

SHOULD COLLEGE INSTRUCTORS CHANGE THEIR TEACHING STYLES TO MEET THE MILLENNIAL STUDENT?

Peter M. Markulis
SUNY Geneseo
markulis@geneseo.edu

Elizabeth Murff
Eastern Washington University
emurff@ewu.edu

Daniel R. Strang
SUNY Geneseo
strang@geneseo.edu

ABSTRACT

Have you noticed a change in students lately? Today's students, called the "millennials" are believed by many to have markedly different expectations about learning, grades, learning goals and professors than past generations of students. The purpose of this paper is to provoke a discussion on what instructors perceive may be the difference in learning styles and attitudes of the millennials toward simulation and experiential exercise use as opposed to past students. The paper discusses the characteristics of the so-called millennial students, their attitudes toward learning and their expectations about college instructors. The paper also discusses, if and how, college instructors have altered their use of simulations (SIMs) and experiential exercises (EEs) to accommodate to the different learning styles of the millennials. The paper presents the results of a survey of instructors who use, and/or have used, SIMs and EEs as part of their pedagogy. It asks: (1) if the instructors perceive that today's college students have a different set of learning styles, as well as expectations of their professors than past students did; (2) if instructors have noticed a change in how the students approach simulations and/or experiential exercises and if so, have students' expectations of their instructors changed in this regard; (3) if instructors have tried to alter their use of the EE and/or SIM to accommodate the perceived changes in students learning attitudes; and finally, (4) if the instructors believe that they should alter their use of EEs and/or SIM pedagogy to accommodate today's college learners.

INTRODUCTION

Two of the authors have been using a computerized simulation for several years in strategic management. The simulation is a "typical" total enterprise simulation as de-

scribed by Keys and Biggs (1990). In a similar fashion to most simulations, this one asks students (or teams of students) to make twenty-eight simulation-related decisions. However, before students make their decisions, they must enter three important non-simulation decisions; (1) their team number, (2) the current period number (round or period of play number) and (3) their industry number (if there are several classes playing the simulation, each class is assigned an industry number). In the past three years, we have noticed that more and more students are entering the *wrong* team numbers, the *wrong* industry numbers and/or the *wrong* period of play numbers. Despite our threats and remonstrations, students seem almost 'indifferent' to this simple, minor, but important obligation. It has occurred to us that this behavior is a change from previous students who seldom made these kinds of errors—or, if they made them, they would be quite upset with themselves. Why is this the happening—has something changed?

THE MILLENNIAL STUDENT

"Today's students are no longer the people our educational system was designed to teach." (Prensky, 2000) Many of articles have appeared in the popular press as well as in some academic-oriented journals about today's college generation of students. They have been called the "millennials;" the "Y-Generation;" the "Moofers;" (mobile out-of-office workers). Characterizations differ, but some common features include (Coates, 2007; Dobbins, 2005; and Oblinger & Hawkins, 2005):

1. A close relationship with parents,
2. Attachment to structure and shelter,
3. Attentive & respectful,
4. Used to being schedules and programmed
5. Team-oriented,

6. Accustomed to supervision,
7. Pressured to succeed,
8. Involved in many activities
9. Open and eager,
10. Demanding of themselves & others,
11. Stressed,
12. Multitasking,
13. Socially conscious,
14. Have a high need for speed,
15. Learns better by discovery,
16. Shifts attention easily from one thing to another and
17. Prefers learning through visuals.

Although not as commonly mentioned or shared among commentators other characterizations include: (1) an over confidence in their own abilities, (2) an unrealistic expectations of life and the world; (3) a broad, but lack of-in-depth understanding of many subjects and issues.

A further phenomenon is that of the “*helicoptering*” parent (sometimes called ‘Velcro’ parents). The *helicoptering* parent is one who is constantly involved in the management of their children’s lives. “We estimate that 60% to 70% of parents are involved in some kind of *helicoptering* behavior,” says Patricia Somers (2007), an associate professor of education at the University of Texas-Austin, whose analysis is based on more than 50 interviews with officials from ten four-year public universities across the USA. Somers says the helicopter parent is often thought of as coming from the middle and upper classes, but that’s a misconception. Her interviews suggest they come from all socio-economic classes. Further, *helicoptering* does not stop with college graduation. In a Michigan State University survey of employers, 26% said parents had actively promoted their son or daughter for a position, 31% said parents submitted a résumé on behalf of their offspring, and 41% said parents obtained company materials for their kids (Lancaster & Stillman, 2010).

ACADEMIA’S RESPONSE

Several articles offer advice on how universities and college instructors can (should?) adapt and accommodate teaching regimens to millennials. Ideas range from using more sophisticated technology to sharing learning with parents (Dede, 2004; Dobbins, 2005; and McGlynn, 2007). For example, Dede notes, “Colleges and university executives should consider asking themselves the following strategic questions: 1. Do we know our students and their preferences, or do we assume we know? 2. How are we adapting programs to students’ needs. 3. What balance of physical and virtual will best serve our student population? 4. Are our building and renovation plans based on outdated assumptions? 5. What is the proper balance between student and faculty perspectives?”

