PowerPoint vs. Web 2.0

Which yields higher student motivation?

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Introduction

Students of this generation, millennials as they have been termed, are much different than the students ten years ago. Technology—cell phones, the Internet, digital cameras, iPods, and gaming devices—saturate their lives. Much of their time spent out of school involves interacting with some sort of technological tool. It seems that students have shorter attention spans and have a harder time focusing in traditional classroom settings. "Millennials absorb information quickly, in images and video as well as text, from multiple sources simultaneously. They operate at twitch speed, expecting instant responses and feedback." (Downes) Traditional teaching methods, including the use of PowerPoint, may seem dull and uninspiring to this generation. Teachers are finding it difficult to capture students' attention and motivate them. Perhaps teachers need to include more of the tools that these students use in their everyday lives to encourage students to perform at optimal levels. Although most students use Web 2.0 tools, such as Facebook and Twitter, for socializing, teachers might want incorporate similar tools into the curriculum to help increase student engagement and motivation, and in turn, increase student achievement.

Regardless of the school or the grade level, teachers across the nation are being urged to utilize technology for instructional delivery and student learning activities. One of the more often-used technology tools is presentation software such as Microsoft PowerPoint, or Apple Keynote. Teachers are incorporating PowerPoint presentations into their curriculum for various reasons. "Attracted by the slick interface and easy learning, educators and students are employing the presentation software in classrooms in ever-increasing numbers. For some teachers, the computerized slide-show format is deposing the blackboard." (Glasner, 2002) PowerPoint is easy to use for both teachers and students. It is software that is regularly available for teachers and students at school and often at home, and therefore it is often the technology tool of choice.

PowerPoint was first introduced nearly twenty-five years ago. According to Atkinson, the initial release was in 1987, "originally designed for the Macintosh computer, the initial release was called Presenter." The name was changed to PowerPoint shortly after. PowerPoint soon became the new way of teaching, replacing traditional teaching methods such as chalkboard lectures and overhead transparencies. PowerPoint is used so often by teachers it may be considered the "new" traditional teaching method.

Although an increase of the use of PowerPoint means that more teachers are incorporating technology into the classroom, perhaps this is not the best solution

for integrating technology into instruction. Many teachers are finding that PowerPoint does not have the same "wow" factor that it once had. In fact, many students find PowerPoint presentations uninteresting and boring. Perhaps the more teachers use PowerPoint, the less effective of a tool it is. Some teachers are finding it harder and harder to capture students' interest and motivate the students to learn and perform. Although PowerPoint may have once gained the students' attention, that time has come and gone. It may be time for teachers to discover what other tools are available to inspire learners.

As technology advances, so do the needs of students. Research shows that traditional teaching methods are ineffective with students of this generation. Technology has changed how millennials learn, act, and socialize. They no longer have to rely on a teacher to learn something. Information is readily accessible at all times from most locations throughout the world. Because of this, teachers need to change their pedagogy to involve a learner-centered classroom. One way of doing this is by incorporating Web 2.0 tools. According to Downes, "Web 2.0 provides choice, variety, collaboration, hands-on, and participatory learning opportunities; all the characteristics that are most attractive to today's 'net generation' or 'millennial' student."

Web 2.0 has been developing since 2003, changing the way the Internet is viewed and used. Tools such as wikis and blogs have been around for years, yet it was not until recently that teachers began using them in the classroom. "These changes are sweeping across entire industries as a whole and are not unique to education; indeed, in many ways education has lagged behind some of these trends and is just beginning to feel their wake." (Downes) We believe that it is time for teachers to consider integrating these tools into student projects and delivery of instruction.

Research problem

How do new Web 2.0 tools compare with PowerPoint? In the mid 1990's, PowerPoint projects seemed to be a highly motivating tool for student learning. Recently, however, teacher observations are suggesting that this is no longer true. Unfortunately, there is not enough research measuring the effectiveness of PowerPoint on student motivation and achievement. There is even less research on the use of Web 2.0 tools in the classroom and how this affects student motivation and achievement. There is good reason to believe that a student's motivation strongly impacts their overall academic success. There is also reason to believe that technology can increase student motivation, depending on how it is used in the classroom. Therefore, if the teacher incorporates the use of technology tools students are interested in using, perhaps their motivation and academic achievement will increase.

