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UPDATING POWERPOINT FOR THE NEW BUSINESS CLASSROOM

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ABSTRACT

Aim/Purpose	To update a 2010 study that recommended “rules of thumb” for more effective use of PowerPoint in the post-secondary business classroom. The current study expanded the focus to include the business classroom in India as well as the US and examined possible shifts in student perception of the utility of PowerPoint among Generations Y and Z.
Background	The study examined students’ perception of the learning utility of PowerPoint in post-secondary business classrooms in the US and India and the relationship of the use of PowerPoint to course ratings.
Methodology	Surveys were distributed in post-secondary business classrooms in India and the US in 2018 and early 2019, resulting in 92 completions from India and 127 from the US. Separately 50 student course evaluations from the same US college were compared to the use of slides as well as to their conformance to the “rules of thumb” for effectiveness established earlier and other measures of quality.
Contribution	These results show how PowerPoint is viewed by post-secondary business students in India and the US and its perceived utility as a learning tool for Generations Y and Z.
Findings	Most post-secondary business students (80%) found PowerPoint an effective learning tool, but only 21% of the business classes examined used it. US students were more positive than Indian ones, who were more likely to say PowerPoint is overused.

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There was no difference in student course evaluations between those that had slides and those that did not. However, most of the slide decks examined did not follow the “rules of thumb,” exhibiting a much greater number of words per slide.

Generations Y and Z gave high ratings to slides that incorporated audiovisuals, mixed media, and special effects and said they learned more when they were the ones who created the slides. However, most students did not rate themselves as competent in creation of PowerPoint slides.

- Recommendations for Practitioners
- (1) Faculty should consider students’ positive reception of PowerPoint, their preference for adaptive, interactive learning that builds on strong multimedia elements while creating instructional materials.
 - (2) Faculty should receive prescriptive design instruction for incorporating PowerPoint best practices to cut back on their self-reported high time spent on slide creation and student-reported low technical competency in faculty instruction.
 - (3) Publishers should concentrate on slide design and innovativeness along with content coverage to serve faculty needs.
 - (4) Business curricula should take into account generational as well as cultural differences in learning preferences.
 - (5) To address the students’ conflation of personal social media prowess with superior technology or communication skills in the professional context, Business curricula should incorporate learning outcomes related to professional use of technology tools such as PowerPoint.

Recommendations for Researchers

There is still utility in old-fashioned paper questionnaires to assess what impacts student learning. There is also merit in comparing student course evaluations with various in-classroom treatments.

Impact on Society

PowerPoint may be underused in the post-secondary business classroom, but this paper raises questions about the value of unedited use of the very dense slides provided by publishers as effective learning tools in the post-secondary business classroom.

Future Research

Future research can be focused on the use of PowerPoint slides in the business classroom in other countries and cultures, as only the US and India were examined. Further examination needs to be made of the relationship between extensive and unedited use of publisher-provided slides and the reporting of the staggering statistics that most students are not now buying textbooks. Finally, this study did not touch on gender or socio-economic differences in the student demographics, which might open further avenues for investigation.

Keywords

PowerPoint, post-secondary business classrooms, Generations Y and Z in the US and India

INTRODUCTION

The starting point for this investigation is a 2010 study on the relationship between PowerPoint slides and perceived teaching effectiveness (Brock & Joglekar, 2011). The 2010 research uncovered a correspondence between lower textual density on slides and positive student feedback. The rule of thumb was set at no more than 3 bullet points or 25 words per slide for positive perceptions regarding slide quality and teaching effectiveness. The way PowerPoint decks are used to involve students in learning was deemed more important than the number of slides used.

The use of PowerPoint slides has now become de rigeur in the academic and business context. Both instructors and students use PowerPoint frequently in the business classroom. At the same time, we

have experienced generational shifts in instructor and learner demographics, with Generation X constituting a majority in instructor population and Generation Y/Z dominating the student demographic. This study investigates possible shifts within the student perception of PowerPoint in the new Business classroom. Learning style differences were the focus of the 2010 study. This investigation also touches upon generational and cultural aspects behind PowerPoint reception.

The current study also examines the prevalence of PowerPoint slide use in the classroom, especially the adoption of the slide decks typically provided by textbook publishers. The common availability of extensive slide decks, typically 40-50 slides per chapter may need to be juxtaposed to reports that as many as 70% of students are not buying textbooks.

LITERATURE REVIEW

POWERPOINT IN THE CLASSROOM

A vast body of research analyzing the effectiveness of PowerPoint as a pedagogical tool exists. There is no one consistent conclusion as to its utility. Students may have views at variance with those of faculty. Given the ubiquity of PowerPoint as a communication medium in the Business classroom and in professional life, it is important to delineate the main themes arising from student and faculty responses to this tool.