While an article from the EDUCAUSE Review reports on a conference sponsored by the American Association of

State Colleges and Universities, EDUCAUSE, and Microsoft, held in June 2004, where college administrators (Oblinger & Hawkins, 2005):

...heard about what today’s students, the “Net Generation,” expect from information technology, based on their lifetime experiences with computers: instant messaging, chat rooms, *Googling*, online games, virtual tours, and bulletin boards, for example. They heard about the multi-tasking Net Generation students who **demand** instant access to infinite amounts of information on a 24/7 basis. It soon became clear that current and future students expect state-of-the-art technology at home, in the classroom, and on campus.

The article goes on to state “The administrators returned to campus and established a task force to plan a campus-wide workshop to discuss the Net Generation learners and their preferred learning methods.” In fact, there is a website called FACULTY TEACHING TIPS primarily dedicated to this particular subject (Coates, 2007).

With that in mind, the authors conducted a selected survey of instructors who use SIM and EE to determine if they perceived a change in students learning styles and expectations of instructors;

- (1) if instructors have altered their teaching styles to accommodate to the millennials
- (2) if instructors altered their use of EEs or SIM to accommodate to the millennials

Finally, given the AACSB call for more “responsible, accountable and professional leadership” in educating education in B-school students, it is interesting to consider the general academic response to the millennials, that is to accommodate to their needs and not vice versa. One might reason that such accommodation is antithetical to the AACSB’s charge. Thus the survey asked

- (3) If instructors felt that they should accommodate to the millennials learning styles and expectations.

METHODOLOGY & RESULTS

Emails were sent to 325 members of the Organizational Behavior Teaching Society (OBTS) and 546 current or past members of the Association for Business Simulations and Experiential Learning (ABSEL) members requesting that they take an online survey implemented through SurveyMonkey. The survey consisted of 38 questions, most using a 7-point Likert scale (strongly agree to strongly disagree). See APPENDIX A for a copy of the survey.

There were 102 individuals who responded to some or all, of the survey. The response rate of 11.7% is typical for a survey of this nature and falls within generally accepted standards for response rates for surveys for which no incentives to respond are offered and no attempt is made to pur-

sue individuals who did not respond to the initial invitation to participate.

In the survey, several taxonomic questions were posed to get a sense of the composition of the respondents. Some scales were collapsed during analysis due to small cell counts and post-coding was done for textual responses.

APPENDIX B presents the major results from the survey. As can be seen, Organizational Behavior (28%) and Strategic Management (18%) comprised the majority of the respondents, with other disciplines being split among the remaining respondents. A majority of the respondents were over 50 of age (63%), which means that the views of the millennials and subsequent teaching styles reported in this paper are mainly of this age cohort. This corresponds with the years teaching results which shows that a majority of the respondents have taught over 20 years. Finally, as one would expect given the target of the mailing, most respondents used a simulation, an experiential exercise or both.

For each of the Likert-scaled questions that were posed the median response was determined and a Wilcoxon Signed Rank Test was used to test the hypotheses that the median equaled 4 or did not equal 4 (i.e. the neutral point on the Likert Scale). Means were not used as they are mathematically inappropriate for ordinal-scaled data, such as Likert scales. The following section presents the noteworthy results. The results were segregated to cover characteristics of students, expectations of students, changes in instruction or attitudes about instruction, and changes in process or expectations in the context of experiential exercises or simulations. For each survey question, the following information is provided: the section of the questionnaire and question number is indicated, the median response for all respondents is provided, a descriptor that indicate where the values of the median would be on the Likert Scale (i.e., either disagree or agree), and the value of p for the test of median equal or not equal to 4 from the Wilcoxon Signed Rank test is provided.

Notable characteristics of current students:

Survey question 1-3. Current college students are more concerned about grades than previous cohorts of students.

Median = 5 Agree p = .000

Survey question 4 -2. Current college students seem to be less interested in being involved with experiential exercises or simulations than previous cohorts of students.

Median = 3 Disagree p = .002

Survey question 4-3. Current college students play experiential exercises and/or simulations less enthusiastically than previous cohorts of students.

Median = 3 Disagree p = .026

What can be said about this? As shown from the above results, most of the respondents believe that millennials are more concerned with grades than were previous students, but perhaps more noteworthy is that a majority

believe millennials have difficulty following simple instructions.

Notable expectations of students with respect to their professors:

Survey question 1-5. Current college students expect professors to use more technology than previous cohorts of students.

Median = 5 Agree p = .000

Survey question 1-6. Current college students expect professors to be more lenient in terms of grading than previous cohorts of college students.

Median = 5 Agree p = .000

Survey question 1-8. Current college students expect professors to be less demanding than previous cohorts of college students.

Median = 5 Agree p = .018

What can be said about this? The above responses tell us that instructors believe that millennials expect them to use more technology, be more lenient in grading and be less demanding. This finding is similar to that from Milliron's research, which states "Millennials were found to attach significantly more importance to a low class workload and significantly less importance to the development of analytical and computational skills," (2008, 406).

Notable changes in instruction or attitudes about instruction:

Survey question 2-1. I have altered my teaching methods or styles to meet what I believe are the different learning modalities of today's college students.

Median = 5 Agree p = .000

Survey question 2-2. I believe that professors need to change their teaching methods or styles to meet the changing learning styles of today's college students.

Median = 5 Agree p = .000

Survey question 2-3. I believe that most professors are less demanding in their expectations of college students than in previous years.