The purpose of this study is to measure if and how the student use of PowerPoint impacts student motivation. This study will also measure if and how the use of Web 2.0 tools impacts student motivation. The data gathered will then be compared to see if PowerPoint or Web 2.0 tools are more effective as a motivational tool with our current population of students. Two Web 2.0 tools will be studied: Wikis, a website that allows easy creation of web pages, and Prezi, web-based presentation software incorporating a single canvas rather than a series of slides. Specifically, the questions guiding our study are:

- Does the student use of PowerPoint presentations motivate students to learn and perform?
- Can Wikis be used as an alternative to PowerPoint?
- Can Prezi be used as an alternative to PowerPoint?
- Will substituting a Web 2.0 tool for a PowerPoint presentation yield higher student academic performance?
- Will substituting a Web 2.0 tool for a PowerPoint presentation yield higher student motivation?

Review of the Literature

In education, there will always be trends. The trends are usually based around what new information has been discovered from the latest research studies. As new studies are published, new trends are put in place. Recent news seems to be saying that this generation learns differently because of the available technology. Therefore, teachers need to change their pedagogy to meet the learner's needs. It seems that the wave of technology may be changing the role of the teacher entirely. "The role of the teacher in the classroom is being transformed from that of the font of knowledge to an instructional manager helping to guide students through individualized learning pathways." (Hawkins) To prepare for the latest trends and changes, teachers need to use effective technologies, creating learner based learning environments that utilize technology as a learning tool.

According to Solomon and Schrum, Web 2.0: New Tools, New Schools, in 2006, the computer is the only technology product that teachers use more than grade K-12 students. Students spent more time than teachers using cell phones, handheld devices, digital cameras, video cameras, iPods, and video game players. Students are constantly chatting on computers, texting on cell phones, and engaged in online gaming. Even when they are in their bedrooms they

aren't alone. Technology keeps students in constant contact with friends, neighbors, and global communities. What do students want from their schools? Students are tech-savvy and want to be learning in tech-savvy schools. They want to use technology as they use it daily in their personal lives.

Creating a learner based classroom environment may be the key to motivation the students. Studies have shown that students with a high task value are more likely to succeed. According to Menager-Beeley, "students with high task choice value can be expected to persist in class," and be more academically successful. This means that if students have a choice in what they are learning and how they learn it, they are more likely to be motivated to do the work, and in turn, perform better. Teachers are starting to incorporate the use of Web 2.0 tools as part of the learner based curriculum. Perhaps changing the audience for which the student is performing can be motivating. Monroe state, "Whereas in the past, students wrote for one audience, their teacher, with Web 2.0, they are now writing for a much larger audience, potentially world-wide audiences." Web 2.0 offers many different types of communities in which student can share ideas, discuss topics, and gather large amounts of information.

Recent studies indicate that including various forms of new technology into the classroom positively impacts student motivation and performance. In a report by Beltramo involving 28 at-risk middle school students, the study shows a positive impact of using video production to increase motivation and achievement. "The findings from this study indicated that participants were motivated by the project, valued career research, and learned the importance of education and role that math plays in people's daily lives." (Beltramo) Incorporating technology into the curriculum resulted in a positive social change for the students and also made learning more meaningful and motivating.

In a report by Paino, a study involving first grade math students revealed similar results. In this study, computer software and white boards were used to teach math to first grade students. Half of the students participated in the technology implementation; the other half used traditional paper and pencil learning activities. "The results of this study support the idea that *technology* increases academic achievement and increases *student motivation* when learning mathematics." (Paino) Perhaps this is proof that teachers need to change their pedagogy to include new ways of teaching.

Checho reported about a study involving at-risk high school students. These students were involved in a technology-integrated classroom using podcasts. The results of the study revealed increases in content knowledge of literature and grammar. The students positively responded to using podcasts as a way of learning and interacting. "Therefore, this study uncovered ways that at-risk students can participate in activities using digital *technologies* to promote learning." (Checho) The study suggests that students more willing to use podcasts as a tool for learning over traditional methods, and in turn increasing knowledge and understanding of the content.

