workspace was perceived as the least efficient method. There were no significant differences among the multimedia methods (audio, video, workspace). Also, there was no significant difference in efficiency between e-mail and texting.
Text-based methods (e-mail and texting) are significantly more available than multimedia methods (audio, video and workspace) and face-to-face meetings. As seen in Figure 2 and Table 3, in almost every comparison audio and video were perceived as less available. This could be related to the technical requirements for using audio or video conferencing. There was, however, no significant difference in how participants evaluated the availability of face-to-face meetings and multimedia methods (audio, video, and workspace).
E-mail is perceived to provide more content sufficiency than workspace, audio, video and text. In addition, face-to-face meetings are perceived to provide more content sufficiency than the multimedia methods (audio, video, and workspace) and even text. There were no significant differences in content sufficiency among the multimedia methods (audio, video, and workspace). There were significantly more favorable scores of texting over the workspace.
Figure 4
Means for Savings

Table 5
Paired Samples Test for Savings

<table>
<thead>
<tr>
<th>Methods</th>
<th>Mean difference</th>
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<th>Pairwise adjusted p-value</th>
<th>Wilcoxon p-value</th>
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<td>0.00*</td>
<td>0.00*</td>
</tr>
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<td>.9440</td>
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<td>0.00*</td>
<td>0.00*</td>
</tr>
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<td>workspace – face</td>
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<td>0.02*</td>
<td>0.00*</td>
</tr>
<tr>
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<td>0.04*</td>
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<td>.5556</td>
<td>0.07</td>
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<tr>
<td>text - workspace</td>
<td>.3889</td>
<td>0.07</td>
<td>0.10</td>
<td>0.66</td>
</tr>
<tr>
<td>e-mail – text</td>
<td>.1111</td>
<td>0.43</td>
<td>0.56</td>
<td>0.00*</td>
</tr>
<tr>
<td>audio – workspace</td>
<td>.0000</td>
<td>1.00</td>
<td>0.95</td>
<td>0.69</td>
</tr>
<tr>
<td>video - workspace</td>
<td>.0000</td>
<td>1.00</td>
<td>0.91</td>
<td>0.96</td>
</tr>
<tr>
<td>video - audio</td>
<td>.0000</td>
<td>1.00</td>
<td>0.90</td>
<td>1.00</td>
</tr>
</tbody>
</table>

* p-value < .05, two-tailed

Most of the pairwise comparisons were significant. The mean perceived savings for e-mail were significantly greater than the means for all the other communications methods. The mean perceived savings for face-to-face meetings were significantly lower than the means for all the other communications methods. This result suggests that face-to-face meetings are perceived
as having the highest related expenses. The perceived savings did not differ significantly among the multimedia methods (audio, video, and workspace).

The hypothesis tested was:

$H_0$: There will be no difference in the efficiency, convenience, availability, effectiveness, and perceived cost savings for the communication methods.

Based on the analysis we reject the null hypothesis for efficiency, availability, effectiveness, and perceived cost savings. The null hypothesis was not rejected for convenience.

The data from 30 questionnaire items was analyzed using factor analysis with Varimax (orthogonal) rotation. The factor analysis was exploratory given the limited sample size. As shown in Table 6, all items loaded on five factors, only 3 items had loadings between .4 and .5. The analysis yielded six factors explaining a total of 86% of the variance for the entire set of variables. Factor 1 was labeled virtual workspace and includes the five items related to the use of the virtual workspace. This first factor explained 25% of the variance. The second factor derived was labeled face-to-face. This factor has high loadings for the items related to face-to-face interaction. The variance explained by this factor was 18%. The six factors account for 86% of the variability in all variables. Items in each factor were clustered together as shown in Figure 6.

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy is only 0.36, but according to MacCullum et al. When communalities are high (> .6), the factor analysis can be reliable even though the sample size is below 100 because only 2 out of the 30 communalities are lower than .6. The number of factors was set to 6 based on the communication methods used by the teams. This is compatible with the general rule based on Eigen values greater than 1, the Eigen values for all 6 retained factors were greater than 1. In addition the scree plot (Figure 5) was visually inspected to determine the number of factors.
The factor scores were correlated and also used in an ANOVA to estimate the effect of the communication methods on the quality of student collaboration.

The hypothesis to be tested was:

$H_0$: There is no difference between conventional (face-to-face) communication methods and contemporary (video chat, audio chat, texting, email, virtual workspace) communication methods with regard to the perceptions of quality of collaboration.

