STUDENT PERCEPTIONS OF EFFECTIVE VISUAL AID USAGE

ABSTRACT

This study investigates whether significant differences exist across college undergraduates' grade levels, majors, gender, age levels, and income levels regarding their perceptions of visual aid usage in effective presentations. These differences were measured by subjecting 226 college undergraduates at a medium sized state university to a Visual Aid Usage Presentation Survey (VAUPS). Principal component factor analysis was performed on collected data, which revealed significant differences in students' perceptions across declared majors and college grade levels on all factors. These results suggest that business professors should present visual information according to differing perceptions of effectiveness across majors and grade levels.

Key words: Effective visual aid usage, Validation of traditional methods

STUDENT PERCEPTIONS OF EFFECTIVE VISUAL AID USAGE

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INTRODUCTION

Speech as an academic discipline began in 1915 and that same year the National Association of Academic Teachers of Public Speaking was formed and it grew from 165 members to 20,000 in less than 50 years (Buehler and Linkugel, 1962). The field of Communication now encompasses Public Speaking. Speech is offered to freshmen on large campuses across the US as the "Basic Course", which introduces students to the sub-fields of Communication, including Interpersonal, Mass, Small Group, and Public Speaking. In Business Communication courses, students receive guided practice and feedback on several types of speeches, including the purposes of speech (persuasive, informative and entertainment). AACSB-International accredited business schools require their students to enroll in one or more Business Communication courses as a core component of their curricula.

Business Communication textbooks cover core concepts of the field of Communication such as the Shockley-Zalabak (1988) model. Business Communication textbooks include many chapters covering different forms of business writing, including business letters, resumes, employment application letters, progress reports, newsletters, and more. Many textbooks are weighted heavily on business written communication. The overabundance of coverage on writing seems to preclude business students a more in-depth knowledge on oral communication skills. Oral communication is behavior most often associated with a manager's time (Conger, 1998). Furthermore, it is through oral communication that managers can most often frame things visually.

Stylistic devices are techniques often taught. Sprague and Stuart tell students to "enliven your language through the planned use of figures of speech and certain arrangements of words and phrases" (2000: 220). Mental imagery can be used to evoke powerful images that influence change in behaviors. For example, "The War Address by FDR" started with a most meaningful use of personification, "Yesterday, December 7, 1941—a date which will live in infamy—the United States of America was suddenly and deliberately attacked by the naval and air forces of the Empire of Japan." Presentation effectiveness might be measured by an accomplished speech purpose.

An audience may ultimately determine the effectiveness of a presentation. Therefore, effectiveness might be based on audience perceptions, their changed beliefs and behaviors resulting from exposure to a presentation. This anecdotal knowledge is a problem currently being discussed among scholars teaching the basic communication course. They strive to answer the question: how to study an elusive phenomenon, such as effective visual aid usage, which is a culmination of everything visual that aids the speaker in achieving some purpose? A presentation is fluid and dynamic, not static; nonetheless, two communication scholars are calling for a validation of old pedagogical methods and what they refer to as outdated tautology predicated on Greek and Roman traditions.

Needed Research

Hugenberg and Hugenberg (1997) disagreed with the current pedagogical practices in the basic communication course for relying too heavily on the ancient Greek and Roman traditions. They argued that the basic public speaking course "uses textbooks that are almost totally dependent on classical rhetoric for teaching students ways to develop and improve their communication skills" (1997: 4). They stated in the second of five conclusions drawn from their content analysis of five contemporary public speaking textbooks that "offering students

platitudes and poorly-supported assertions really do not prepare them for the public speaking situation" (1997: 27). Business professors use visual aids when presenting information to their own students; the practice is largely based on anecdotal knowledge.

Research is needed for all grade levels of instruction where visual aids are used to enhance student learning by effectively presenting information visually. Speech educators' plea for a more precise delineation of course content and teaching practices is valid for Business Communication professors who teach units on oral communication in their courses. Other business instructors seeking to facilitate learning style differences by integrating their lectures with effective visual aids to accommodate visual learners need research that can guide their pedagogical practices. Dunn and Dunn (1993) have already clarified in their model the three learning styles. They are (1) visual, (2) auditory and (3) kinesthetic. Furthermore, Hugenberg and Hugenberg (1997) made remarks about "platitudes" and "poorly-supported assertions" as not really preparing students for the public speaking situation. Great concern should be sparked in business teachers whose methods are rooted in common practices.

Drucker states in his book, **Innovation and Entrepreneurship**, "every practice rests on theory, even if the practitioners themselves are unaware of it" (1985: 26). Business teachers who use visual aids as a means of enhancing student learning or those who require students to engage in classroom presentations seem to be proliferating subjective tautology without empirical validation supporting the pedagogy. Business teachers and students use presentation methods based on mostly anecdote and not empirical evidence; therefore, this study needed an operational definition to limit its scope.