In a 2009 research study on the effects of using blogs and wikis motivate learners, Shifflet discovered that students who published on blogs, were more motivated because they had an authentic, interactive audience. Most students enjoyed writing on blogs instead of writing in traditional journals. The author shows numerous reasons that teachers used wikis and blogs. Although the teachers may not be in 100% of agreement on the specific effects on students, all teachers report a variety of positive results on student learning, achievement, and motivation. Six out of eight of the teacher participants claimed that student blogs were more motivating for student learning. The remaining two teachers, who did not select motivation, said that the students' writing improved or the students performed better.

One of the purposes of having an authentic audience was to allow audience interactions with the writers. Students' who wrote on public wikis experienced higher student motivation. Blogs allow users and audiences to make comments that create a more engaging experience for students. Web 2.0 tools provide the social interactions that students desire to make learning meaningful. It didn't matter the original purpose of the assignment; using a wiki or blog produced higher quality work.

PowerPoint is an old technology tool. In a 2010 action research study involving five teachers who used wikis, blogs, and podcasting to enhance learning, Allen found that teachers went through a personal and professional technology transformation. The study shows teachers change not only the way they developed student learning opportunities with more wikis, blogging, and podcasts, but the teachers used these same tools to become contributors. In the classroom, students used more authentic learning activities. Students were more engaged in learning and experienced higher achievement levels.

Similarly, teachers became involved in blogs, podcasts, and wikis to become more contributors to their professional world. They shared their expertise with other educators through blogs, podcasts, and wikis. This proved to be a supportive tool for teachers, who sometimes experience isolation from nontechnology-savvy peers at their schools. Having the online learning support provided opportunities for staff development that were not available at their schools. This facilitated personal growth, developed confidence, and led to their transformation. The individuals who were most involved with blogging and podcasts were the ones who underwent the furthest transformation. If teachers are passionate about what they do, then it is easy for our students to become passionate, too. Exploring new Web 2.0 technologies with students often takes extra commitment on the part of the instructor to understand how to use the tool as well as how to help students learn to use it. The innovation of working together on new Web 2.0 technologies could be a motivating experience for curious learners.

Menager-Beeley (2001) studied the correlation between motivation, demographics, prior English courses, and continued enrollment in online courses. They were curious about the percentage of dropped online courses compared to traditional courses. The study was trying to find characteristics that predict student drop out. For measuring motivation, the CANE (Commitment and Necessary Effort) model was used to calculate a value for student motivation from surveys of student values of utility, interest, and importance. The CANE model was introduced by Richard Clark (1999).

"Active commitment to goals is predicted by a multiplicative relationship between three factors: Personal agency, emotion and control values. Personal agency is defined as general self efficacy, a meta-assessment of one's ability to achieve a class or domain of work goals ('Can I do it?'), on the one hand, and our estimates of the barriers that surround the class of work goal ('Will I be permitted to do it?'), on the other hand. In addition, our emotional reaction to the goal must be neutral or positive. Finally, we must believe that achieving the goal will lead to control benefits (e.g. make us significantly more effective than competing goals). Three types of values were hypothesized to influence work goal commitment: a) utility ('I may not enjoy the pursuit of this goal, but I do desire the benefit of achieving the goal'); b) Interest ('I am curious about this goal, it has intrinsic value'); and c) Importance ('Mastering this goal will make me more effective and/or give a good impression to others')." (Clark).

The CANE model seems to be an effective way to measure motivation.

Research Questions

After reviewing the literature, it is clear that teachers are having a difficult time motivating students, yet motivation is the key to student achievement. Perhaps technology is creating a generation with a constant need to socialize and find instant answers. Because of this, teachers need to reassess their current pedagogy based on the needs of students. PowerPoint may not be the best tool for motivating today's students. Perhaps teachers need to incorporate more Web 2.0 tools since this is what interests millennials. The purpose of this study is to investigate and research some of these problems and solutions. Specifically, this study will try to answer the questions listed in the chart below. The chart also indicates how the research will be conducted and analyzed.