The results of the ANOVA analysis did not show any significant $F$ values. The correlation matrix in Table 6 shows that text was significantly correlated with the quality of team collaboration, but although the correlations are significant at alpha 0.05, the correlation coefficients are below 0.60. Based on the ANOVA analysis $H_0$ was not rejected.
Table 7
Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>VIRTUAL</th>
<th>FACE</th>
<th>AUDIO</th>
<th>TEXT</th>
<th>EMAIL</th>
<th>VIDEO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our team trusted each other sufficiently to accurately share information, perceptions, and feedback.</td>
<td>-.152</td>
<td>-.007</td>
<td>.162</td>
<td>.248*</td>
<td>.042</td>
<td>.107</td>
</tr>
<tr>
<td>Our team helped each other by compensating for individual shortcomings.</td>
<td>-.099</td>
<td>.157</td>
<td>.160</td>
<td>.221*</td>
<td>.123</td>
<td>.082</td>
</tr>
<tr>
<td>Our team could trust each other to act completely and responsibly in performing our individual tasks.</td>
<td>-.044</td>
<td>.058</td>
<td>.040</td>
<td>.223*</td>
<td>.134</td>
<td>.038</td>
</tr>
<tr>
<td>As a team we embraced a common set of guiding values.</td>
<td>-.059</td>
<td>.129</td>
<td>.123</td>
<td>.300**</td>
<td>.115</td>
<td>.149</td>
</tr>
</tbody>
</table>

Although the analysis did not show a significant effect of the communication methods on the quality of team collaboration, it is noteworthy that the collaboration scores were generally high. For instance, Figure 7 shows the distribution of scores for the variable team trust.

Figure 7
Team Trust Scores

CONCLUSION

This study indicated differences between conventional (face-to-face) communication methods and contemporary (video chat, audio chat, texting, email, virtual workspace) communication methods with regard to effects on efficiency, sufficiency, convenience, availability, and cost savings. Respondents indicated that:

- E-mail was the preferred method for efficiency in transferring content that required thought and analysis.
- Texting was the preferred method for convenience in notifications.
- Digital methods were found to be insufficient to engage the team members and move the team to a successful conclusion of the team project.
Availability of communication methods, and cost savings were found to be satisfactory for all methods, and not differentiators.

The respondents in this research also indicated that face-to-face communication is necessary for success in their team projects. In regards to the seven independent variables, the following are the key findings:

1. **Efficiency.** The analyses identified ‘e-mail’ followed by ‘texting’ as the most efficient of communication methods studied. The research team observed the opportunity to introduce and encourage use of ‘cloud’ resources, e.g., Google Groups, Dropbox, for file exchange accessible from any electronic device. New postings could prompt group members by texting an advisory to members to access the file space.

2. **Sufficiency.** The analyses revealed email and face-to-face communication methods were perceived to provide more content than all other multimedia methods studied. The substantive exchange of content in both communication methods is consistent with the Heuristic Systemic model (HSM) which explains how people receive and process persuasive messages. The model proposes a deeper processing of information, one motivated by one’s desire for sufficiency and moderated by one’s capacity to process the information deeply and critically (Griffin, Neuwirth, Dunwoody & Giese, 2004).

3. **Availability.** The analyses suggested that text-based methods (e-mail and texting) were viewed as most readably available than other multimedia methods studied. This assessment underscores the Pew Internet: Mobile study which revealed that in 2013, 91% of adult Americans have a cell phone; 81% send or receive text messages (Brenner, 2013).

4. **Cost savings.** The data revealed that the perceived cost savings with face-to-face communication were lowest among all the communication methods studied.

Team-based learning is an important instructional strategy that requires improved and sustained classroom introduction, and application and continual practice in group work. We cannot assume that our day to day use of technology is sufficient nor expect that students are sufficiently experienced and equipped to use all forms of communications methods for engaging in their assigned group work.

**LIMITATIONS OF THE STUDY**

The findings of this research are noted and should be considered in the wider interpretation of the study’s results. The study utilized a convenience sample (N = 102) reflecting a 23% response rate of the target population. The results of this study may not be generalizable, and are limited to students sampled in this study.

This assessment tested communication methods (independent variables): face to face, email, texting, audio chat, video chat, virtual workspace (Blackboard), and the utility of each communication method (dependent variables): efficiency, sufficiency, convenience, availability, cost savings, and quality of collaboration.
The null hypotheses were defined as:

H$_{01}$: There is no difference between conventional (face to face) communication methods and contemporary (video chat, audio chat, texting, email, virtual workspace) communication methods with regard to effects on efficiency, convenience, availability, effectiveness, and cost savings.

Based on the analysis, we reject the null hypothesis for efficiency, sufficiency, convenience, availability, and cost savings.

H$_{02}$: There is no difference between conventional (face to face) communication methods and contemporary (video chat, audio chat, texting, email, virtual workspace) communication methods with regard to the perceptions of quality of collaboration.

Based on analysis of quantitative data, we reject the null hypothesis for perceptions quality of collaboration. The findings resulted in rejecting H0 and accepting H1.

Limits to the study include:

1. Assumptions on student training and application of communication technologies
2. Unknown frequency and length of communications.
3. Measurement at individual and group level on collaborative outcomes, i.e., team satisfaction, peer performance.
4. Identification and extent of social loafing and other group dysfunctions.
5. Comparisons to control group.
6. Comparisons to include other academic divisions.

Recommendations for future research include examination of generational challenges in learning, use of new technologies for collaborative work, and additional student satisfaction surveys to determine their needs for optimizing collaboration and effectiveness.