Mantei (2002) noted that using PowerPoint slides led to 20% time saving in presenting learning materials in the classroom compared to traditional teaching techniques. However, James, Burke, and Hutchins (2006) found that students have a less positive view of PowerPoint effectiveness in learning compared to educators. More recently, Baker, Lusk, and Neuhauser (2012) found that students differ markedly from faculty, with students exhibiting much greater acceptance of in-class use of technology. In addition, male students and undergraduate students are found to be more accepting of technology and off-task use of computers in the classroom than their female and graduate counterparts are.

Mazowiecki-Kocyk (2016) showed that students rated PowerPoint as the most effective teaching tool whereas teachers rated it as least effective. Positive feedback from students centered on its flexibility, accessibility outside classrooms, audiovisual incorporation, and ability to update content. Students appreciated the visual, auditory, and virtual stimuli offered by PowerPoint slides and often rated it highly as a teaching tool. However, this author also noted that the static nature of presentations negatively affects the students' observation and critical thinking skills.

Farmer (2006) reported an increase in publisher-provided materials from 2004 to 2006. A 2017 report described guidelines around distributing supplementary text materials including slides to students (Peters, 2017). This may be juxtaposed to indications that as many as 67% of students are not buying textbooks (Orange Grove, 2016), supported by qualitative change in student purchase patterns (Parry, 2013).

POWERPOINT DESIGN

Levasseur and Sawyer (2006) analyzed the reasons behind positive student responses to PowerPoint, namely organization and appeal of course materials, while cautioning that PowerPoint usage could negatively affect learner-instructor interaction. They point out that computer generated slides have no significant impact on student learning outcomes as per extant research and ask why PowerPoint continues to be a popular teaching and learning tool. Their research provides a strong pedagogical rationale to using slides, namely Weiner's arousal theory (1990) correlating emotional arousal and learning as well as Paivio's dual coding theory (1990) of visual or verbal learning styles that can help PowerPoint address a wider array of learner preferences. At the same time, they point to a research gap. Not much is available in terms of prescriptive design principles for instructors incorporating PowerPoint.

Gardner and Aleksejuniene (2011) applied three cognitive learning theories (cognitive load theory or CLT, multimedia learning theory or MMLT, and visual spatial learning theory or VSLT) to PowerPoint slide design in a dentistry classroom to determine effective methods of teaching and learning using visual technology. They found that multimedia content was preferred in a large group setting because it allowed for better connections. Most (96%) of their surveyed students said they were visual learners. The authors recommend aligning instructional slide design to visual learning preferences of students. The authors applied CLT to indicate that learning occurs along audio and visual tracts and that teaching is effective when both tracts engaged simultaneously in learners. MMLT suggests that PowerPoint slides should contain images with auditory explanation, according to these authors. Strauss, Corrigan, and Hofacker (2012) have built further on this hypothesis, demonstrating how a combination of relevant visual elements and instructor narration uses both the visual and verbal channels of a student's working memory, thus improving knowledge transfer.

Effectiveness of PowerPoint as a teaching tool may vary depending on how the slides are designed. Hertz, van Woerkum, and Kerkhof (2015) claim that PowerPoint is an overused tool leading to lack of contact with audience and recommended slides designed based on common sense rather than guidelines around human information processing. Brock and Joglekar (2011) noted that teaching effectiveness is low if the number and density of slides is too high.

How are instructors designing their PowerPoint slides? Kennett-Hensel's 2007 article surveys US marketing faculty to establish the usefulness of publisher provided slides for faculty teaching preparation and even for textbook adoption decisions. 70.2% of surveyed faculty used publisher provided PowerPoint slides in teaching, and 60% out of these combined publisher slides and slides of their own design. However, even though PowerPoint has become necessary for faculty to conduct their work, Young (2004) suggests that a majority of faculty are unskilled in the use of this technology. Indeed, Levasseur and Sawyer (2006) have pointed out the excessive time spent in creating PowerPoint materials: an average of 3 hours per 30 minutes of content. Thus, the gap between students' positive reception of PowerPoint as a teaching tool and instructors' self-reported struggle with PowerPoint needs to be addressed through further specifics on PowerPoint slide design that this study aims to provide.

GENERATIONAL DIFFERENCES IN LEARNING: GEN Y/ MILLENNIALS AND GEN Z

Digital natives born between 1980 and 1994 (Prensky 2001) are labelled Millennials by Howe and Strauss (2002). Frand (2000) and Oblinger, Oblinger, and Lippincott (2005) claim that this generation tends to learn differently. They are active experiential learners who are proficient multi-taskers and savvy users of communication technology for information access and sharing. Prensky (2001) noted, "Today's students are no longer the people our educational system was designed to teach." Koulopoulos and Keldsen's (2016) work on Generation Z emphasizes adaptive learning as well as disruptive invention and reinvention as the key for educators to engage with this demographic. From this context, it seems to be important to adapt PowerPoint technology usage building on Generation Y and Z's learning needs.