Research Question	Design	Instrumentation	Analysis of Data	
Does the student use of PowerPoint presentations motivate students to learn and perform?	Descriptive	Teacher survey and interview Student survey	Qualitative data will be presented within a pie graph to show percentages of survey and interview questions	
Can wikis be used effectively as an alternative to PowerPoint?	Descriptive Experimental	Teacher survey and interview Student survey Three Projects Grading Rubric	Qualitative analysis of data will be presented within a pie graph to show percentages of survey and interview questions Quantitative analysis of data will be present using a 3 bar Histogram to	
			aisplay the wiki vs. PowerPoint scores of each group	
Can Prezi be used effectively as an alternative to PowerPoint?	Descriptive	Teacher survey and interview Student survey	presented within a pie graph to show percentages of survey and interview questions	
	Experimental	Three projects grading rubric	Quantitative analysis of data will be present using a 3 bar histogram to display the Prezi vs. PowerPoint scores of each group	
Will substituting a Web 2.0 tool for a PowerPoint presentation yield higher student academic performance?	Experimental	Three Projects Grading Rubric	Quantitative analysis of data will be present using a 3 bar histogram to display the grading rubric data of overall student performances	
Will substituting a Web 2.0 tool for a PowerPoint presentation yield higher student motivation?	Experimental	Three Projects Grading Rubric	Quantitative analysis of data will be present using a 3 bar histogram to display the grading rubric data of overall student performances	

Table 1

Research Methods/Design

This research study consists of an observational and experimental study evaluating the effectiveness of PowerPoint, Prezi, and Wiki on student motivation. The control group tool is PowerPoint because of its popularity in school instruction. Prezi and Wiki are both examples of our experimental group. Our goal is to observe noticeable changes in student motivation and performance based on the use of these alternatives compared to PowerPoint.

Our sample population is teachers and students from an Art Appreciation course. This is a large-format survey course, typical at major universities. It will consist of approximately 150 undergraduates, primarily freshmen and sophomores, from various majors. Most are taking the course to satisfy a fine arts requirement. The university is a large state school in Columbia, SC. The students will be randomly assigned to 3 groups of 50 students each, designated A, B, and C. Each student will complete three research assignments, one using PowerPoint, one using a wiki, and one using Prezi. Each assignment will involve researching an artist. All three assignments will have the same objectives and be scored with the same style rubric. All that will change is the artist and the tool being used to share the information. The chart below (table 2) will show how the three groups will rotate through the tools with each project assignment.

Group	First Project	Second Project	Third Project
1	PowerPoint	Prezi Presentation	Wiki
2	Wiki	PowerPoint	Prezi presentation
3	Prezi Presentation	wiki	PowerPoint

Table 2

Materials/Instrumentation

A typical assignment from an art appreciation course is a report on an important artist, their works, and their influence. This project can easily incorporate text, images, and other media. This type of assignment was chosen because it does not favor one of the prospective tools over the other. PowerPoint, Wikis, and Prezi all have the ability to support text, images, diagrams, video and other multimedia although in different ways. In each stage of the study, the students are assigned the same project. Students are to research an important artist and their works. They are instructed to include:

- basic biographical information about the artist
- description of era in which artist lived/worked
- important political and social events during the artist's life
- major works produced by the artist
- artist's influence

Students are required to include media beyond text. This media can include, but is not limited to:

- still images (photos, sketches, diagrams, etc)
- moving images (animation, video, etc.)
- sound
- narration
- color
- font

The report will be presented using the tool specified by the study—PowerPoint, wiki, or Prezi. Students are to incorporate good design principles. Projects should utilize proper English grammar, and be free of mechanical or factual errors.

Because each student will create a project using each of the tools, we believe that we will be able to evaluate the influence various tools have on the student's motivation. In addition, because we have students divided into three groups using tools in three different sequences, we believe that we can remove effects of increases in students' acquired research and design skills as we examine scores from students first, second, and third projects.

Procedure

At the beginning of the study, participants will be given a pre-study survey. The purpose of this survey is to determine the student experience with PowerPoint and Web 2.0 tools, as well as their interest and attitude toward them. The participants will be given a basic overview of the three tools being used in this study and how to access them. Microsoft PowerPoint is available in the school computer lab. Prezi and Wikis are available online using standard web browsers on the same computers. The students are provided with the web address of Prezi and several recommended Wiki hosting services.