Operational Definition

Sandford and Yeager (1942) presented what Professor V. A. Ketcham called the seven principal kinds of imagery as "the seven doors to the mind." They offered a summary of those doors he pointed out that a business speaker should use to be highly effective. They summarized the seven "doors" to the mind as:

> (1) *Visual* – things seen: the dazzling glare of lights on Broadway; the red, white and blue of Old Glory; the cigar-shaped dirigible; (2) *Auditory* – things heard: the hiss of steam; the roar of the cannon; the shriek of a woman; rumbling trains; (3) *Motor* – muscular sensations: we pushed, shoved, twisted our way through the crowd; we swayed in the rhythm of the dance; (4) *Tactile* – things felt: the smoothness of silk; the roughness of tweed; the dryness of chalk; the stabbing pain of the knife wound; a fly crawling over your face; (5) *Gustatory* – things tasted: the sweetness of candy; the tang of lemon; the bitterness of quinine; (6) *Olfactory* – things smelled: the odor of ether; the aroma of a cigar; the stench of rotting flesh; the perfume of violets and (7) *Thermal* – perception of heat and cold: the chill of steel; the warmth of the hearth fire; the biting north wind. The definition was written according to their instruction (1942: 194).

Dunn and Dunn (1993) might call those doors three styles of learning: Visual, Auditory, and Kinesthetic. Learning styles might be viewed as ways in which people think, solve problems and learn. A visual "door to the mind" could be construed as any word or phrase that evokes responses connected with sentient experiences (such as learning) in a student audience. Visuals could alter their beliefs and actions towards the presenter's purpose. Hence, the operational definition for this study was determined: Visual aid usage is any tool that can be a "thing seen" by an audience and manipulated by a presenter in making the presentation more effective. Any

gesticulation, eye contact, facial expression, mechanical device, color usage in slides, electronic equipment including PowerPoint, and non-technical devices (flip chart, chalkboard, transparency, etc.) are all examples of *Visual Aid Usage* if used during a presentation to enhance its effectiveness. If student learning increases as a direct result of a visual aid used by a professor that would represent an effective visual aid. The scope of this study was on student perceptions of visual aid usage in effective presentations. A literature search was conducted to determine if any studies had been conducted across all grade levels that would provide empirical support to the validity of this study. The search was broad because learning style differences were assumed to be ubiquitous at all instructional levels.

RELATED LITERATURE

Scheiber and Hager (1994) presented strong evidence that visual aid selection was beneficial to presentation effectiveness and its persuasive meanings. They found that more than two thirds of the managers they surveyed reported that they "very frequently" or "frequently" gave presentations. Morrison and Vogel (1998) found that although business presentations rely on a variety of factors beyond the substance and structure of the presentation (audience factors, environmental factors, and perceptions of the speaker) the visual variable affected all factors. They found a 79 percent over 58 percent audience consensus when comparing visual to non-visual usage. They also found that too many colors and an overuse of animation could backfire on the presenter.

Pruisner (1993) conducted a study to determine the impact of color on learning. The entire seventh-grade class from a Midwestern junior high school was used in one of four treatment groups: (1) color-cued presentation, color-cued assessment; (2) color-cued presentation, black/white assessment; (3) black/white presentation, color-cued assessment; (4) black/white presentation, black/white assessment. It was determined that the preferred presentation type was color-cued; an important factor in enhancing performance appeared to be the presence of a systematic color cue in graphic presentation.

Wilson (1967) provoked an early discussion on the aspect of visual aid to determine a clear understanding of visual perception that is important to teachers. For a teacher working with specific problems, visual perception can aid a child to become a better reader and a better learner.

Allen and Daehling (1968) used still slide programs with audiotapes in three forms: figural, symbolic, and semantic. A total of 247 sixth-grade students were randomly assigned to one of the nine treatment groups, and measures of mental, verbal and cognitive abilities related to the three intellect factors were obtained for all participants. Performance was assessed by a written post-test. They found no conclusive interaction between modes of presentation, inherent content of materials, and learner characteristics.

Wheelbarger (1970) tested theories in audiovisual education that held that learning from a visual illustration was directly related to the realism of the visual aid. They used five treatment groups and all groups were pre-tested, taught the same unit of instruction, and post-tested. Four groups saw slide sequences with illustrations with a different degree of realism: line drawing (black and white), line drawing (color), shaded drawing (black and white), and shaded drawing (color). The fifth group saw a slide presentation with words only. The results of the study showed no significant difference among the five groups' learning achievement.