Median = 5 Agree p = .018

Survey question 2-5 Professors, in general, should retain the same standards that they have used for years in grading students' assignments even if the student expectations have changed.

Median = 6 Agree p = .000

What can be said about this? Respondents say that they have changed their teaching methods to meet the learning styles of the millennials and agree that this should be done in general while saying that they have not altered their standards. This would coincide with them saying that they are still as demanding as they were in the past, despite the view they have about the millennials being more demanding on them. In terms of simulations and experiential exercises, the respondents believe that the millennials are

just as interested as past students were in these types of pedagogies. It is interesting to view these findings in the light of Sax's finding, "[That] grade inflation has resulted in the number of entering college freshman reporting A grade averages more than doubling in the past 40 years, while the number of C students has plummeted to about 5%." Further, Rojstaczer notes, "Rigorous evaluation of instructors appears to have yielded to less demanding standards as a consistent pattern of rising grades is evidenced throughout U.S institutions of higher education over the past 35 years" (1999, 2003).

Notable changes in process or expectations in the context of EE's or simulations:

Survey question 4-7. I am less strict with due date deadlines for current students than I have been in the past.

Median = 3 Disagree p = .000

Survey question 4-8. I provide more guidance on substantive issues/topics for students than I have in the past.

Median = 5 Agree p = .009

What can be said about this? What is most interesting here is that instructors say they have not altered the way in which they use simulations, experiential exercises or both, while at the same time saying (as noted above) that they have altered their teaching modes in general to accommodate to the millennials different learning styles. The reason why this is so is hard to determine. It may well be simply a matter of perception. We did not ask how instructors changed their teaching styles, but this might be a topic to pursue in future research. Saying they are just as strict with deadlines, have not modified their use of simulations and/or experiential exercises, and have not experienced a difficulty with millennials completing simulations and/or experiential exercise tasks is an interesting finding, especially when one compares this to what instructors say, in general, about the millennials. Although respondents do say that they have to provide more guidance in SIM and/or EE pedagogies than they had to do in the past. APPENDIX C presents the Attitude Question Distributions.

Since demographic information was simultaneously gathered in the survey, various cross-tabulations were performed to see if any of the patterns observed above were sensitive to the demographic profiles of the respondents. The analysis provided no noteworthy results, as seen in APPENDIX D. On several occasions is seemed the age of the respondents may have been a moderating factor in the intensity of the responses but their impact was at best marginal. In the absence of more definitive results, these results were not worthy of separate consideration

CONCLUSIONS

Clearly, the views instructors have of millennials are not particularly positive, especially when compared to pre-

vious generations of students. According to this survey, instructors have tried to alter their use of technology and teaching styles to accommodate to the millennials. Interestingly, however, those same respondents have said that they have not altered how they use simulations, experiential exercises or both to accommodate to the millennials learning styles, despite the fact that these same instructors say they have altered their teaching styles in general. This may be due to the fact that 63% of the respondents were over 50.

Much has been written about the millennial students and how college instruction can, and should be, adapted to meet their different learning styles. Yet, as shown from this short survey, instructors, at least those who use simulations and/or experiential exercises, have some negative views about these students' learning styles (as compared to past students). Further, these same instructors believe that standards of rigor and grading have been compromised when it comes to teaching the millennials. We acknowledge that these views, as mentioned earlier, may be a function of the survey respondent's age (63% are over 50). Furthermore, we understand that self-reporting has many limitations. Yet, as far as we know, no research has been conducted regarding the views instructors have of the millennials in terms of their learning styles, their demands and expectations on instructors, etc. But a more important questions is: Why and whether instructors should change their teaching styles or standards of academic performance to accommodate to the millennials? The above literature review suggests that college instructors understand and accommodate to the new generation of learners, but as Derek Bok, former president of Harvard, notes, "not only do many students enter college with weak skills, but they also graduate with weak skills. Noting national-survey evidence that indicates most bachelor degree graduates failed to measurably improve their cognitive skills during college...students can pass courses and even earn high grades without truly understanding the material or how to apply it to problems different from those covered in class," (2006). We thus end with the crucial question: How much should we, the instructors, be accommodating?

REFERENCES

Bok, D. (2006). *Our Underachieving Colleges*. Princeton, NJ.: Princeton University Press.

Coates, J. (2007). Generation Y – The Millennial Generation. *Generational Learning Styles*. Published by LERN Books, a division of Learning Resources Network (LERN). Retrieved from <http://honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/GenY.htm>

Dede, C. (2004). Planning for Neomillennial Learning Styles: Implications for Investments in Technology and Faculty. In Oblinger, D. & Oblinger, J. (Eds.), *Educating the Next Generation*, chapter 15. Retrieved