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THE EXPERIMENTAL CYBERLEARNING WORKSTATIONS PEDAGOGICAL MODEL: TENETS AND DYNAMICS

Valentin Ekiaka Nzai
Yu-Lin Feng
Texas A&M University-Kingsville

ABSTRACT

Today's digital native students no longer are the type of students school districts are designed and trained to teach. They have radically changed from students of the past. These natural divergences are serious threats to effective teaching and learning faced by many school districts in the U.S. and abroad (Collins & Halverson, 2009; November, 2010; Prensky, 2001, 2010 & 2012). Teachers typically have little appreciation for skills and experiences that digital native students bring to the classrooms. Digital immigrant teachers are not convinced that their students can effectively learn through systematic use of learning oriented electronic or digital media (Prensky, 2001, 2010 & 2012). Recently, the authors’ research team has been testing the suitability of various home-based cyberlearning technologies for teaching digital native elementary school children in after-school settings. This paper details the basic tenets and dynamics of the experimental cyberlearning workstations model used in cyberlearning projects that include systematic and intensive use of digital videogame and other learning-oriented electronic resources as core curricula. Optimal research fidelity conditions and implications for training present and future teachers of digital native students are discussed.

Keywords: Experimental cyberlearning workstations, digital native students, digital immigrant teachers, digital funds of knowledge

INTRODUCTION

Information technology advocates strongly believe that the introduction of computer and digital technologies in the classroom opens new avenues, not only for curriculum development changes, but also for school reform (Collins & Halverson, 2009; November, 2010). Today’s digital natives are no longer the type of students school districts were designed and trained to teach. They have radically evolved from students in prior years. Today’s students are surrounded by computers, videogames, digital music players, video cameras, cellular phones, instant text messaging, emails and various other tools of the digital age. They think and process information fundamentally differently from their predecessors, who continue to think and process information as digital immigrants. Figure 1 below illustrates the basic features of digital native students and digital immigrant teachers (Prensky, 2001, 2010 & 2012).

These differences are deeper and more significant than most educators realize since these teachers always retain, to some degree, their digital immigrant accent; that is, their feet are still in the past (Collins & Halverson, 2009; November, 2010; Prensky, 2001; 2010 & 2012). Digital
immigrant teachers’ accent can be seen in such things as turning to the Internet for information as a second option rather than first, or reading the manual for a program rather than assuming that the program itself will have instructions on its use, or using learning-oriented cyberlearning resources as an instructional strategy (Prensky, 2001; 2010 & 2012).

**Figure 1**

Differences between Digital Native Students and Digital Immigrant Teachers

<table>
<thead>
<tr>
<th>Digital Native Students</th>
<th>Digital Immigrant Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growing up with digital technology</td>
<td>Growing up prior to the digital age</td>
</tr>
<tr>
<td>Prefer interacting with pictures, sounds and video rather than text</td>
<td>Prefer talking on the telephone or in person</td>
</tr>
<tr>
<td>Prefer a learning process that is fun and active</td>
<td>Prefer a learning process that is serious</td>
</tr>
<tr>
<td>Prefer receiving information quickly through multiple media and technology</td>
<td>Prefer receiving information slowly</td>
</tr>
<tr>
<td>Prefer multi-tasking</td>
<td>Speak an outdated language</td>
</tr>
</tbody>
</table>

(Source: Adapted from Prensky, 2001; 2010 & 2012; Zur & Zur, 2011)

The natural divergence between today’s digital immigrant teachers and digital native students is a serious threat to effective teaching and learning faced by many school districts in the U.S. and abroad. How can a digital immigrant teacher, who speaks an outdated language, effectively teach a population that speaks an entirely new language; a population he or she does not know? (Howard, 2006). In fact, today’s teacher attitudes and perceptions toward experiences of digital native students are evidence that the digital divide is growing even deeper because most digital immigrant teachers typically have very little appreciation for these new digital skills and experiences that students bring into the classroom. They do not believe that their students can learn successfully through systematic use of learning-oriented electronic and digital media.

Moreover, some teachers assume that instructional strategies, such as direct instruction or learning centers that effectively worked with elementary students in the past, will produce the same learning outcomes with today’s digital native students (Campbell, 1991). Traditionally, learning centers (Campbell, 1991; Sower & Warner, 2011), also called workstations, are designated areas of the classroom where students congregate in small groups to accomplish specific learning tasks. Typically, students work independently in these learning centers under the supervision of the teacher or an assistant. (Refer to the literature review section for further explanation). The above pedagogical assumption is no longer valid because it does not take into account today’s digital native student learning styles. Failure to take into consideration digital native student learning styles may be the cause of the current achievement gap, especially in rural and low economic status communities.

Despite the recent calls for proposals aimed at funding research and training projects in cyberlearning promoted by the National Sciences Foundation, there are very few new interdisciplinary instructional teaching techniques or cutting-edge school ventures exclusively designed for digital native children which are essentially technology-driven and based on core digital-game curricula. At this stage, Quest-to-learn, in New York/Chicago, a school for digital
kids where participants play, invent, grow, and explore (Corbett, 2010), is one of the few ground-breaking projects that inspired the authors in their quest for a new pedagogical framework aimed at preparing current and future pre-service teachers to effectively teach current and future digital native students.