Indeed, these so-called digital natives have been described as disengaged, disappointed, and dissatisfied with learning (Prensky 2005). Bennett, Maton, and Kervin (2008) described the sophisticated technical skills imbuing learning preferences of the Net Generation for which traditional education is unprepared. This research examined the evidence around the need for educational reform and concludes that educators are facing "moral panic." However, Bennett et al. noted, students pragmatically accept differences in technology use at home and in educational institutions (Selwyn 2006), even though they might express frustration.

The second claim investigated by Bennett et al. (2008) concerned different learning styles for digital natives, e.g., multi-processing and needing dynamic information through game-based learning. How-

ever, it is problematic to make blanket statements as even Kolb (1984) in his learning style demarcation cautioned that these are not static nor are they generalizable to whole populations. Socioeconomic, cultural, gender differences were not explored at the time of Bennett et al.'s study.

In 2018, Jack Ma, the Alibaba founder, claimed in his World Economic Forum address: "If we do not change the way we teach, 30 years from now, we will be in trouble. The things we teach our kids are... knowledge-based. And we cannot teach our kids to compete with machines, they are smarter" (Whiting 2018). Ma's solution: teach learners creativity, problem solving, collaboration, resilience, and empathy.

This approach might be centered on what Hudson (2007) defines as high impact teaching, including teacher enthusiasm, student involvement, and applicability outside the classroom. However, it may be worthwhile to remember that even the Net Generation may not be truly "fluent in digital language" (Prensky 2001). This author found Generation Y and Z engaging in a high level of word processing in line with Bennett et al.'s (2008) findings, but showing low engagement in content creation or emerging technologies such as blogs, podcasts, etc. Caruso and Kvavik's 2004 study found lower level skills than expected from the digital native status. Lingwall and Kuehn (2013) argue that Generation Y and Z's self-perception can conflate personal social media prowess with superior technology or communication skills in the professional context. Our research considers Generation Y and Z's self-efficacy with relation to PowerPoint.

CULTURAL DIFFERENCES IN LEARNING

Geert Hofstede's seminal work (1991) applies culture primarily to national groups, cautioning that nations might be a slightly limiting concept. However, he points out that nations are "the only kinds of units available for comparison." Hofstede's study has identified five key dimensions of cultural diversity, namely: power distance; collectivism versus individualism; femininity versus masculinity; uncertainty avoidance; short term versus long-term orientation.

Scholars like Tsikriktsis (2002) have further used Hofstede's dimensions and examined technology-based communication from a perspective of design, visual appeal, and interactivity. The author analyzed website design and found that countries with higher masculinity scores have higher expectations about interactivity, design, and visual appeal in technology-based communication, and countries with higher long-term orientation scores have higher expectations about innovativeness in technology-based communication. High scores on masculinity indicate that a country is focused on appearance and success. When a nation scores high on long-term orientation, according to Hofstede, it values modernity and innovation as a way to prepare for the future. Low scores on long-term orientation suggest a greater weightage on quick results and at the same time, greater apathy or resistance regarding change.

There is no extant research on cultural differences in learning perception using technology tools such as PowerPoint, although a body of literature exists on cultural differences in traditional classroom or online learning. Liu, Liu, Lee, and Magjuka (2010) suggest considering language level and cross-cultural examples while designing an online MBA curriculum for students across cultures. Building on the work of Kolb (1984), Vita (2001) proposes a link between culture and learning styles, encouraging business school faculty to cater to multiple learning styles while designing curricula. The author finds in his UK university-based study that both international students and home students demonstrate a marked preference for visual learning, with international students preferring visual inputs at 75% in comparison to 52.4% visual learners among home students. Our research takes the cultural dimension into consideration while analyzing PowerPoint reception across two countries.

RESEARCH QUESTIONS

The questions investigated by this study include:

1. What is the correlation between using PowerPoint and perceived teaching effectiveness from a learner perspective?
2. What is the correlation between PowerPoint slide design and perceived teaching effectiveness from a learner perspective?
3. Are the rules of thumb (3 bullet points or 25 words per slide limit) still valid when it comes to PowerPoint impact on student perception of learning?
4. What differences in student reception of PowerPoint are present in different generational cohorts?
5. What differences in student reception of PowerPoint are present in different cultural cohorts?

METHODOLOGY

The purpose of the research is to document the utility and efficacy of PowerPoint slides in the collegiate classroom.

Two research methods were used. During fall 2018, a 10-question survey was distributed in four classes in a Manhattan graduate school of business, three classes in one of the same college's undergraduate school, and a large graduate business class in a large Indian city. Approximately 100 responses have been obtained from the US sample and 100 from the Indian sample. Student participation was voluntary. Respondents were informed that participation or declining participation would not affect grade. They were also told they could choose not to respond to any question. Being a part of standard academic class process, this research was submitted as "exempt" to the college IRB and approved. Appendix A contains a copy of the survey.