Bennett (1988) provided examples of visual representations that are helpful in understanding number relationships and the algebraic statements of those relationships. They suggested teachers use the representations to aid students in discovering number relationships.

Roth (1992) suggested visualization as a factor of intelligence that includes the mental manipulation of spatial configurations and has been associated with spatial abilities, creative thinking, and conceptual problem solving. They suggested that the shift from print to electronic media would increase the need to educate the next generation for the use of visual images.

Beck (1965) provided guidance on studies of the effectiveness of instructional television that showed it to be at least as productive as standard methods. Suggestions on its integration into the classroom as a presentation tool were also made. Allen (1963) suggested that teachers integrate technology into the classroom; as other instructional tools, the key value of television is its effective use in conjunction with classroom instruction.

Harland and Whyte (1981) investigated the proposition that males have a predominant tendency to encode visually when reading, whereas females tend to encode phonologically. Their findings indicated that males appeared to benefit more from word training, whereas females benefited more from letter training in the transfer task. The findings suggest that when teaching reading to young children, a more visually oriented method might be more effective for boys and a less visual method might be more effective for girls.

The literature search and review revealed several articles with relevance to the scope of this study and its purpose, such as Scheiber and Hager (1994) and Morrison and Vogel (1998). These papers contributed to the development and types of statements used in the *VAUPS*. Not only did the literature review provide important understanding of visual aid usage and its viability for instructional purposes, but also it helped the authors set appropriate limitations and delimitations.

Limitations and Delimitations

The study was limited to the perception of students at a medium sized regional state university. The twenty-five statements in the survey (the survey is included in the Appendix) reflect a very small number of potential visual aids used by business professors and students. No attempt was made to measure all available types of visual aids for instruction, especially figures of speech and thought (allusion, allegory, personification, irony, interrogation, etc.), which rely on a variety of factors beyond the substance and structure of the presentation (Morrison and Vogel, 1998). Furthermore, the survey statements merely reflect the visual aids observed to be routinely used by faculty and students and those suggested important in the literature.

PROCEDURE

A twenty-five item VAUPS and a separate list of questions that pertain to assessment of demographics were administered. Four business professors asked their own students in ten undergraduate business courses to complete the VAUPS during the fall of 2003 and spring of 2004 semesters. The ten courses were: one section of Principles of Microeconomics, two sections of Introduction to Business, three sections of Managerial Accounting, two sections of Management Information Systems and two sections of Business Communication. These courses are either core requirements for the College or University where the survey was conducted.

The amount of exposure to presentations differed among those ten courses. The four professors in these courses used a variety of visual aids, including PowerPoint, chalkboard, whiteboard, liquid crystal display (LCD), handouts, transparencies and videos. The survey was

strictly voluntary and students read a disclosure form prior to completing the survey. Two hundred twenty-six business and non-business students completed the survey. As shown in the *Appendix,* the students responded to a five-item Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Three (3) was used as the Neutral term.

Descriptive Data

There were 226 completed surveys and eight were found to be unusable due to too much missing data. The statistical analysis presented in this study is therefore based on 218 observations. Table 1 presents information concerning usable questionnaire returns.

Table 1: Usable Questionnaire Returns

Group Type	**Group Size**	**Usable Returns**	**Usable Percent**
Students	226	218	96.5

Table 2 provides detailed information regarding the mean, standard deviation and percentage of responses selected for each of the 25 items. Statements are indicated in Table 2 by S1, S2, S3, etc., where, for example, S2 refers to statement 2 - "A business presentation is more effective when color slides are used rather than black and white slides." The full list of statements is presented in the *Appendix*.

Analysis of the demographic data revealed that 120 males and 98 females completed the survey. Two hundred eleven students were 17-26 years old and 7 were 27-36 years old. Income was reported to be less than $10,000 by 183 students, between $10,000-$30,000 by 30 students, between $31,000-$50,000 by 2 students, and $51,000 or more by 3 students. The declared majors of the respondents were: Accounting – 42, Management – 66, Marketing – 20, Finance – 8, MIS – 56, Double-major – 7, and Non-business – 19. There were 49 freshmen (which comprised 22.5% of the respondents), 41 sophomores (18.8%), 65 juniors (29.8%), and 63 seniors (28.9%). Table 3 presents the breakdown of respondents across declared majors and class standings.