During the past three academic years, the authors’ research team has been systematically testing the suitability of some home-based cyberlearning technologies for teaching digital native elementary children in afterschool settings. This paper details the basic tenets and dynamics of the experimental cyberlearning workstations pedagogical model used in those cyberlearning research projects, which included the systematic and intensive use of digital videogames and other learning-oriented resources as core curricula, rather than as supplemental resources. Optimal conditions for implementation of cyberlearning workstations in classrooms and the implications for training digital immigrant in-service teachers and millennial pre-service teachers are discussed.

LITERATURE REVIEW

The Experimental Cyberlearning Workstations Pedagogical Model Tenets

Lessons from the field have suggested that several school districts, in South Texas, should consider digital and electronic learning materials as supplemental resources for teaching. The adoption of the digital learning approach, which differs from the automated viewpoint, means that a fundamental and radical shift of control, curriculum design, space, scheduling, assessment, communication and responsibility must be made within classrooms (Collins & Halverson, 2009; November, 2010).

In fact, the effectiveness of some learning-oriented electronic and digital media resources in fostering meaningful learning experiences has been documented recently. Some scholars (Anderson, & Pempek, 2005; Pempek, Kirkorian, Richards, Anderson, Lund & Stevens, 2010; Jusoff, & Sahimi, 2009; Wartella, Caplovitz, & Lee, 2004) suggested that educational video games, DVDs and web-based learning materials could play an important role in literacy, numeracy, and overall cognitive development for children born and raised in poor and low-educated families. Because electronic and digital media are more affordable and are easier in making learning fun and turning playtime into education time, cyber and digital learning materials provide interactivity, repetition, and the ability to customize content. Because of these qualities, these tools have a tremendous potential for teaching and learning (Wartella, Caplovitz, & Lee, 2004; Jusoff, & Sahimi, 2009).

Moreover, teachers and school districts in low socioeconomic status (SES) communities have been unable to grasp the socio-cultural and digital relationships which today’s digital native children are bringing into classrooms. Learning generated at home may be the key factor for teachers to understand the construction of their students’ cultural identity as well as their personality (Gonzalez, Moll & Amanti, 2005). It follows from the above postulate that today’s student life settings (which involve spending considerable amounts of time playing and learning unconsciously from digital and multimedia technologies) drastically contrast with their school and classrooms environments. This contrast is exacerbated by today’s teachers’ and school districts’ inability to incorporate digital native students’ funds of knowledge (i.e., the knowledge students gain from their family and cultural backgrounds) into official curricula. Therefore,
school districts continue to perpetuate the cultural conflict between digital native students and their digital immigrant teachers.

According to Gonzalez, Moll & Amanti (2005), teaching from the funds of knowledge approach means introducing children to active pedagogy in which they learn a variety of tasks adequately. Children will have more than one domain in which they may be successful. Data from the authors’ previous research (Feng, Moreno, Boleli & Ekiaka, 2011 & Feng & Ekiaka, 2011) suggested that one of the main characteristics of using the digital native culture as the backbone of knowledge transmission is that it provides children with a very low anxiety comfort zone that is highly familiar to them.

The above suggests that public school districts and classroom teachers should pay greater attention to incorporating digital native student funds of knowledge from current digital native student households into learning modules that approximate the total reality and experiences of the digital native student population. Therefore, the authors contend that classroom instructional strategies must maximize the use of digital native children’s funds of knowledge to tap into vast funds of knowledge that these children and their families have, but are rarely given the opportunity share and express in the classroom (Gonzalez, Moll & Amanti, 2005). The disconnect and cultural mismatch between digital native children’s culture and today’s educational approach, deeply embedded in K-12 education in the U.S., should be addressed in order to keep our children highly competitive in the global world.

To reach one of the research agenda objectives of not only drafting a cutting-edge instructional strategy aimed at effectively fostering meaningful learning experiences among today’s K-12 digital native students, but also training pre-service teachers to teach future generations of digital native children effectively, researchers drafted the experimental cyberlearning workstations pedagogical model which is grounded on Campbell’s (1991) learning centers theory; Gonzalez, Moll & Amanti’s (2005) notion of funds of knowledge, the digital videogame and information learning theoretical tenets (Collins & Halverson, 2009; November, 2010; Prensky, 2001, 2001, 2005 & 2010) and recent research findings from fitness and academic performance postulates (Cocke, 2002; Dwyer, Coonan, Leitch, Hetzel, & Baghurst, 1983; Tremblay, Inman, & Willms, 2000; Shephard, 1997).

In his search for maximizing his students’ learning potential, Campbell (1991) proposed an application of Gardner’s (1983) multiple intelligences theory. The basic tenet of Campbell’s learning centers relies on students’ intrapersonal and interpersonal differences with respect to readiness, culture, interest, language, intelligences, and gender, learning styles, abilities, developmental level and experiences. Meeting individual needs is a challenging and demanding responsibility for teachers in diverse classrooms. Targeting the development of these seven intelligences within a classroom requires individualization and differentiation of instruction that allows each student to work at her/his own developmental level, cooperate with others, and develop a sense of shared responsibility within the classroom. One way to meet the needs of each student is to use a variety of strategies that foster teacher-student interaction as well as students-peer interaction.