- from <http://net.educause.edu/ir/library/pdf/pub7101o.pdf>
- Dobbins, K. (2005). Getting Ready for the Next Generation Learner, *EDUCAUSE Review*, vol. 40, no. 5 (September/October 2005): 8–9. Retrieved from <http://www.educause.edu/EDUCAUSE+Review/EDUCAUSEReviewMagazineVolume40/GettingReadyfortheNetGeneratio/158008>
- Jayson, S. (2007). ‘Helicopter’ parents cross all age, social lines, *USA Today*, Retrieved from http://www.usatoday.com/news/nation/2007-04-03-helicopter-study_N.htm
- Keys, J. B. & Biggs, W. (1990). A Review of Business Games, In J. Wingender & W. Wheatley (Ed.), *Guide to Business and Gaming*, chap. 5, pp. 48-50. (Reprinted in *The Bernie Keys Library*, (11th edition.))
- Lancaster, L. & Stillman, D. (2010). Rocking the Workplace: How the Millennial Generation is Shaking Up the Way You Do Business, posted by *StrategyDriven* on March 10, 2010. Retrieved from <http://www.strategydriven.com/2010/03/10/rocking-the-workplace-how-the-millennial-generation-is-shaking-up-the-way-you-do-business/>
- McGlynn, A. P. (2007). *Who Are Today’s College Students? Widening the Circle of Success*, Madison, WI, Atwood Publishing.
- Milliron, V. C. (2008). Exploring Millennial Student Values and Societal Trends: Accounting Course Selection Preferences, *Issues In Accounting Education*, 23, 3, 405-419.
- Oblinger, D. G. & Hawkins, B. (2005). The Myth about Students, *EDUCAUSE Review*, vol. 40, no. 5 (September/October 2005): 12–13. Retrieved from <http://www.educause.edu/EDUCAUSE+Review/EDUCAUSEReviewMagazineVolume40/TheMythaboutStudents/158010>
- Prensky, M. (2001) *Digital Natives, Digital Immigrants*, *On the Horizon* (MCB University Press, Vol. 9 No. 5, October 2001) Retrieved from <http://www.marcprensky.com/writing/Prensky%20-20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf>
- Rojstaczer, S. (1999). *Gone for Good: Tales of University Life After the Golden Age*,. Oxford, UK.: Oxford University Press.
- Sax, L. J. (2003). Our Coming Students: What are they like? *About Campus*, 8, 3, 15-20.
- Somers, P. (2007). Mom Needs an “A”: Hovering, hyper involved parents, the topic of landmark study, *Feature Stories*, University of Texas. Retrieved from <http://www.utexas.edu/features/2007/helicopter>
- Sujansky, J. & Ferri-Reed, J. (2009). Keeping the Millennials: Why Companies are Losing Billions in Turnover to This Generation -- and What to Do About It. Retrieved from http://books.google.com/books?id=CBMdS7jDUu0C&printsec=frontcover&dq=Keeping+the+Millennials:+Why+Companies+are+Losing+Billions+in+Turnover+to+This+Generation+--and+What+to+Do+About+It&source=bl&ots=TwMIrEdb0z&sig=2UE_T_SSnglNCAT49nO0cNrfEHA&hl=en&ei=SmbVTMunJMX4nwehn_3NCQ&sa=X&oi=book_result&ct=result&resnum=3&ved=0CCAQ6AEwAg#v=onepage&q&f=false
- Trip, G. (2010). Students, Welcome to College; Parents, Go Home, *New York Times, Education*, Aug. 22, 2010. Retrieved from http://www.nytimes.com/2010/08/23/education/23college.html?_r=1&ref=trip_gabriel

APPENDIX A: SURVEY OF INSTRUCTORS (Survey as implemented in SurveyMonkey)

1. Perceptions of CURRENT college students: Please respond to each of the following statements using the 7-point Likert scale below based on your experience with CURRENT college students (1 = Strongly disagree, 4 = Neutral, 7 = Strongly agree).
 - a. **(sd1)** Current college students are as committed to academic success as previous cohorts of students
 - b. **(sd2)** Current college students work as hard academically as previous cohorts of students
 - c. **(sd3)** Current college students are more concerned about grades than previous cohorts of students
 - d. **(sd4)** Current college students have more difficulty following simple instructions or completing simple tasks than previous cohorts of students
 - e. **(sd5)** Current college students expect professors to use more technology than previous cohorts of students
 - f. **(sd6)** Current college students expect professors to be more lenient in terms of grading than previous cohorts of college students
 - g. **(sd7)** Current college students expect professors to be more like "buddies" than teachers than previous cohorts of college students did
 - h. **(sd8)** Current college students expect professors to be less demanding than previous cohorts of college students
2. Teaching methods and style: Please respond to the following statements using the 7-point Likert scale below (1 = Strongly disagree, 4 = Neutral, 7 = Strongly agree).
 - a. **(sd9)** I have altered my teaching methods or styles to meet what I believe are the different learning modalities of today's college students
 - b. **(sd10)** I believe that professors need to change their teaching methods or styles to meet the changing learning styles of today's college students
 - c. **(sd11)** I believe that most professors are less demanding in their expectations of college students than in previous years
 - d. **(sd12)** I believe that I am less demanding than I have been in the past
 - e. **(sd13)** Professors, in general, should retain the same standards that they have used for years in grading students' assignments even if the student expectations have changed
3. Use of simulations and experiential exercises: Which BEST describes your current use of simulations and/or experiential exercises with your students?
 - a. regularly use simulations but not experiential exercises
 - b. I regularly use experiential exercises but not simulations
 - c. I regularly use both experiential exercises and simulations
 - d. I used simulations or experiential exercises in the past, but do not use them now
 - e. I have never used either experiential exercises or simulations
4. Experiential exercises and simulations: Please respond to the following statements using the 7-point Likert scale below (1 = Strongly disagree, 4 = Neutral, 7 = Strongly agree).
 - a. **(2sd1)** I have experienced more difficulty getting current students to complete the tasks involved with my experiential exercises or simulations than I experienced with previous cohorts of students
 - b. **(2sd2)** Current students seem to be less interested in being involved with experiential exercises or simulations than were previous cohorts of students
 - c. **(2sd3)** Current students play experiential exercises and/or simulations less enthusiastically than previous cohorts of students
 - d. **(2sd4)** In general, current students are less responsible, more lackadaisical, or more careless in performing required tasks of the play of experiential exercises or simulations than previous cohorts of students
 - e. **(2sd5)** In general, I find that there is less student interest, either inside or outside of class, in the theories, principles and concepts behind simulations and/or experiential exercises than previous cohorts or students had
 - f. **(2sd6)** I have found myself modifying my use of experiential exercises or simulations due to the behaviours of current students
 - g. **(2sd7)** I am less strict with due date deadlines for current students than I have been in the past
 - h. **(2sd8)** I provide more guidance on substantive issues/topics for students than I have in the past
 - i. **(2sd9)** I provide more guidance on technical issues for students than I have in the past
 - j. **(2sd10)** I spend more time correcting technical student input errors, despite having told the students that such errors are costly in term of their grades, than I would have in the past
 - k. **(2sd11)** Somehow, I try to make the simulation/exercise more "exciting" for students than I have in the past
 - l. **(2sd12)** I feel compelled to add more new technology to a simulation and/or experiential exercise than I have