The questionnaires were manually distributed before the break at the mid-point in the class. There was a large envelope at the front of the classroom into which students could insert their responses on return from break, before instructors returned to the classroom. The instructor sealed the envelope with no knowledge of who completed and gave it to one of the investigators.

Additionally, 50 graduate business classes in the same Manhattan college were analyzed for the effect that using slide decks had on the student's evaluation of a course. Where PowerPoint decks are used, these were evaluated for match to the following decision rules of effective use:

- Number of slides used/class
- Number of bullet points/average slide
- Number of words/average slide
- Use of visual aids
- Ability to "make meaning" from the average slide in the deck.

After removing the data points with missing values, we analyzed the data sample using SPSS Version 22.0. We conducted descriptive analysis including cross-tabulated bar charts and compared variance in means of data by grouping variables, to understand the difference between groups. We tested the preconditions for using ANOVA, but as homogeneity of variable criteria was not satisfied by our dataset, we checked that assumption using Lavene's tests. We have used non-parametric tests to understand difference between the data grouped by country variable i.e. India or United States, and then further comparing Generation Z respondents of both the countries (detailed results are included as part of Appendix B).

RESULTS

PREDICTABILITY AND TEACHING EFFECTIVENESS OF POWERPOINT

Figure 1 reports the percentage distribution of students who find PowerPoint as a teaching tool to be predictable or overused. Only about 20% of students did not believe that PowerPoint had instructional value in the classroom. However, in the graduate business classroom examined, only 21% of the 50 classes examined used slide decks, indicating a gap between student reception and faculty usage of PowerPoint.

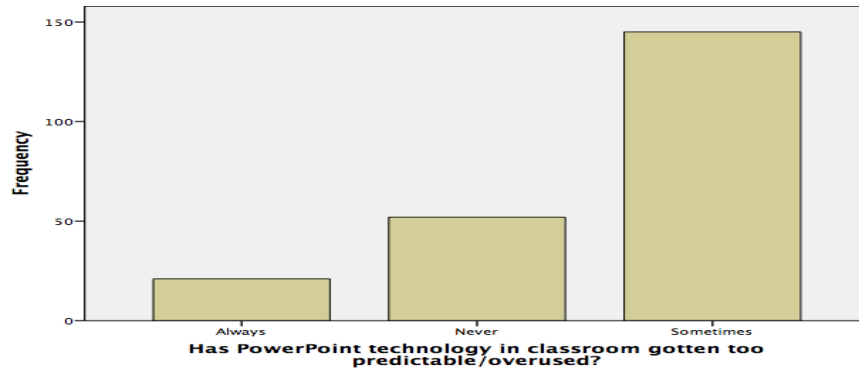


Figure 1: Predictability or overuse of PowerPoint

When the responses across India and the US were compared, between 70-75% of surveyed Indian and US students rated PowerPoint as the best method of classroom instruction. However, US students were more positive than the Indian ones (75% top box rating versus 56%).

The data substantiates that rating PowerPoint as the best method for class instruction and perception of student learning in the classroom using PowerPoint does not show significant cross-country difference ($p > 0.10$). An overwhelming 95.6% of Indian students feel that PowerPoint helped them learn new concepts and ideas well, and US students were enthusiastic at 89%, as Figure 2 indicates.

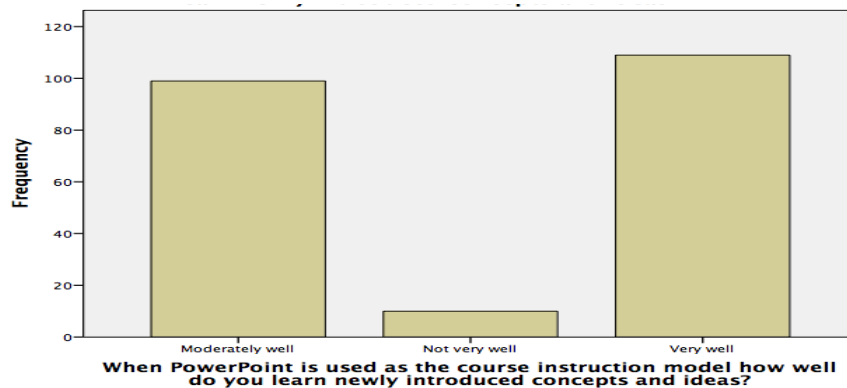


Figure 2: Using PowerPoint for new concepts

The appeal of PowerPoint is shown in some of the statements made by survey participants. A US student pointed out the “perfect balance of images...also great with class interaction,” and another cited how the technology allowed “diverse ways to make PowerPoint interesting to watch.” Indian students found PowerPoint to be an effective means of instruction especially with “live examples for each topic” or when the slides contained “efficient use of humor and memes to teach us the subject.”