In fact, Gardner’s seven multiple intelligences theory concentrates on various customs in which students can acquire vocabulary acquisition. These multiple intelligence customs are explained as followed: visual-spatial as those who think in terms of physical space, bodily-kinesthetic are able to use the body effectively, musical can relate easily to sound and rhythm, interpersonal is understanding and good at working with others, intrapersonal understands their
own interests and goals well and tends to shy away from others, linguistic is able to use words effectively and efficiently, and logical-mathematical is good at reasoning and calculating things.

Multi-grade centers are useful as practical tools for individualizing and differentiating instruction, since they provide the learners with the opportunity to tell and share their own stories, providing them with a secure and organized atmosphere that allows them to work at their own pace or developmentally, cooperate with others and develop a sense of shared responsibility within the classroom.

Simply put, a multi-grade learning center is an area of the classroom that contains activities or materials designed to teach, reinforce, or extend a particular skill or concept. It offers students powerful learning opportunities, academically and socially. Materials and topics are initially drawn from the basic curriculum. However, a teacher-facilitator might develop the ability to re-construct the mainstream curriculum as a personal one in which each student will be working at her/his pace from and within the realm of her/his cultural background.

Furthermore, Campbell’s (1991) multi-grade learning centers followed Kostelnic, Sodeman, Whiren and Stein’s (2001) basic characteristics:

(a) Teachers should organize and implement the multi-grade centers according to what they know about their students and their abilities.
(b) Activities presented within centers are flexible and adaptable rather than rigid and static.
(c) The arrangement of multi-grade learning centers should provide children on a daily basis – well diversified and balance of cognitive, effective, and psychomotor development.
(d) Teachers take the time necessary to introduce multi-grade learning centers regarding related materials and activities, so students understand how to use the learning centers properly.
(e) The materials at different multi-grade learning centers should be adaptable to use in different domains.
(f) The multi-grade centers used by teachers should be frequent and spontaneous. This is a time for active learning constructing and sharing.
(g) The multi-grade centers should tackle each child’s multiple intelligences enhancement at their own developmental level.
(h) The multi-grade centers should address the curriculum objectives. However, teachers will occasionally include theme-related materials to different areas of study for students to explore.
(i) The multi-grade centers determine the selection of the instructional strategies in a daily lesson plan.

A greater understanding of Campbell’s (1991) learning theory is needed in order to comprehend the notion of the experimental cyberlearning workstation pedagogical model suggested by the authors. Recent research (Anderson, & Pempek, 2005; Toyama, 2010; Prensky, 2001 & 2010; Wartella, Caplovitz, & Lee, 2004) suggested that electronic and digital media technologies magnify human learning potential and capacities. Its multiplicative effects might lead to radical human and social changes if usability conditions and environmental changes are positively implemented by users. In today’s digital arena, the systematic use of digital technologies and devices within classrooms is a culturally responsive teaching strategy which provides multiple occasions for experimentation. This is due to the fact that the XBOX 360
Kinect, Nintendo DS and Nintendo Wii, are widely used in many households (even in low SES communities) for children’s entertainment.

From the funds of knowledge (Gonzalez, Moll & Amanti, 2005), integration of digital technologies in the classroom calls for the incorporation of K-12 digital native children’s culture into learning modules to promote quality culturally responsive education. It also means that children should learn in a setting that is highly familiar yet experimental to them with very low anxiety, where errors are not dealt by using punishments and where self-esteem is not endangered. If some learning-oriented electronic digital media and resources might be considered revolutionary learning tools, and the systematic use of these digital devices increase students’ academic achievement, then teachers should take advantage of today’s digital native students’ cultural funds of knowledge in order to teach them effectively.

Another pillar of this adopted instructional strategy theoretical framework comes from research findings in the area of physical fitness and academic performance. Some studies (Dwyer, Sallis, Blizzard, Lazarus, & Dean, 2001; Dwyer et al. (1983); Grissom, 2005; Linder 1999; Linder 2002; Shephard, 1997; Tremblay et al., 2000) suggest that there is a consistent positive association between overall fitness and academic achievement. This relationship between physical activity and academic performance has been explored in several studies sponsored by the California Department of Education. These studies support the idea that when a substantial amount of school time is dedicated to physical activity, academic performance meets, and may exceed, the performance of students who are not involved in additional physical activity (Shephard, 1997).

In fact, youth involved in additional physical activity tend to show improved attributes such as increased brain function and nourishment, higher energy/concentration levels, changes in body build affecting self-esteem, increased self-esteem and better behavior, which may all support cognitive learning (Cocke, 2002; Tremblay, Inman, & Willms, 2000; Dwyer, Coonan, Leitch, Hetzel, & Baghurst, 1983; Shephard, 1997). Improved brain attributes associated with regular physical activity consist of increased cerebral blood flow, changes in hormone levels, enhanced nutrient intake, and greater arousal (Shephard, 1997).