Table 2: Mean Scores, Standard Deviations, and Percent of Responses Indication Level of Agreement With Statement:

Statement	Mean	SD	Percent of Response					Total %
			1	2	3	4	5	
S1	3.99	0.99	2.3	4.1	23.4	32.6	37.6	100
S2	4.29	0.91	2.3	1.4	12.8	31.7	51.8	100
S3	4.32	0.86	1.4	2.8	9.2	36.2	50.5	100
S4	2.37	1.06	23.4	34.4	27.5	11.5	3.2	100
S5	3.31	1.14	7.3	16.5	28.9	32.1	15.1	100
S6	3.90	1.10	4.1	6.0	22.9	29.8	37.2	100
S7	3.69	1.05	4.6	6.4	28.0	37.2	23.9	100
S8	3.74	1.10	3.2	10.6	25.2	30.7	30.3	100
S9	2.77	0.98	9.2	29.8	40.4	16.1	4.6	100
S10	3.89	1.25	7.3	7.8	17.0	24.8	43.1	100
S11	2.75	1.11	15.1	23.9	39.4	13.8	7.8	100

S12	3.15	1.07	8.3	14.7	42.2	23.4	11.5	100
S13	2.88	1.03	11.9	17.4	48.6	15.1	6.9	100
S14	3.34	1.10	8.3	9.6	36.7	30.7	14.7	100
S15	3.48	0.92	3.2	6.0	44.5	32.1	14.2	100
S16	3.71	1.05	3.7	8.3	26.6	36.2	25.2	100
S17	3.85	1.06	3.7	6.9	22.5	34.9	32.1	100
S18	3.83	1.00	1.8	8.3	24.3	36.2	29.4	100
S19	3.56	0.97	3.2	8.7	32.6	39.4	16.1	100
S20	3.84	0.90	1.4	6.4	22.0	47.2	22.9	100
S21	3.91	0.89	0.9	5.0	23.4	43.1	27.5	100
S22	4.08	0.87	0.9	4.1	15.6	44.5	34.9	100
S23	3.64	0.97	3.7	6.0	30.7	41.7	17.9	100
S24	4.15	0.82	0.9	2.8	13.3	46.8	36.2	100
S25	3.96	0.93	1.8	5.5	17.9	44.0	30.7	100

Table 3: Descriptive Statistics by Declared Majors and Grade Level Categories

Grade Level	Accounting	Management	Marketing	Finance	MIS	Double Major	Non-Business
Senior	9	5	4	3	32	0	10
Junior	15	19	6	4	15	3	3
Sophomore	11	13	3	0	7	4	3
Freshman	7	29	7	1	2	0	3
Total	42	66	20	8	56	7	19

Reliability

The 25 items contained in the VAUPS instrument were compiled by the authors from their observations of textbooks, empirical research, classroom presentations by students and guest speakers, and research presentations by faculty members. A scale reliability test (Cronbach's Alpha) was performed on the VAUPS instrument. Table 4 lists the item-wise alpha reliability coefficients and the overall scale coefficient, which at 0.78 well exceeds the Nunnaly (1978) criteria of 0.70 for an acceptable alpha. A personal comfort range for alpha coefficients recommended by Devellis is "below .60, unacceptable; between .60 and .65, undesirable; between .65 and .70, minimally acceptable; between .70 and .80, respectable; between .80 and .90, very good…" (1991: 174).

Table 4: Reliability Statistics (Cronbach's Alpha)

Statement	Item-test Correlation	Item-rest Correlation	Avg Inter-item Covariance	Alpha
S1	0.59	0.52	0.12	0.76
S2	0.59	0.53	0.12	0.76
S3	0.63	0.57	0.12	0.76
S4	0.28	0.17	0.13	0.78
S5	0.17	0.06	0.13	0.78
S6	0.24	0.13	0.13	0.78
S7	0.50	0.41	0.12	0.76
S8	0.41	0.31	0.12	0.77
S9	0.10	0.00	0.13	0.78
S10	0.33	0.21	0.13	0.77
S11	0.15	0.04	0.13	0.78
S12	0.21	0.11	0.13	0.78
S13	0.21	0.11	0.13	0.78
S14	0.34	0.24	0.13	0.77
S15	0.37	0.29	0.13	0.77
S16	0.54	0.46	0.12	0.76
S17	0.52	0.43	0.12	0.76
S18	0.54	0.46	0.12	0.76
S19	0.33	0.24	0.13	0.77
S20	0.54	0.47	0.12	0.76
S21	0.56	0.49	0.12	0.76
S22	0.59	0.53	0.12	0.76
S23	0.40	0.32	0.12	0.77
S24	0.61	0.56	0.12	0.76
S25	0.42	0.34	0.12	0.77
Test Scale			0.12	0.78

Factor Analysis

The VAUPS administered to students were subjected to an exploratory factor analysis using Principal Factors method. An unrotated factor solution and Scree test suggested that six factors be retained for rotation that could account for 62% of the total variance explained, as can be seen from Graph 1 below. Promax (Oblique) Rotations were then used to extract the six factors. The criterion for selecting factor loadings was set at 0.40, which conforms to the commonly used cut-off in the literature (Devellis, 1991).