Further, our data revealed that Indian students perceived a significantly higher overuse of PowerPoint in comparison with US students' response for the same question ($p=.000$). Indian students ranked themselves lower in competency level in executing PowerPoint ($p=.077$) in comparison with US students.

CORRELATION BETWEEN POWERPOINT DESIGN AND PERCEIVED TEACHING EFFECTIVENESS

In the analysis of the 27 PowerPoint decks used in the US graduate business school the average course rating by students was not significantly different for those classes that used slide decks compared to those that did, 4.1 on a 5-point scale.

The average design followed the “rules of thumb” recommended by Brock and Joglekar (2011) for the average number of bullets per slide. However, the average slide had nearly 60% more words than had been recommended. Table 1 summarizes the analysis of the current study and juxtaposes it to the “rules of thumb” developed by these researchers.

Table 1: Quality rating of slides used

Average:	Rule of thumb	Current study
# slides/ 2-hour class	NA	26.5
# words/slide	25	39.5
# bullets/slide	3	3.9
# visual aids	More than zero	13.7

In examining factors that increase student engagement with PowerPoint, relevant images were mentioned in both the Indian and US samples. This dimension was ranked first for the Indian sample, with two-thirds of the students checking it. In addition, video and interactive content as well as mixed media were deemed to add to PowerPoint design impact.

US students described their most memorable presentation as “engaging, interactive and presented in simple terminology with multiple means of presenting the information with graphs, video” and “interactive, [with] bullet points, relevant images.” An Indian student liked a PowerPoint presentation that “was very simple and [where] the use of colors was very creative and attention grabbing.” Other Indian students cited the following regarding impactful design: “interactive videos where my professor asked us about our interpretation and the topic we were going to learn [and] the effects and transitions were on point.”

GENERATIONAL DIFFERENCES IN POWERPOINT RECEPTION

Our sample cohorts claimed that PowerPoint enabled them to learn new concepts and ideas better. These Generation Y and Z students gave high ratings to audiovisual incorporation, mixed media, and special effects.

In keeping with the Net Generation's predilection for visual, experiential learning, 85% of US students and 90% of Indian students expressed a preference for self-created slides as a more productive way of engaging with PowerPoint than to consume slides generated by others (Figure 3).

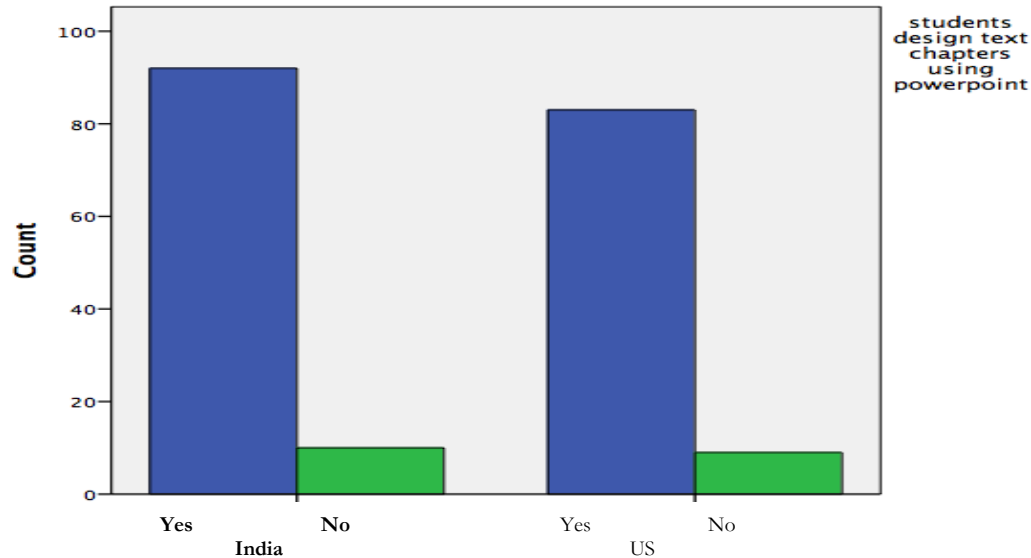


Figure 3: Students preferring to create their own PowerPoint

Despite their demanding expectations from faculty slides and interest in content creation, students did not demonstrate high self-esteem regarding their own PowerPoint competency. Less than one-fourth of the Indian sample and 39.2% of the US sample rate themselves “high” in executing a PowerPoint presentation in a business environment. Indian Generation Z students have a higher mean rank for the variable “PowerPoint being overused in class” ($p=.021$) and a higher competency level in executing PowerPoint ($p=.074$). When we did not consider generation as factor, Indian students had lower mean rank for competency level in executing PowerPoint than US students. Learning in class using PowerPoint also showed significant difference in rank with Generation Z Indian students having higher mean rank ($p=.044$), while there was no significant variation in ranks in complete data. The variable rating PowerPoint as the best method for classroom instruction did not show significant cross-country difference for Generation Z ($p > 0.10$).