Furthermore, Cocke (2002) suggested that regular exercises could improve cognitive function and increase levels of substances in the brain responsible for maintaining the health of neurons. The Brain’s function may also indirectly benefit from physical activity due to increased energy generation, as well as from physical activity within and outside of the classroom. The increased energy levels and time outside of the classroom may give relief from boredom, resulting in higher attention levels during classroom instruction (Linder 1999). This phenomenon justifies the inclusion of some digital devices such as the XBOX 360 Kinect and Nintendo Wii as learning tools aimed at providing students with the opportunity to perform physical movements while playing educational digital videogames in the classroom.

In addition, the proposed pedagogical model is also grounded in the following supplemental framework: Environmental stimulation actually changes and affects the way people think and learn. Enriched environments stimulate thinking and mental schemata changes to create deep learning processes compared to impoverished ones after as little as two weeks when involved in systematic and intensive learning (Scientific Learning Corporation, 2001). Participants are systematically and consciously engaged in cyberlearning workstation activities for a minimum of 500 minutes per week in formal & informal learning settings to create desired mental schemata and cognitive changes (Bavelier, Green, Dye, 2010; Scientific Learning Corporation, Baynes, quoted in Prensky, 2001).
Consequently, the main characteristics of the experimental cyberlearning workstations pedagogical model consists of the systematic and intensive use of digital videogame curricula, 3D virtual games and home-based digital technologies/devices, namely the use of laptops + the Internet, Smart buddy devices, digital touch-screen devices (such as ipads, digital tablets and smart-phones), play station, play station vita, Nintendo DS, Nintendo Wii, and XBOX 360 Kinect-, etc. as core medium of instruction. Most of these digital technologies are commonly used for children’s home-based entertainment.

The Experimental Cyberlearning Workstations Pedagogical Model’s Dynamic

For approximately three academic years, the researchers tested their working instructional strategy with third and fourth grade elementary students participating in an afterschool program in Kingsville Independent School District (KISD). Some students were systematically involved in intensive cyberlearning reading and vocabulary instruction using digital game-based reading resources as core curriculum. Under optimal fidelity conditions, students were divided into four to six teams of two to four students per team. There were four to six workstations in each cyberlearning classroom. Students spent a minimum of fifteen to twenty minutes in each cyberlearning workstation scheduled learning activities. Each session lasted a minimum of eighty minutes, with a maximum of one hundred twenty120 depending on each teacher’s lesson designed plan.

A cyberlearning workstation is a team teaching environment. There was one lead-teacher as well as three to six associate instructors or team leaders (one at each workstation) previously trained by the lead-instructor. Associate instructors or team leaders were selected among pre-service teachers and graduate students majoring in education. They were in charge of monitoring and supervising learning activities under the supervision of the lead-instructor. Before moving to the next cyberlearning workstation, students took the module built-in tests or quizzes which were automatically recorded in the digital videogame’s performance center. Each digital video game provided immediate performance feedback to each player, so that she/he was aware of her/his learning performance. Moreover, digital video games enabled the instructors to assess important competencies and aspects of thinking in various contexts and through activities that students cared about in everyday life. A brief group introduction at the beginning and conclusion at the end of each session were mandatory.

For an informed reader of digital information learning literature aimed at rethinking education in the digital age, the experimental cyberlearning workstations pedagogical model is a promising, research-based instructional strategy that some visionary K-12 institutions are attempting to implement. For example, Quest to Learn (QL), a school for digital students in New York was designed to be game-like, even when it does not involve using a computer in classrooms or schools. The QL students record podcasts, film and edit videos, play video games on the XBOX 360 Kinect and Nintendo Wii, blog avidly, and occasionally receive video messages from aliens (Corbett, 2010). Following this approach, students participating in the cyberlearning afterschool projects were assessed in a different way than the conventional K-12 classroom students. They did not earn grades, but rather achieved levels of expertise, as pre-novice, novice, amateur, apprentice, senior, expert or master (Corbett, 2010).

The research design established the distinction between conventional and transformative cyberlearning workstations that teachers could apply when teaching today’s digital native students. In conventional cyberlearning workstation classrooms, instructions are delivered exclusively in a formal learning setting, while in transformative cyberlearning workstations...
students receive instructions in a formal manner (classroom-based). However, they were granted access to some digital videogame curricula for further practice in informal settings with parents'/guardians' supervision because children spend 70% of their waking hours (including weekends and holidays) outside the classroom (Michigan Department of Education, 2001).