The study itself will proceed in three rounds. Participants are given the

assignment described above. Students are free to choose the subject of their report, within the restriction that it must be a well-known artist. All students receive the same assignment, with the exception of the required delivery tool. After completing the assignment, students complete a post-round survey. For survey questions that pertain to a particular tool, the wording of this question will be customized for each group.

The reports will be graded to judge the affect of each tool on academic performance and to determine if there is a correlation between motivation and performance. In order to ensure consistent grading, each of the projects will be graded using a numerical grading rubric. For the purposes of this study, the projects will be graded by the faculty instructor and two graduate student teaching assistants. Their scores will be averaged, with the instructor's score weighted double the teaching assistant's scores. (Teaching assistants (TA) in an art appreciation course are assumed to have a basic knowledge of art, artists, and art history.)

Final score = Average of: (Instructor Score * 2) + TA#1 Score + TA#2 Score

The study will continue through two additional rounds so that each participant creates one project with each tool. Each round will include the project, grading via the rubric, and the post-round survey. Table 2 lists which tool each group will be using for the assigned projects. In addition to the student surveys, teachers will also be surveyed and interviewed at the beginning and end of the study.

Survey

The primary purpose of the student survey is to determine the student's level of intrinsic motivation. Various survey questions were developed based on the CANE (Commitment and Necessary Effort) Model of Motivation (Clark, 1999). The CANE model looks at the components that cause an individual to make an active commitment to completing a task. Using this model, we pulled six characteristics that go into our evaluation of motivation:

- Efficacy: Can I do it?
- Context: Will I be permitted to do it?
- Mood: How do I feel about it?
- Utility: Is the outcome beneficial to me?
- Interest: Does the task have intrinsic value?
- Importance: Will this task make me more effective or more impressive to others?

Individual student survey questions will be answer using a five-level Likert scale:

- 1 Strongly disagree
- 2 Disagree
- 3 Neither agree nor disagree
- 4 Agree
- 5 Strongly agree

Sample Student Questions:

(n.b. characteristics shown in parentheses are not included in the survey questions)

- I am confident in my ability to complete the task with the required tools. (efficacy)
- I am pleased with the time, tools, and assistance that I had to complete this project in a satisfactory manner. (context)
- I enjoyed this task. (mood)
- Completing this assignment was beneficial to me. (utility)
- I was interested in the presentation tool used for this task. (interest)
- Utilizing the presentation tool made me more effective. (importance)

Teacher Survey Questions:

- How would you rate your students' experiences using PowerPoint?
- How would you rate your students' motivation towards using PowerPoint?
- How did your students respond to using the Web 2.0 tools?
- How would you rate your students' active engagement while using the Web 2.0 tools?

Teacher Interview Questions:

- What type of response do get from students when they are asked to create PowerPoint presentation?
- What tool do you prefer your students to use? Why?

Data and Analysis

The information from the teacher and student surveys will be represented using the Likert Scale. Responses to questions will range from strongly agree to strongly disagree. Each survey question will be evaluated using a pie graph to display the percentages of each student and teacher answer. These percentages will be used to draw conclusions about student performances and motivation. The graph below demonstrates how the data for each question will be represented.



Graph 1

The quantitative data to prove student motivation and performance will be displayed using a histogram. Each project will be evaluated using a rubric designed to evaluate each project. The scores for project 1, project 2, and project 3 will be presented individually to compare the scores of each group after the completion of each project. The graph below demonstrates how this data will be represented.



Graph 2

After the completion of all three projects the scores for each group will be evaluated to compare the performance and motivation within each group individually. The scores will again be displayed using a histogram to show this comparison. The higher score will represent higher student performance and motivation. The graph below represents how this data will be displayed.



Graph 3

The research will evaluate the results of pre- and post-project teacher surveys; pre- and post-project student surveys; and project rubric scores. We will be using a sample survey for student and teacher data collection because it is an efficient way to collect meaningful data for a large population. We will be collecting both quantitative and qualitative (categorical) data.