Graph 1:

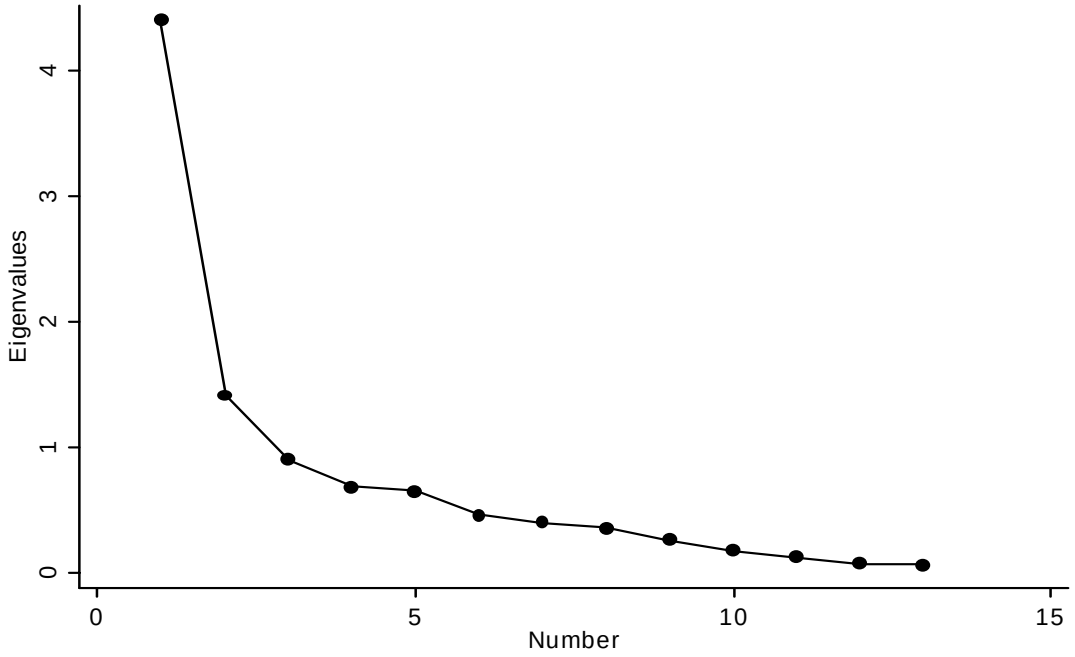

Table 4a: Promax (Oblique) Rotations With Six Factors

Rotated Variable	Factor Loadings						Uniqueness
	1	2	3	4	5	6	
S1	0.01	-0.10	0.02	0.67	0.15	-0.07	0.55
S2	0.06	-0.33	-0.07	0.72	-0.11	-0.04	0.37
S3	0.00	0.09	-0.07	0.62	0.05	0.10	0.50
S4	-0.01	0.66	-0.06	-0.27	0.04	-0.06	0.50
S5	0.01	0.50	-0.03	0.18	-0.08	-0.08	0.72
S6	-0.05	0.10	0.01	0.38	-0.06	-0.14	0.89
S7	-0.09	0.13	0.13	0.42	0.05	0.21	0.69
S8	-0.14	-0.12	-0.12	0.06	0.00	0.52	0.69
S9	-0.01	0.10	-0.16	-0.19	0.35	-0.02	0.83
S10	0.10	-0.19	-0.04	0.26	0.15	-0.16	0.88
S11	0.09	0.08	0.14	-0.09	0.34	-0.20	0.82
S12	-0.08	-0.02	0.28	0.03	0.42	0.10	0.73
S13	-0.10	0.26	0.02	-0.06	0.40	0.12	0.74
S14	0.15	-0.01	-0.05	0.10	0.50	-0.13	0.70
S15	-0.08	-0.15	-0.13	0.13	0.42	0.14	0.70
S16	0.24	-0.02	0.10	0.01	0.06	0.46	0.63
S17	0.35	0.02	0.21	0.14	-0.08	0.29	0.62

S18	0.09	-0.04	0.05	-0.02	-0.03	0.66	0.54
S19	0.09	0.06	-0.46	0.15	0.05	-0.05	0.73
S20	0.14	0.04	-0.24	0.21	-0.03	0.22	0.69
S21	0.10	0.09	-0.17	0.36	0.01	0.11	0.69
S22	0.30	-0.01	-0.06	0.05	0.20	0.29	0.61
S23	0.51	0.12	-0.02	-0.08	0.04	0.04	0.71
S24	0.63	-0.12	0.06	0.16	0.08	0.05	0.44
S25	0.64	0.05	-0.24	-0.04	-0.11	-0.01	0.53