As in a traditional classroom, some basic fidelity of implementation conditions must be met in order to achieve average outcomes. To be highly effective, the researchers suggested some initial fidelity conditions before testing their experimental cyberlearning workstation pedagogical model:

- Classroom size must not exceed twenty four participants and must be divided in teams of two to four students. The model is suitable beginning with second grade and up.
- The Lead-teacher must plan to set up four to six cyberlearning workstations for daily teaching.
- The instructional period for each lesson plan must span between eighty minutes (minimum) and one hundred twenty minutes, depending on grade level.
- Team-teaching: there must be one lead-instructor and four to six associate instructors or team leaders in each classroom. Students might take turns being team leaders. The lead-instructor might also train parents/guardians (or paraeducators) as associate teachers or team leaders, which will increase parental involvement. The team of instructors must meet weekly for planning, assessment and evaluation purposes.
- The Lead-instructor should be familiar with the theoretical tenets of the cyberlearning workstations pedagogical model and be trained on how to implement it effectively within regular classrooms.
- Availability of a variety of digital technology devices and web-based cyberlearning software, laptops and the Internet in schools for conventional (school-based) cyber reading instruction and at homes for transformative cyber reading instruction in informal learning settings require parent/guardian supervision.

So far, the experimental cyberlearning workstations sessions have been conducted in afterschool projects. Their applications within regular classrooms require that the school districts provide state-of-the-art digital technology widely used for children’s home entertainment, and also to provide training for teachers and school administrators on the kinds of third-order changes needed for using the educational videogames as core (not supplemental) curricula in order to meet the needs of digital native students. One research project, associated with this exploratory groundwork, was conducted to test the effectiveness of the aforementioned instructional reading strategy. Another study targeting mathematics, sciences and social sciences is still in progress. The following section summarizes some anticipated findings of the first study.

THE INCIPIENT TESTING OF THE EXPERIMENTAL CYBERLEARNING WORKSTATION MODEL

As suggested above, researchers tested the aforementioned experimental cyberlearning workstations frame by teaching English vocabulary to forty eight Mexican-American elementary students (third n = twenty four & fourth grades n = twenty four; twenty four girls and twenty four boys) attending an afterschool program in Kingsville Independent Schools District (KISD) using an experimental approach. Participants were divided into two subsamples: the control (n =
twenty four; twelve boys and twelve girls; eight – ten years) and experimental (n = twenty four; twelve boys and twelve girls, eight – ten years) subgroups. The control subgroup was instructed using traditional reading techniques, such as mnemonic and game play twice per week for ninety minutes per session during twelve weeks; while the experimental subsample was instructed using the experimental cyberlearning frame discussed above twice per week for twelve minutes per session during twelve weeks. The experimental classroom layout included were six cyberlearning workstations: silent and radio cyberreading workstation, spelling bee cyberreading workstation, cyberreading vocabulary games workstation, peer reading cyberreading workstation, cyberreading vocabulary comprehension workstation and digital reading performance (drama) studio. (See figure 2).

Figure 2
The six Cyberreading Workstations

The experimental subsample was divided into six teams of four participants each. The content for the experimental subgroup was drawn from pre-design digital curricula widely adopted by school districts in Texas in other states as supplemental reading resources such as brainpop.com, tickettoread.com, brainchild.com, and spellingcity.com.
Assessments for both groups (pre and post tests) were conducted during regular cyberreading classes. That is, assessments took place in a regular afterschool classroom through the cyberreading workstation approach, using traditional reading test techniques where students use paper and pencil to complete the tests designed by the lead-teacher, and consisted of 25 words that were selected from a vocabulary list from the school. This list included all vocabulary words that third and fourth grade students are required to master throughout the entire school year. Assessments lasted approximately thirty to forty minutes. To protect the welfare of the children, each participant was assigned a “number” from the beginning of the project for data
collection and statistical analysis purposes. Findings of the study suggested performance
differences between both subsamples. (See figure 3).

**Figure 3**
*Summary of Findings of the Incipient Study*

Simple or one way statistical analysis of variance (also defined as F test) of the above
empirical data between both groups suggested an overall exponential gain for the experimental
group in comparison to the control group from pre to post-tests with an F factor of 8.032 (See
figure 4).
According to Salkind (2003), the one-way ANOVA was designed to measure the differences between groups on variables. The authors set the level of risk at .05 to avoid Type I error as a level of significance in terms of the null hypothesis. The F value 8.032 which is larger than the critical value 4.30 indicates that the results are significantly high enough to conclude that the score difference between the two groups is not due to chance or other factors. Therefore, the null hypothesis was rejected. Certainly, the results also exhibited that overall there was no pair wise difference between pre and post tests in control and experimental subgroups. The significance ($p<.05$) only contributed to pre and post tests in experimental subgroup which suggested that cyberreading workstations impacted the vocabulary learning process dramatically in a certain time period (in this case 4 months between pre and post tests). In other words, the implementation of cyberreading workstations required teachers to offer enough time and proper guidance in order for children to benefit from this type of learning instructions.

**CONCLUSION**

The following conclusions emerged after analysis of findings of this incipient study:

- Data analysis suggested that cyberlearning workstations can yield students’ academic success during the vocabulary acquisition process. This statement can be justified when observing the exponential growth of the experimental group from the pre to the post-test which reveal a statistically significant difference.
- Data analysis also suggested that cyberlearning workstations were pivotal in increasing the experimental group’s reading motivation and learning engagement. Thus, they are not only considered as tools with which participants were familiar, but also enhanced learning engagement within a stress-free and anxiety-free learning setting.
- The ANOVA analysis highlighted statistical significance between pre and post tests in both groups. The results suggested that educators should consider the systematic use of this teaching approach grounded on integration of digital
technologies with which children are familiar from their daily lives in order to achieve significant progress in the learning process.