Teacher and student responses from the survey and interview questions represent the qualitative data. These responses will separate the groups into categories related to their initial feelings about the project, enjoyment while completing the project and their overall motivation during the project. Pie graphs will be used to display the responses to the questions during the different phases of this study; the pre-project phase and the post-project phase. Percentages from the pie graphs can illustrate trends in student and teacher responses.

The second part of the data collection and analysis consists of quantitative variables. To achieve an overall conclusion of higher student performance and motivation, numerical values will be collected. Each of the three groups will complete three separate projects using PowerPoint, Prezi, and Wiki. Each of the projects will be graded using the same numerical grading rubric. The rubric that will be used is in Appendix A.

After each project scores will be evaluated and compared for each of the three groups. The quantitative data will be presented within a 3-bar histogram to compare the scores of each group. The same process, scoring and evaluation, will take place with project 2 and project 3. Histograms will be created again in project 2 and project 3 to compare scores for the three groups of participants. A final evaluation of scores will take place at the conclusion of the third project to compare the scores of the PowerPoint project, Prezi project, and the Wiki project for each of the three groups of participants. This data will also be displayed within a 3-bar histogram to compare individual group data with other groups. The quantitative data from each graph will be used to draw comparisons of student performance and motivation between Web 2.0 tools and PowerPoint.

Conclusion

We believe that this is a well thought out study that can be used to understand if using a different tool for a research project can affect student motivation and student performance. Dividing the students into three equal groups, having the students use three different tools in three different sequences, and comparing the evaluations of student projects as well as student perception of the project can help provide us with information to understand our research questions:

- Does the student use of PowerPoint presentations motivate students to learn and perform?
- Can Wikis be used as an alternative to PowerPoint?
- Can Prezi be used as an alternative to PowerPoint?
- Will substituting a Web 2.0 tool for a PowerPoint presentation yield higher student academic performance?
- Will substituting a Web 2.0 tool for a PowerPoint presentation yield higher student motivation?

Appendix: Rubric

CATEGORY	Excellent	Superior	Average	Poor
Total: 50	43-50	30-42	16-29	1-15
Content	Covers topic in-depth with details and examples. Subject knowledge is excellent.	Includes essential knowledge about the topic. Subject knowledge appears to be good.	Includes essential information about the topic but there are 1-2 factual errors.	Content is minimal OR there are several factual errors.
Points: 7	13-15	10-12	6-9	1-5
Attractiveness	Makes excellent use of font, color, graphics, effects, etc. to enhance the presentation.	Makes good use of font, color, graphics, effects, etc. to enhance to presentation.	Makes use of font, color, graphics, effects, etc. but occasionally these detract from the presentation content.	Use of font, color, graphics, effects etc. but these often distract from the presentaion content.
Points: 7	7	5-6	3-4	1-2
Organization	Content is well organized using headings or bulleted lists to group related material.	Uses headings or bulleted lists to organize, but the overall organization of topics appears flawed.	Content is logically organized for the most part.	There was no clear or logical organizational structure, just lots of facts.
Points: 7	7	5-6	3-4	1-2
Originality	Product shows a large amount of original thought. Ideas are creative and inventive.	Product shows some original thought. Work shows new ideas and insights.	Uses other people's ideas (giving them credit), but there is little evidence of original thinking.	Uses other people's ideas, but does not give them credit.
Points: 7	7	5-6	3-4	1-2
Mechanics	No misspellings or grammatical errors.	Three or fewer misspellings and/or mechanical errors.	Four misspellings and/or grammatical errors.	More than 4 errors in spelling or grammar.
Points: 7	7	5-6	3-4	1-2
Permissions	All permissions to use graphics "borrowed" from web pages or scanned from books have been requested, received, printed and saved for future reference.	All permissions to use graphics "borrowed" from web pages or scanned from books have been requested and received.	Most permissions to use graphics "borrowed" from web pages or scanned from books have been requested and received.	Permissions were not requested for several graphics "borrowed" from web pages or scanned from books.
Points: /	/	5-6	3-4	1-2

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Web Links:

Microsoft PowerPoint http://office.microsoft.com/

Prezi <u>http://prezi.com/</u>

Wikis http://en.wikipedia.org/wiki/Wiki