Using these criteria, three items (S23, S34, S25 in the VAUPS) were found to load on the first factor which was subsequently labeled *"Visual Aids with Speech Purpose"*; two items (S4, S5) loaded on factor two which was labeled *"Gradation in Complexity of Visual Aid Usage"*; one item (S19) loaded on factor three which was labeled *"Color Preferred to Text"*; four items (S1, S2, S3, S7) were found to load on factor four which was labeled *"Colorized Visual Aid Necessity & Use of Graphics"*; four items (S12, S13, S14, S15) loaded on factor five and was labeled *"Caution, Coordinated Colors & Environmental Appropriateness"*; and three items (S8, S16, S18) loaded on factor six and was labeled *"Electronic Visuals Aids Preferred to Non-electronic Visual Aids"* (see Table 4b for factors and statements).

Table 4b: New Factors and Item Descriptions

Factor One: Visual Aids with Speech Purpose
S23: Presentation visuals that persuade a change in my beliefs or actions are effective.
S24: Presentation visuals that enhance information make the presentation more effective.
S25: Presentation visuals that are entertaining are very important regarding effectiveness.
Factor Two: Gradation in Complexity of Visual Aid Usage
S4: Black and white slides are just as effective as color slides for a one-hour business presentation.
S5: Colorized Transparencies are as effective as Power Point slides.
Factor Three: Color Preferred to Text
S19: Letter size matters more than color in a slide show.
Factor Four: Colorized Visual Aid Necessity & Use of Graphics
S1: A one-hour business presentation is more effective if colorized examples of technical information, in the form of Bar Charts, Pie Charts and Histograms, is used.
S2: A business presentation is more effective when color slides are used rather than black and white slides.
S3: Visual aids such as Overhead Transparency, PowerPoint, Whiteboard, Flip Charts, or Handouts make the presentation more effective.
S7: Accounting and finance presentations are more effective when using graphs and charts.

Factor Five: Caution, Coordinated Colors & Environmental Appropriateness
S12: Red should never be used in the business presentation when expressing a healthy income statement.
S13: The color of the room should not contrast with the colors of the slides.
S14: Four or five colors should be the maximum number used in a slide.
S15: Background colors should be determined before any other color is selected when creating slides.
Factor Six: Electronic Visuals Aids Preferred to Non-electronic Visual Aids
S8: PowerPoint is more effective as a visual aid than Transparencies and Whiteboards combined.
S16: The presenter's clothes can make the presentation more effective.
S18: Video presentations are more effective than using a chalkboard.

Among the six factors, component S19 was the only factor loading that had a negative correlation to that factor and had only one variable surviving the rotation. Component S21, which assessed text preferred to bullets and numbers, did not load high enough to survive the rotation. This was an indication that not enough text and color contrast statements were presented; however, given the respectable scale reliability (Cronbach Coefficient Alpha of 0.78) and a large random sample (218 observations), statement 19 was preserved for hypothesis testing. To ascertain if there were any significant differences in students' perceptions among the demographic variables (grade level, declared major, income, age and gender), data were further analyzed using the MANOVA technique.

Hypothesis Testing

The MANOVA procedure was used to ascertain whether significant differences existed in students' perceptions of visual aid usage in presentation effectiveness across the following five independent variables: (a) college grade level, (b) declared major, (c) gender, (d) age, and (e) income. The MANOVA results and the related descriptive statistics are summarized in Tables 5a, 5b, 5c, 5d, and 5e. Pillai's trace criterion was used to test the significance of the test statistics, as Pillai's trace is a better criterion than Wilk's lambda for determining statistical significance when there are unequal cell sizes and the assumption of homogeneity of variance is violated.

The MANOVA results presented in Table 5a revealed significant multivariate effects for the different grade levels (p-value = 0.08) and declared majors (p-value = 0.06), which suggest that there is indeed significant statistical difference across grade levels and declared majors at the 10% level of significance in student's responses to VAUPS items that constitute all six factors. Furthermore, the insignificant multivariate effects for gender (p-value = 0.48), age (p-value = 0.58) and income (p-value = 0.62) suggest that there is no such difference across different levels of gender, age and income.

Table 5a: Summary of Two-Way MANOVA with Between Groups Design

Source	Pillai's Trace	DF	F Statistic	p-value
Model	0.4385	14	1.14	0.1836
Grade Level	0.1313	3	1.53	0.0753
Major	0.2393	6	1.41	0.0575

Gender	0.0271	1	0.92	0.4831
Age	0.0234	1	0.79	0.5779
Income	0.0762	3	0.87	0.6172

Table 5b lists the p-values of testing the hypotheses of no significant difference between the mean vectors of each grade level vs. other grade levels. These results revealed significant differences between freshmen and seniors (p-value = 0.02) and between freshmen and juniors (p-value = 0.01), while there was only marginal difference between sophomores vs. juniors (p-value = 0.10).