in the past

5. Demographics
 - a. Which of the following BEST describes the number of years you have taught college classes? Less than 1 year, 1 to 7 years, 8 to 14 years, 15 to 21 years, More than 21 years
 - b. For the classes you taught in the LAST academic year...
 - i. How many sections?
 - ii. What was the typical class size?
 - iii. How many sections used experiential exercises or simulations?
 - iv. What was the typical class size for sections involving experiential exercises or simulations?
 - c. What is your age? Less than 20 years, 20 to 30 years, 31 to 40 years, 41 to 50 years, More than 50 years, I choose to not answer this question
 - d. Please indicate your PRIMARY teaching area (choose 1): Accounting, Finance, Human Resources, Information Technology, International Business, Marketing, Organizational Behavior, Quantitative Methods, Strategic Management, I currently do not have a teaching responsibility, Other (please specify)
 - e. Please indicate any SECONDARY teaching areas (choose all that apply): Accounting, Finance, Human Resources, Information Technology, International Business, Marketing, Organizational Behavior, Quantitative Methods, Strategic Management, I currently do not have a teaching responsibility, Other (please specify)
 - f. Is your university or primary place of employment in the USA? Yes, No
6. School Demographics
 - a. Which type of school are you at? Public, Private, Other (please specify)
 - b. Roughly how large is your school? less than 2000 students, 2000-5000 students, 5001-10000 students, 10001-20000 students, more than 20000 students
7. Done: This completes the survey. Thank you for your time.

Appendix B: Demographic Tables

SchoolType	Count	Percent	
*	10	9.80	
ForProfit	1	0.98	
Private	29	28.43	
Public	62	60.78	
N =	102		
PrimaryTeachAreaRecode	Count	Percent	(small cells collapsed for analysis purposes)
*	12	11.76	– *, none, EL for others
Human Resources	11	10.78	– HR
Marketing	10	9.80	– mktg
Org Behavior	29	28.43	– org dev, org behavior
Other -- Nonquant	7	6.86	– comm, entre, gen mgmt, ind psych, mgmt, ops mgmt
Other -- Quant	7	6.86	– acct, finc, econ, IT
Quant Methods	8	7.84	– quant meth, bus model
Strategy	18	17.65	– strat mgmt
N =	102		
SchoolSize	Count	Percent	
*	10	9.80	
10001-20000 students	24	23.53	
2000-5000 students	13	12.75	
5001-10000 students	26	25.49	
less than 2000 students	8	7.84	
more than 20000 students	21	20.59	
N =	102		
AgeGroup	Count	Percent	(small cells collapsed for analysis purposes)
*	13	12.75	
<=50	25	24.51	
>50	64	62.75	
N =	102		
YearsTaught	Count	Percent	
*	10	9.80	
1 to 7 years	6	5.88	
15 to 21 years	19	18.63	
8 to 14 years	20	19.61	
More than 21 years	47	46.08	
N =	102		
ExpSimUse	Count	Percent	
*	3	2.94	
both	40	39.22	
experiential	37	36.27	
simulations	12	11.76	
past	7	6.86	
never	3	2.94	
N =	102		