The students’ doubts regarding their PowerPoint self-efficacy is in keeping with extant research on Generation Y and Z’s conflicted approach to technology use and technology competence.

CULTURAL DIFFERENCES IN POWERPOINT RECEPTION

A comparison of Generation Z participants from the Indian and US sample reveals that not much variation in PowerPoint reception exists within the studied sample. However, some broad themes emerge in PowerPoint reception between the two cultures’ complete data set in the studied sample.

The US students were intrigued with the special effects that PowerPoint offers. They were less enamored by music and other innovative elements. US students preferred the use of clicker ($p=.057$) more in comparison with Indian students. Indian students were more in favor of adding video ($p=.000$), adding relevant images ($p=.009$), adding interactive video ($p=.000$) than US students. The other design elements and interactive tools i.e. use of Prezi, did not show a cross-country difference ($p > 0.10$).

Our analysis indicates that Indian Generation Z also rated the adding Video ($p=.000$), adding relevant images ($p=.063$), adding interactive video ($p=.056$) more favorably than US Generation Z students. US Generation Z students preferred use of clicker ($p=.057$) more than Indian students. We wish to indicate that this difference is not remarkable for Generation Z students, as the difference in

mean rank is less when we considered only Generation Z students of both countries. The use of Prezi did not show a cross-country difference for Generation Z as well ($p > 0.10$).

Both India and the US score high on masculinity in the Hofstede (1991) dimension: India scores 56 and the US scores slightly higher at 62. The focal points of a higher masculinity country score are appearance and success, which Tsiriktsis (2002) correlated with higher expectations about interactivity and visual appeal in technology-based communication. While both Indian and US students place high value on PowerPoint design, the Indian cohort rates interactive elements higher, whereas the US cohort appears to be less enamored by them and more taken with visual appeal. According to Hofstede, high scores on masculinity also indicated that a culture focuses on success. Our findings do not bear out this linkage, however, as both the US and Indian cohorts demonstrate a low self-efficacy perception in relation to PowerPoint competence.

India scores higher at 51 than the US at 26 on long-term orientation, which is a Hofstede dimension where a country focuses on modernity and innovation as a way to build for the future. Countries with higher long-term orientation scores have higher expectations about innovativeness in technology-based communication, according to Tsiriktsis. In keeping with this research, predictability and over-use of PowerPoint is an issue for some (13%) of Indian students, but for none of the New York ones. A third of the latter group said that those were never issues for them, indicating a higher level of comfort with stasis, as Figures 4 and 5 demonstrate.