- The standard deviations results suggested that teaching reading through cyberlearning workstations has the potential to effectively narrow the vocabulary gap that exists between Mexican American students and their peers. Moreover, findings suggested that transformative approach of cyberlearning workstations (use of game-based curriculum at home) might increase parental engagement.
- Lastly, this incipient study has revealed that, although children are engaged in playing, learning is actually occurring. Findings suggested the importance of helping current in-service teachers, understand that today’s digital native students learn better when having fun in small groups.

IMPLICATIONS

Findings from this research might have practical implications since it includes some features of the National Educational Technology Plan – NETP- postulates (US Department of Education, 2010). The plan calls for applying the advanced technologies used in people’s daily personal and professional lives to the entire U.S. educational system to improve P-16 students’ learning, accelerate and scale up the adoption of effective practices, and use data and information for continuous improvement (U.S. Department of Education, 2010). Furthermore, the NETP is an invitation to systematically conduct educational technology research that explores how embedded assessment technologies, such as simulations, collaboration environments, virtual worlds, games, and cognitive tutors, can be used to engage and motivate learners while assessing complex skills. In other words, the NETP requests third-order (radical) changes of the entire U.S. educational system, instead of evolutionary ones. These changes cannot be achieved with the adoption of technologies as supplemental resources by school districts.

Adoption of digital technologies as supplemental resources can be considered an evolutionary approach of promoting educational changes powered by technology. It fosters only first or second order educational changes (Bartunek & Moch, 1987) within the old box (schools district system). To move toward a revolutionary or third order (radical) approach of transformation, the American Educational system powered by technology, digital learning, educational video games, virtual learning environments and simulators, etc., must be used as core medium of instruction aimed at fostering students’ learning motivation, engagement and learning retention rates at highest level. Adoption of technology as core media of instruction has practical impact on teacher education programs. It is imperative to train future teachers aimed at developing digital game-based curriculum design professional. Furthermore, some electronic/digital devices used (X-box 360 Kinect, Wii, laptop and Nintendo) in cyberreading workstations also grant parents an opportunity to utilize these same devices at home to contribute to the learning process, which may increase parental engagement in their children’s education.

At this stage, these incipient findings cannot be generalized yet. Further replication studies are needed. Considering the limitations of this study (see next segment), to increase higher validity, all further replication studies in educational settings should take into consideration the following optimal research conditions:

a) Reduction of experimental bias at minimal level. To ensure higher internal validity, it is recommended that treatment provider be 100% blinded. In other words, treatment provider must not be aware of involvement in research project. Using educational research
terms, the lead-teacher or treatment provider must be involved in lesson plans design, assessment tools construction, data collection, and limited exposure to the research site and/or participants prior to the beginning of the educational experimentation stage.

b) For further replications, instead of adopting pre-designed game-based curricula and 3D virtual games developed by outsiders with limited knowledge of targeted research sites' curricula and educational vision, the research treatments for both groups should preferably be designed by a multidisciplinary team involving, engineers, engineering faculty experts, school educational administrators and education faculty experts. Same principle should be applied for the adoption of tailored standardized assessment tools.

c) The educational experimentation should be performed in regular classroom settings in order to allow full observation of the treatment protocols and avoid being restricted by potential afterschool program policies. Also, the concurrent triangulation mixed methods research design, especially the QUANT (quantitative)–QUAL (qualitative) strategy involving the true experimental (controlled randomized) technique for QUANT and the grounded theory research procedure should be adopted in order to capture all research events that might occur in each research site.

LIMITATIONS

Admittedly, no research is perfect. After conducting this incipient testing, it is important to pinpoint some limitations.

a) Experimenter bias as an internal threat to validity. Given the fact that the authors have been working on this project over almost three years, and taking into account that they were instrumental in designing data collection tools, there might be some kind of experimenter’s bias toward the expected outcomes. The following four types of experimenter bias: background (previous experience) bias, assignment of participants into groups’ bias, expectation bias and assessment instrument bias maybe an internal threat to validity.

b) The Nature of the afterschool program as an external threat to validity. Conducting an educational experimentation means following the research protocol. In this case, some participants who were tested in the pre-test did not attend all the treatment sessions. In several occasions, some parents picked up their children early, thereby not allowing them to fully complete their assigned treatments. This situation was out of the control of the treatment providers. Moreover, there was a research site policy ending all afterschool events by 6:00 pm to allow time for these children to get picked up. Such mandated policy forced the reduction of the sessions for both groups from one hundred twenty minutes per session to ninety minutes per session, (twice per week) for a total of one hundred eighty minutes of formal treatments per week instead of two hundreds forty minutes as originally designed.

c) Research design limitation: There were several research events that were occurring while on the field regarding participants’ learning motivation, enthusiasm, engagement, and curiosity that could not be captured exclusively through the experimental design.
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