Appendix C: Attitude Question Distributions

Variable	N	N*	Minimum	Q1	Median	Q3	Maximum
sd1	101	1	1.000	3.000	4.000	6.000	7.000
sd2	101	1	1.000	2.000	3.000	5.000	7.000
sd3	101	1	1.000	4.000	5.000	6.000	7.000
sd4	102	0	1.000	3.000	5.000	6.000	7.000
sd5	101	1	1.000	5.000	5.000	6.000	7.000
sd6	101	1	1.000	4.000	5.000	6.000	7.000
sd7	101	1	1.000	3.000	4.000	5.000	7.000
sd8	101	1	1.000	4.000	5.000	6.000	7.000
sd9	99	3	1.000	4.000	5.000	6.000	7.000
sd10	99	3	1.000	5.000	5.000	6.000	7.000
sd11	99	3	1.000	4.000	5.000	6.000	7.000
sd12	99	3	1.000	2.000	3.000	5.000	7.000
sd13	99	3	1.000	5.000	6.000	7.000	7.000
2sd1	92	10	1.000	2.000	4.000	5.000	7.000
2sd2	92	10	1.000	2.000	3.000	4.000	7.000
2sd3	92	10	1.000	2.000	3.000	4.000	7.000
2sd4	92	10	1.000	2.000	4.000	5.000	7.000
2sd5	91	11	1.000	2.000	4.000	5.000	7.000
2sd6	90	12	1.000	2.000	4.000	5.000	7.000
2sd7	92	10	1.000	1.000	3.000	4.750	7.000
2sd8	90	12	1.000	4.000	5.000	5.000	7.000
2sd9	91	11	1.000	3.000	4.000	5.000	7.000
2sd10	89	13	1.000	3.000	4.000	5.000	7.000
2sd11	91	11	1.000	3.000	4.000	5.000	7.000
2sd12	91	11	1.000	3.000	4.000	5.000	7.000

Wilcoxon Signed Rank Test: Likert-scaled variables

Ho: median = 4 vs. H1: median ≠ 4

* Median shifted above neutral towards agreement

+ Median shifted below neutral towards disagreement

	N	N*	N for Test	Wilcoxon Statistic	P	Estimated Median	
sd1	101	1	84	2030.5	0.275	4.000	CommittedToSuccess
sd2+	101	1	88	1466.0	0.041	3.500	WorkHard
sd3*	101	1	70	1938.0	0.000	4.500	ConcernAboutGrades
sd4*	102	0	87	2496.5	0.014	4.500	NotFollowDirections
sd5*	101	1	91	3732.0	0.000	5.500	ExpectMoreTech
sd6*	101	1	84	3079.0	0.000	5.000	ExpectGradeLenency
sd7	101	1	70	1104.0	0.419	4.000	ExpectBuddies
sd8*	101	1	80	2374.5	0.000	5.000	ExpectLessDemanding
sd9*	99	3	89	3047.0	0.000	5.000	SelfChangeMethods
sd10*	99	3	92	3409.5	0.000	5.000	OthersChangeMethods
sd11+	99	3	86	2851.5	0.000	5.000	OthersLessDemandng
sd12+	99	3	85	1283.0	0.017	3.500	SelfLessDemanding
sd13*	99	3	90	3625.5	0.000	5.500	RetainStandards
2sd1+	92	10	67	699.5	0.006	3.500	LessTaskCompletion
2sd2+	92	10	75	552.0	0.000	3.000	LessStudentInvolvement
2sd3+	92	10	76	657.0	0.000	3.000	LessStudentEnthusiasm
2sd4	92	10	77	1201.5	0.128	3.500	LessResponsibleStudents
2sd5	91	11	70	1244.5	0.993	4.000	LessStudentInterest
2sd6+	90	12	71	813.0	0.008	3.500	ModifyingExpSim
2sd7+	92	10	81	763.0	0.000	3.000	LooserDeadlines
2sd8*	90	12	71	1734.0	0.009	4.500	SubstanceGuidance
2sd9	91	11	75	1544.0	0.531	4.000	TechGuidance
2sd10	89	13	65	987.0	0.579	4.000	CorrectingErrors
2sd11	91	11	71	1282.5	0.982	4.000	MoreExciting
2sd12	91	11	72	1268.5	0.801	4.000	AddNewTech

Appendix D: Attitude Questions by instructor age group, by teaching experience, and by recoded primary teaching area

Mood Median Test: Likert-scaled variables (variables in question order)