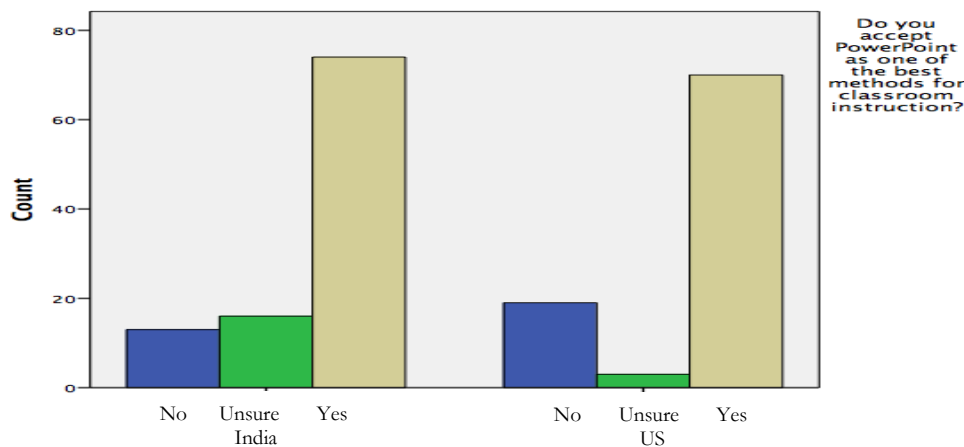


Figure 4. PowerPoint: One of the best methods for classroom instruction

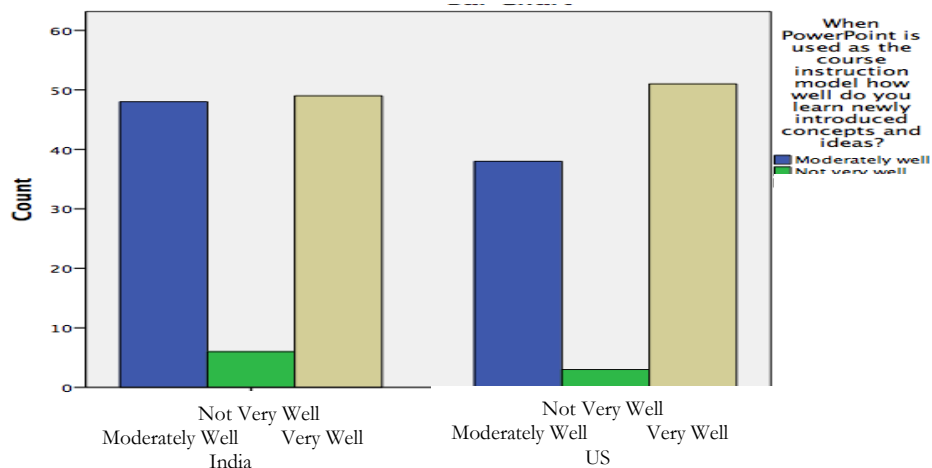


Figure 5. PowerPoint: One of the best methods for new concepts and ideas

CONCLUSIONS

Our research demonstrates that students rate PowerPoint as the most effective teaching tool, justifying its continued deployment within the Business classroom. At the same time, the findings have clear practice-based implications, suggesting that the use of PowerPoint as a teaching tool must be flexible enough to develop inclusive instruction that supports technologically and culturally diverse learning preferences.

For business instruction at both the undergraduate and graduate level, we have the following curriculum and instructional design recommendations:

- (1) Faculty should consider students' positive reception of PowerPoint, their preference for adaptive, interactive learning that builds on strong multimedia elements while creating instructional materials.
- (2) Faculty should receive prescriptive design instruction for incorporating PowerPoint best practices to cut back on their self-reported high time spent on slide creation and student-reported low technical competency in faculty instruction.
- (3) Publishers should concentrate on slide design and innovativeness along with content coverage to serve faculty needs.
- (4) Business curricula should take into account generational as well as cultural differences in learning preferences.
- (5) To address the students' conflation of personal social media prowess with superior technology or communication skills in the professional context, Business curricula should incorporate learning outcomes related to professional use of technology tools such as PowerPoint.

Future research can be focused on the use of PowerPoint slides in the business classroom in other countries and cultures, as only the US and India were examined. Further examination needs to be made of the relationship between extensive and unedited use of publisher-provided slides and the reporting of the staggering statistics that most students are not now buying textbooks. Finally, this study did not touch on gender or socio-economic differences in the student demographics, which might open further avenues for investigation.

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APPENDICES

APPENDIX A: QUESTIONNAIRE

Participation in this survey is voluntary. Participation or declination of participation will not impact your grade. You may choose not to respond to any question.

1. Do you accept PowerPoint as one of the best methods for classroom instruction?
Yes () No () Don't know ()
2. When PowerPoint is used as the course instruction model, how well do you learn newly introduced concepts and ideas?
Very well ()
Moderately well ()
Not very well ()
Not at all ()
3. Has PowerPoint technology in the classroom gotten too predictable/overused?
Always ()
Sometimes ()
Never ()
4. What elements would make a PowerPoint presentation more dynamic and produce more student engagement?
Use Prezi ()
Add video ()
Use PP special effects ()
Add relevant images ()
Add mixed media ()
Add music ()
Add interactive video ()
Use clicker ()
Have students design text chapters using PowerPoint ()
Other
5. Describe the best classroom PowerPoint presentation you ever saw. Why do you still remember it and what did you learn
6. Do PowerPoint presentations help you to think critically? Explain.

7. Do you learn from creating your own PowerPoint presentation or from reviewing a presentation that has already been prepared on a particular topic? Explain.
8. How would you rate your competency level in executing a PowerPoint presentation in a business environment?
 - Highly competent ()
 - Moderately competent ()
 - Not very competent ()
 - Not at all competent ()
9. Which gender do you identify with?
10. What is your age?
 - Under 21 ()
 - 22 -- 25 ()
 - 26 -- 29 ()
 - 30 -- 39 ()
 - 40 -- 49 ()
 - 50 -- 59 ()
 - 60 and over ()

Thank you for taking the time to answer.

APPENDIX B: STUDENT SURVEY DATA ANALYSIS

Table B.1. Test of homogeneity of variances

	Levene Statistic	df1	df2	Sig.
Use Prezi	.905	1	215	.342
Add Video	50.824	1	215	.000
Use special effects	3.425	1	215	.066
Relevant images	11.234	1	215	.001
Mixed media	.869	1	215	.352
Music	.072	1	215	.789
Interactive video	1.313	1	215	.253
Clicker	16.164	1	215	.000
Design chapters on PowerPoint	.449	1	215	.504
Learn when PowerPoint used	.377	1	216	.540
PowerPoint overused	41.973	1	216	.000
Competency level	12.061	1	216	.001
Best method for class	.460	1	216	.498