Table 5b: The p-values of testing the hypotheses of no significant difference between the mean vectors of each grade level vs. other grade levels

Grade Level	Sophomore	Junior	Senior
Freshman	0.6923	0.0142	0.0245
Sophomore	-	0.1026	0.3555
Junior	-	-	0.5800

The differences found in Table 5b can be explained by the descriptive statistics presented in Table 5c, which revel that, when compared to juniors and seniors, freshmen had significantly higher mean scores on VAUPS items that constitute factor one, two, and three. Moreover, freshmen had significantly lower mean scores on factors four and five than juniors and seniors. On factor six, freshmen had a higher mean than seniors and a lower mean than juniors.

Table 5c: Mean Scores and Standard Deviations of Individual Factors for Each Grade Level

Factors	Freshman		Sophomore		Junior		Senior	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
1	4.03	0.83	3.90	0.90	3.89	1.02	3.88	0.85
2	3.01	1.17	2.93	0.99	2.76	1.02	2.74	1.19
3	3.67	1.07	3.76	0.73	3.49	0.9	3.43	1.07
4	4.02	0.97	4.07	0.91	4.13	0.92	4.06	1.01
5	3.12	1.16	3.21	0.88	3.22	1.03	3.28	1.03
6	3.80	1.09	3.56	0.99	3.85	1.03	3.78	1.07

Table 5d lists the p-values of testing the hypotheses of no significant difference between the mean vectors of each major vs. other majors. These results revealed significant differences between Accounting and Double majors, MIS and Double majors, MIS and Management, MIS and Marketing, and Marketing and Management. Descriptive statistics in Table 5e show the differences across majors in student responses to VAUPS items that constitute the six factors.

Table 5d: The p-values of testing the hypotheses of no significant difference between the mean vectors of each major vs. other majors

Major	MGMT	MRKT	FIN	MIS	Double Major	Non-business
ACCY	0.5680	0.1464	0.5835	0.1800	0.0662	0.2969

MGMT	-	0.0779	0.8139	0.0610	0.1421	0.9417
MRKT	-	-	0.3448	0.0092	0.3365	0.1719
FIN	-	-	-	0.6711	0.7873	0.8155
MIS	-	-	-	-	0.0477	0.1304
Double Major	-	-	-	-	-	0.1956

Table 5e: Mean Scores and Standard Deviations of Individual Factors for Each Major

Factors	ACCY		MGMT		MRKT		FIN		MIS		Dble Major		Non-Bus	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
1	3.87	0.86	3.85	0.95	4.07	0.93	4.05	0.74	4.01	0.78	4.43	0.98	3.60	1.12
2	2.73	1.07	2.99	1.13	2.53	1.11	3.26	1.03	2.81	1.09	2.79	1.28	2.87	1.06
3	3.50	0.83	3.53	0.98	3.35	1.23	3.63	1.06	3.79	0.89	3.71	0.49	3.32	1.20
4	4.05	0.87	3.97	1.00	4.55	0.64	4.06	0.82	4.06	0.96	4.36	0.90	3.92	1.19
5	3.45	0.94	3.12	1.02	3.31	1.10	2.94	1.33	3.25	1.02	2.93	1.00	3.02	1.10
6	3.67	1.00	3.69	1.10	3.88	1.10	3.88	0.96	3.94	0.95	3.38	1.24	3.65	1.18

IMPLICATIONS

The data analysis above provides strong evidence that students in this sample perceived Factor 1 (*Visual Aids with Speech Purpose)* as being more closely related to effective presentations than any other factor. When all factors were tested for significant differences, grade levels and declared majors were the two independent variables among five that tested significantly. These findings suggest that freshmen differ in their perceptions of visual aid usage in presentation effectiveness than juniors and seniors. Freshmen perceive the use of visual aids with speech purpose (informative, persuasive and entertainment), the gradation of complexity in visuals, and text size preferred to color significantly more favorably than juniors and seniors. Seniors and juniors were more favorable to using caution when selecting colors, coordinating colors used in slides, environmental appropriateness of colors, wardrobe of presenter, and the use of electronic visuals over non-electronic visuals.

These findings have interesting implications for business professors. They should be prepared to offer freshmen lessons integrated with visual aids that enhance speech purposes (persuasive, informative or entertaining); see Sandford and Yeager (1942). This evidence gives the traditional method of using visual aids strong empirical support; furthermore, students perceive speech purpose to be the primary factor in effective visual aid usage lends a great deal of credibility to the traditional pedagogy of teaching speakers to use a speech purpose. Freshmen (required to take the “basic course” the first or second semester of college) might have a unique sensitivity that could explain why they perceive speech purpose significantly different than other grade levels. In addition to visual aids with speech purpose, professors should offer freshmen more simplistic examples as evidenced by their significant favorable perception on Factors 1, 2 and 3. It is accepted pedagogy that freshmen be taught and assessed at the lower levels of cognitive processing (knowledge, comprehension, and application); therefore, business professors should use visual aids with speech purpose suitable for those levels of mental abilities.