vs. age group

Ho: all medians same vs. H1: at least one median differs

Df = 2, group values reported as N<=, N>, Group Median, Q3-Q1

	Chi-Square	p	Ov. Med.	*	<=50	>50
sd1	3.48	0.176	4	5,8,5,2.5	17,8,4,2	32,31,4,3
sd2	0.17	0.918	3	6,7,5,3	13,12,3,2.5	33,30,3,3
sd3	2.32	0.313	5	8,5,4,1	9,16,5,2	30,33,5,2
sd4	2.29	0.318	5	8,5,4,3	9,16,5,2	30,34,5,3
sd5	3.59	0.166	5	3,9,6,1.75	13,12,5,1.5	35,29,5,1
sd6	1.19	0.553	5	9,4,5,2	14,10,5,1.75	34,30,5,2
sd7	0.68	0.711	4	10,3,4,0.5	16,9,4,2	42,21,4,3
sd8	0.21	0.900	5	8,5,4,2	17,8,5,2	40,23,5,3
sd9	2.80	0.247	5	6,4,5,1.25	14,11,5,1	47,17,5,2.75
sd10	0.85	0.654	5	5,5,5,5,1.5	13,12,5,1	39,25,5,2
sd11	0.54	0.765	5	7,3,5,2.25	15,10,5,2	37,27,5,3
sd12	1.91	0.385	3	5,5,3,5,1.5	10,15,4,2	36,28,3,3
sd13	0.33	0.848	6	3,7,6,2.25	9,16,6,1	25,39,6,2
2sd1	1.39	0.499	4	3,3,3,5,2.5	12,12,3,5,2	23,39,4,3
2sd2	0.39	0.823	3	3,3,3,5,2.5	15,9,3,2	39,23,3,2
2sd3	2.23	0.328	3	2,4,5,3	16,8,3,2	36,26,3,3
2sd4	1.50	0.472	4	3,3,5,3,2.5	17,7,3,3	36,26,4,3
2sd5	0.24	0.885	4	4,3,4,2	15,9,4,1.75	34,26,4,4
2sd6	0.75	0.688	4	4,2,3,5,3,2.5	17,6,4,3	39,22,4,3
2sd7	2.47	0.291	3	2,4,5,3,5	16,8,2,5,3,7.5	40,22,3,3
2sd8	0.45	0.800	5	2,4,5,5,3	11,12,5,1	26,35,5,1.5
2sd9	0.03	0.987	4	3,3,4,5,2,7.5	12,11,4,3	33,29,4,2
2sd10	0.08	0.961	4	4,2,4,1,7.5	15,9,4,	36,23,4,2
2sd11	8.57	0.014	4	1,5,5,5,1,7.5	18,6,4,2,7.5	29,32,5,2
2sd12	11.73	0.003	4	1,5,5,5,2	20,4,4,1,7.5	31,30,4,2

Kruskal-Wallis Test: Likert-scaled variables (variables in question order) vs. teach exp

Ho: all medians same vs. H1: at least one median differs

Df = 4, group values reported as Z-score

	H	p-value	*	1-7	8-14	15-21	22+
sd1	2.82	0.589	57.3,0.72	58.7,0.66	48.2,-0.48	57.4,1.06	47.2,-1.19
sd2	1.24	0.872	57.5,0.74	54.0,0.26	49.5,-0.25	54.3,0.54	48.5,-0.79
sd3	7.51	0.111	50.1,-0.10	73.8,1.96	52.3,0.21	58.5,1.24	44.6,-2.01
sd4	3.55	0.471	49.0,-0.28	52.3,0.06	57.1,0.94	59.2,1.25	46.4,-1.59
sd5	9.27	0.055	69.1,1.94	63.0,1.03	38.9,-2.07	56.2,0.86	49.1,-0.62
sd6	6.30	0.178	42.5,-0.97	65.6,1.26	44.9,-1.00	61.9,1.81	49.0,-0.65
sd7	7.09	0.131	58.0,0.80	53.8,0.24	48.8,-0.36	64.2,2.17	44.7,-2.02
sd8	7.62	0.106	53.0,0.23	61.9,0.94	47.0,-0.69	64.8,2.28	45.2,-1.82
sd9	7.83	0.098	55.6,0.54	63.5,1.19	56.6,1.15	56.4,1.09	42.0,-2.63
sd10	4.63	0.327	51.4,0.14	61.0,0.97	54.6,0.81	56.1,1.03	44.0,-1.99
sd11	1.64	0.802	54.5,0.43	46.8,-0.29	45.6,-0.76	46.3,-0.63	53.1,1.02
sd12	5.42	0.247	55.9,0.56	32.0,-1.58	51.7,0.29	41.7,-1.41	54.1,1.35
sd13	5.92	0.205	54.9,0.47	39.0,-0.97	38.5,-2.00	53.6,0.61	54.1,1.35
2sd1	2.78	0.595	43.5,-0.20	41.0,-0.47	43.7,-0.52	40.5,-1.09	50.9,1.59
2sd2	2.62	0.623	54.7,0.54	36.1,-0.90	46.2,-0.05	40.8,-1.05	49.6,1.10
2sd3	4.48	0.345	53.5,0.46	34.8,-1.01	43.3,-0.59	39.6,-1.27	51.5,1.80
2sd4	2.04	0.729	50.3,0.25	35.6,-0.94	43.4,-0.56	44.0,-0.45	49.7,1.16
2sd5	1.32	0.857	43.9,-0.16	34.5,-1.00	44.6,-0.25	48.8,0.50	46.9,0.33
2sd6	1.94	0.746	57.0,0.78	34.8,-0.94	45.1,-0.07	42.5,-0.55	47.3,0.65
2sd7	3.73	0.444	72.5,1.71	37.1,-0.81	47.7,0.23	44.9,-0.28	45.9,-0.20
2sd8	5.50	0.240	57.0,0.78	50.0,0.40	39.9,-1.05	55.7,1.92	42.2,-1.17
2sd9	1.42	0.842	54.5,0.57	52.2,0.54	43.8,-0.41	49.9,0.72	44.0,-0.70
2sd10	3.49	0.479	50.0,0.34	57.9,1.15	41.7,-0.62	51.4,1.17	42.0,-1.09
2sd11	1.63	0.804	58.8,0.86	40.7,-0.46	43.7,-0.42	50.0,0.75	45.0,-0.36
2sd12	3.10	0.541	62.5,1.10	51.2,0.45	38.7,-1.36	48.5,0.46	46.4,0.13