Table B.2. Non-parametric test, comparing use of design elements with PowerPoint between India and USA respondents

	Use Prezi	Add Video	Use special effects	Relevant images	Mixed media	Music	Interactive video	Clicker	Design chapters on PowerPoint
Mann-Whitney U	5607.5	4302.5	5449	4714	5577	5708.5	4274	5208.5	5668.5
Wilcoxon W	13482.5	12177.5	9727	12589	13452	9986.5	12149	9486.5	9946.5
Z	-0.479	-3.78	0.909	-2.63	-0.473	0.134	-3.74	-1.905	-0.334
Asymp. Sig. (2-tailed)	0.632	0	0.363	0.009	0.636	0.893	0	0.057	0.738

Table B.3. Non-parametric test, comparing perception towards utility of PowerPoint between India and USA respondents

	Best method for class	Learn when PowerPoint used	PowerPoint overused	Competency level
Mann-Whitney U	5611.5	5209.5	3866.5	5072
Wilcoxon W	13612.5	13210.5	11867.5	9350
Z	-0.515	-1.443	-5.046	-1.766
Asymp. Sig. (2-tailed)	0.606	0.149	0	0.077

Table B.4. Non-parametric test, comparing use of design elements with PowerPoint between Generation Z respondents only of India and USA

	Use Prezi	Add Video	Use special effects	Relevant images	Mixed media	Music	Interactive video	Clicker	Design chapters on PowerPoint
Mann-Whitney U	2672	1964	2656	2340	2688	2756	2322	2570	2754
Wilcoxon W	6950	3794	6934	4170	4518	4586	4152	6848	7032
Z	0.481	-3.651	-0.555	-1.86	-0.337	0.022	-1.915	-1.25	-0.044
Asymp. Sig. (2-tailed)	0.63	0	0.579	0.063	0.736	0.982	0.056	0.211	0.965

Table B.5. Non-parametric test, comparing perception towards utility of PowerPoint between Generation Z respondents only of India and USA

	Best method for class	Learn when PowerPoint used	PowerPoint overused	Competency level
Mann-Whitney U	2721	2328	2337	2388.5
Wilcoxon W	4612	4219	4228	6666.5
Z	-0.412	-2.014	-2.312	-1.784
Asymp. Sig. (2-tailed)	0.68	0.044	0.021	0.074

BIOGRAPHIES



Sabra E. Brock, PhD; is Dean at the Graduate Business School of Touro College in New York City, Berlin, and Moscow. Dr. Brock publishes and presents widely. *At the Intersection of Communication, Marketing, and Transformation* was published by Academic Studies Press in 2013 and *Discourses in Business Education at the Collegiate Level in 2019*. She presented the results of her study on the emotional journeys of female CEOs as a keynote at Harvard University in 2018. She also writes on gender relationships. *Men Head East, Women Turn Right* has been translated to five languages and converted to an eBook under the title: *I Say This, You Say That*. Prior to entering academia, Dr. Brock held global leadership positions at Citicorp, Colgate-Palmolive, DuPont, Young & Rubicam, as well as various entrepreneurial ventures.



Yogini Joglekar, PhD, is Managing Editor of *ISBInsight*, the flagship research periodical of the Indian School of Business. She has served as Visiting Faculty in Business Communication, Film and Media Studies, and German Studies. Dr. Joglekar has spent close to two decades in the field of experiential learning and cross-cultural management as Asia-Pacific Director and Academic Director for Mountbatten Program, a graduate level work-study exchange program with Cambridge University and other academic partners. Her publications span German Culture, Film Studies, and Business Communication. Dr. Joglekar's current research includes digital communication authenticity as well as women workforce participation and the impact of mentoring.



Ayushi Tandon is pursuing her PhD in the Information Systems area at the Indian Institute of Management, Ahmedabad, India. Her dissertation is on understanding electronic medical record keeping, from socio-cultural perspectives. She received the Pacific Telecommunications Council (PTC) Young Scholar Award in 2018 and has presented a paper on the meaningful use of the Internet by adolescents at the PTC 2019 conference. She has also given papers on the sharing economy in the health sector, use of open source software by researchers, and hedonic (game) technology adoption at various conferences in India. She has published a book chapter on smart meter data analytics.



Gena I. Bardwell has a Masters of Fine Arts degree from Rutgers University and is the Director of General Education Studies at Touro New York School of Career and Applied Studies (NYSCAS). She is an Assistant Professor in the Speech and Communication Department, NYSCAS and an Adjunct Instructor in Strategic Management and Communication at Touro's Graduate Business School. Her interest in the Updating PowerPoint Project grew out of a student's inventive use of PowerPoint in a presentation in one of her communication courses and his peers' positive reaction to his presentation. She asked her student to write about the experience in a brief questionnaire she developed on the use of PowerPoint in the classroom.