In addition, Management Information Systems (MIS) professors should be prepared to offer MIS majors textually enriched visual presentations more so than colorized visuals. MIS majors favored text to color significantly more than other majors, except finance and double

majors, possibly due to their expert insight into web development and design and a keen understanding of the importance of clarity regarding visual communication of web pages.

Freshmen, sophomores, juniors and seniors have different perceptions about visual aid usage in effective presentations because they are groups that learn at different rates and through differing sensory modalities. Learning style differences were assumed to exist for the sampled population of undergraduate business students, see Dunn and Dunn (1993). Further research is needed that would examine learning style differences and visual aid usage by business professors. These studies should be coordinated and conducted on several college campuses. Data should be collected across all grade levels, including graduate students. More questions on text preferred to color and color preferred to text should be included in the survey in order to measure this particular construct in depth.

This study found differences among technical majors and college grade levels, which suggests that visual aid usage in presentation effectiveness should be studied in a more narrowly defined controlled experiment. A cause and effect relationship could be examined to determine if effective visual aid usage by business teachers do indeed cause an audience to alter its belief and actions. The factors that significantly correlated with an independent variable have set the groundwork for a series of studies in the area of assessing visual aid usage in business classrooms and students' perceptions of their effectiveness in presentations.

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APPENDIX

Visual Aid Usage Presentation Survey (VAUPS)

I am enrolled as a: Senior ____, Junior ____, Sophomore ____, or Freshman _____

My Major is: Accounting __, Management __, Marketing __, Finance __, MIS __, or a Double Major in: _____and _____or other/non-business_____
My gender is: Male _____ or Female _____ My age is: 17+__, 27+__, 37+__
My Income is: Less than $10,000____ $10,000-$30,000____ $31,000-$50,000____ or $51,000+____

This survey is designed to measure your perception of visual aids as they are related to an effective business presentation. Please circle the number that best reflects your level of agreement with the corresponding statement:

1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree

1. A one-hour business presentation is more effective if colorized examples of technical information, in the form of Bar Charts, Pie Charts and Histograms, is used.	1	2	3	4	5
2. A business presentation is more effective when color slides are used rather than black and white slides.	1	2	3	4	5
3. Visual aids such as Overhead Transparency, PowerPoint, Whiteboard, Flip Charts, or Handouts make the presentation more effective.	1	2	3	4	5
4. Black and white slides are just as effective as color slides for a one-hour business presentation.	1	2	3	4	5
5. Colorized Transparencies are as effective as Power Point slides.	1	2	3	4	5
6. A one-hour PowerPoint business presentation with fifty slides does not make the presentation more effective.	1	2	3	4	5
7. Accounting and finance presentations are more effective when using graphs and charts.	1	2	3	4	5
8. PowerPoint is more effective as a visual aid than Transparencies and Whiteboards combined.	1	2	3	4	5
9. Hand gestures are more important than mechanical visual aids.	1	2	3	4	5
10. A one-hour business presentation without any visual aids would be boring and ineffective.	1	2	3	4	5
11. Cartoon characters should not be used in a business presentation.	1	2	3	4	5
12. Red should never be used in the business presentation when expressing a healthy income statement.	1	2	3	4	5
13. The color of the room should not contrast with the colors of the slides.	1	2	3	4	5
14. Four or five colors should be the maximum number used in a slide.	1	2	3	4	5
15. Background colors should be determined before any other color is selected when creating slides.	1	2	3	4	5
16. The presenter's clothes can make the presentation more effective.	1	2	3	4	5
17. Business apparel should always be used during a business presentation.	1	2	3	4	5
18. Video presentations are more effective than using a chalk-board.	1	2	3	4	5
19. Letter size matters more than color in a slide show.	1	2	3	4	5
20. Animation can make the presentation more effective.	1	2	3	4	5
21. Bullets or numbers help delineate a business presentation better than text alone.	1	2	3	4	5
22. Eye contact is the most important visual aid for an effective speaker.	1	2	3	4	5
23. Presentation visuals that persuade a change in my beliefs or actions are effective.	1	2	3	4	5
24. Presentation visuals that enhance information make the presentation more effective.	1	2	3	4	5
25. Presentation visuals that are entertaining are very important regarding effectiveness.	1	2	3	4	5

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