Kruskal-Wallis Test: Likert-scaled variables (variables in question order) vs. primary teaching area (recoded)
 Ho: all medians same vs. H1: at least one median differs
 Df= 7, group values reported as Average rank, Z-score

	H	p-value	*	HR	MKT	OB	OthNonQ	OthQ	QUANT	STRAT
sd1	8.22	0.313	59.1,1.02	34.9,-1.93	54.4,0.38	58.9,1.72	51.9,0.09	49.4,-0.15	44.9,-0.61	43.4,-1.17
sd2	10.83	0.146	58.0,0.89	42.3,-1.05	51.0,0.00	62.0,2.40	45.6,-0.51	30.5,-1.92	41.4,-0.97	48.1,-0.45
sd3	9.32	0.230	50.0,-0.13	30.3,-2.48	53.6,0.30	56.2,1.13	59.9,0.83	60.6,0.90	55.6,0.47	44.9,-0.94
sd4	12.68	0.080	44.3,-0.89	56.6,0.60	55.6,0.47	44.4,-1.52	62.9,1.05	82.1,2.83	41.8,-0.97	50.3,-0.20
sd5	9.53	0.217	72.8,2.61	45.3,-0.68	58.0,0.80	49.1,-0.41	40.9,-0.95	52.2,0.11	43.4,-0.77	47.1,-0.62
sd6	9.68	0.207	41.1,-1.25	60.7,1.17	32.8,-1.95	50.6,-0.08	50.3,-0.07	69.4,1.72	57.7,0.67	51.5,0.08
sd7	4.07	0.772	54.2,0.40	53.7,0.31	52.0,0.11	43.9,-1.55	52.3,0.12	63.9,1.21	58.3,0.73	49.6,-0.23
sd8	11.14	0.133	49.0,-0.25	57.6,0.80	38.3,-1.44	41.5,-2.06	60.1,0.85	67.7,1.56	65.5,1.46	54.3,0.51
sd9	1.94	0.963	49.6,-0.05	47.9,-0.26	53.1,0.37	49.6,-0.08	55.4,0.52	60.1,0.96	47.0,-0.31	45.7,-0.71
sd10	5.47	0.602	45.9,-0.45	47.5,-0.31	49.9,-0.01	51.2,0.27	53.2,0.31	49.7,-0.03	68.8,1.93	42.2,-1.27
sd11	4.34	0.740	49.8,-0.02	52.5,0.30	43.1,-0.80	48.2,-0.40	47.2,-0.27	62.2,1.17	63.2,1.35	45.8,-0.69
sd12	3.87	0.795	52.5,0.27	61.4,1.40	53.4,0.39	47.4,-0.59	42.8,-0.69	56.6,0.63	41.6,-0.87	48.1,-0.30
sd13	2.95	0.890	53.3,0.37	55.1,0.62	46.8,-0.38	44.3,-1.27	51.6,0.15	60.1,0.96	48.6,-0.14	52.3,0.38
2sd1	11.84	0.106	31.5,-1.29	48.4,0.23	56.8,1.29	41.0,-1.31	32.8,-1.30	69.7,2.39	50.8,0.47	46.1,-0.06
2sd2	11.54	0.117	40.4,-0.53	49.8,0.41	60.9,1.81	42.6,-0.93	31.3,-1.45	68.4,2.26	41.8,-0.52	43.1,-0.60
2sd3	10.18	0.179	47.6,0.09	55.6,1.14	57.8,1.41	41.7,-1.15	30.3,-1.54	64.6,1.86	42.0,-0.50	42.8,-0.65
2sd4	11.76	0.109	36.1,-0.90	56.6,1.27	53.4,0.87	38.9,-1.79	29.3,-1.64	62.1,1.61	41.9,-0.51	53.4,1.23
2sd5	5.93	0.548	30.6,-1.48	56.4,1.32	46.1,0.01	42.3,-0.88	49.2,0.30	58.3,1.28	45.4,-0.06	45.3,-0.11
2sd6	11.56	0.116	31.8,-1.21	57.6,1.56	57.7,1.57	42.0,-0.84	23.3,-2.15	50.1,0.49	41.4,-0.46	48.6,0.55
2sd7	11.75	0.109	45.0,-0.13	62.9,2.17	52.8,0.78	35.8,-2.55	43.2,-0.32	49.0,0.26	59.3,1.42	44.5,-0.35
2sd8	6.38	0.496	50.0,0.40	49.9,0.56	37.7,-1.00	38.4,-1.72	51.8,0.61	57.3,1.14	55.0,1.08	47.0,0.26
2sd9	11.00	0.139	53.7,0.67	35.0,-1.48	41.5,-0.57	38.5,-1.76	55.7,0.93	61.5,1.62	60.6,1.64	48.8,0.48
2sd10	8.03	0.330	37.1,-0.70	38.9,-0.74	42.0,-0.39	38.1,-1.70	51.6,0.65	60.2,1.62	53.6,0.99	51.3,1.08
2sd11	1.94	0.963	44.9,-0.10	42.2,-0.48	48.0,0.25	43.8,-0.54	41.8,-0.40	55.4,0.98	51.5,0.62	46.1,0.01
2sd12	11.70	0.111	62.2,1.41	55.5,1.21	48.0,0.26	34.3,-2.82	36.5,-0.91	48.4,0.25	54.1,0.91	52.3,1.09