Identifying the Generation Gap in Higher Education: Where Do the Differences Really Lie?

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Millennials, Electronic Natives, the Net Generation. Many names have been used to describe the new generation of college students, whom population experts have identified as being distinctly different from the previous generations in terms of their technological abilities, teamwork skills, and openness to participatory pedagogies (e.g., Howe and Strauss 2003; Lancaster and Stillman 2002). However, if there is general agreement that younger students do not have have the same attributes as their older counterparts, scholars and commentators still offer divergent assessments of this contrast. For example, Howe and Strauss's (2003) optimistic description of the new generation, based on theories and predictions rather than conclusive evidence, has drawn criticism as educators in colleges and universities have perceived this new wave of students quite differently. Meanwhile, Taylor (2006) offers a much less encouraging characterization of "the Generation NeXt student" (that is, a college student younger than 26 years old) as the "disengaged, entitled, student customer" (48). Such contrasting accounts suggest that even if younger students have greater levels of comfort or proficiency with new technologies, it is still debatable whether such traits necessarily entail more open, progressive, or positive perspectives of the educational process.

Moreover, even in cases where quantitative research finds differences between generations, such differences do not always involve a greater tendency to embrace online learning on the part of younger students, nor do they necessarily outweigh the equally important commonalities between older and younger students. For example, Hartman, Moskal, and Dziuban (2005) analyzed student surveys for generational differences in learning engagement, classroom interaction, and learning approaches in response to online environments. Their findings showed that older students, in this case Baby Boomers (that is, individuals born between 1946-1964), had the highest levels of satisfaction with engagement and interaction; their findings also indicated that older students were the most likely to change their approach to learning whereas Net Generation students were the least satisfied and the least likely to change their approach to learning. However, they found no generational differences in what students considered quality university teaching. In other words, although students from different generations had very different attitudes about the online teaching practices to which they were exposed, all students maintained the same fundamental expectations of quality from their faculty teachers.

In light of these competing viewpoints, we sought to investigate the differences between older and younger students at Northern Arizona University (NAU) and to analyze what those differences, if they indeed exist, mean for online teaching and learning. In what follows we provide an overview of the design and methodology of the study, a summary of the results, and further discussion of the results with regard to the similarities and differences between different age groups. While the circumstances of this study may limit broader implications for other populations, we believe that our findings provide a more balanced, nuanced perspective towards the generation gap in higher education.

The Study at North Arizona University

In order to provide sufficient structure and focus to our inquiry, we initially isolated three key elements that shape a student's approach to the online learning environment. First, online learning by its nature requires a certain level of technical skill; accepted wisdom has it that older students are at a disadvantage as compared to their younger counterparts. In turn, online learning also requires students to develop new ways of learning; for instance, online learners may have to synthesize various digital resources rather than simply listening to a lecture (Garrison and Anderson 2003; Jonassen et al. 1995). Finally, the independent nature of learning in online environments means that students must feel comfortable taking part in group activities, monitoring their own progress, and taking the lead in learning activities; for example, students should be prepared to moderate discussions or even develop their own assignments (Chou 2004; Dabbagh and Kitsantas 2004). Based on these premises we thus defined and operationalized the following three variables for measurement in our study:

- Technical ability, operationalized as students' perceptions of their comfort level with various technologically based learning tasks, such as participating in online discussions;
- Learning beliefs, operationalized as students' beliefs about effective ways to learn; and

- Learner responsibility beliefs, operationalized as students' perceptions of who is responsible for different course-related activities.

These definitions were used to design a survey intended to illuminate generational differences among online learners.

Methodology

Participants

An online survey was given to 280 university students who ranged in age and academic level (Table 1 and Table 2). The sample consisted of students enrolled in hybrid courses in a variety of disciplines including biology, business, sociology, construction management, and teacher education. The courses were part of a pilot project funded by our university's e-learning initiative to evaluate the effectiveness of hybrid-format courses. Hybrid courses are defined at NAU as those courses in which at least 30% of "seat time" (that is, time usually spent in the classroom) is replaced with online activities, such as online readings or electronic discussions. Students enrolled in the hybrid courses without knowing that the courses would be taught in this format; as a result, participants had a wide range of experience with online learning (Table 3). Our findings might have been quite different with a sample comprised of students who regularly sign up for online courses.

Instrument
The survey asked for information in four areas. Questions asked about the participant's background, including age, gender, and academic level; perceived technical ability; attitudes toward online vs. traditional teaching methodologies (i.e., learning beliefs); and attitudes toward responsibility for various teaching and learning activities (i.e., learner responsibility). (See Exhibit 1).

The technical ability section of the survey was comprised of 22 items that questioned the student's level of comfort using a variety of electronic interaction and presentation tools, such as asynchronous discussions. Participants were asked to respond using a 4-point Likert scale, with 1 meaning "not comfortable at all" and 4 indicating "very comfortable." The learning beliefs section included eight items that focused on the student's perception of the efficiency of online courses and the relative value of lectures, reading, group discussions, and group projects. For example, students were asked to rate their level of agreement with statements such as "Learning university-level course content is effectively done through lectures." Again, a 4-point Likert scale was used, with 1 meaning "strongly disagree" and 4 meaning "strongly agree." The learner responsibility section asked students to identify who (that is, teacher or student) was responsible for specific course-related activities, such as presenting course content, leading discussions, or evaluating learning. Participants had a choice of four response options for this section: "instructor only"; "instructor and student, but mainly instructor"; "instructor and student, but mainly student"; and "student only."

Data Analysis

Participants were divided into four groups based on age: under 20 years old (Age Group 1), 21-25 years old (Age Group 2), 26-35 years old (Age Group 3), and 36 years old and over (Age Group 4) as seen in Table 1. Since twenty-five years old is the cut-off age typically discussed in the literature for the so-called Net Generation (e.g., Howe and Strauss 2003), one strategy would have been to divide the participants into two age groups: Millennials (25 and under) and non-Millennials (older than 25). However, we decided to separate them into four age groups to allow for the examination of groups in finer detail. For example, the under-20 group, with less university experience, could reasonably be expected to have less exposure to various technical tools and skills than the 21-25 year-olds. Thus, the under-20 group's surveys may yield results that differ from those of the 21-25 group's surveys. The possible interaction between age and experience has also been pointed out by Oblinger and Oblinger (2005), who argue that exposure to technology may, in fact, be more important than age.
One-way analysis of variance (ANOVA) was used to compare the four age groups' answers to the questionnaire items. One-way ANOVA is a statistical technique that is used to test hypotheses about whether two or more population means are equal or not (Noruöis, 2004). The assumptions for the use of one-way ANOVA were generally met in that the four

age groups were independent, the data exhibited normal distribution overall, and the equality of variance assumption was satisfied. Paired-samples t-tests were used to compare survey responses further within the same group.

Results

With regard to perceived technical ability, ANOVA results showed that there were significant differences among the four age groups in 13 out of 22 questionnaire items. Post hoc analyses indicated that participants in Age Group 2 were significantly more comfortable than participants in Age Group 4 in performing the following technical tasks:

- participating in an online asynchronous discussion;
- participating in an online synchronous discussion;
- uploading a webpage to a server;
- creating a presentation using PowerPoint or a similar software program;
- inserting graphics, tables, or charts into a word processing document;
- inserting graphics, tables, or charts into a Web page;
- inserting graphics, tables, or charts into a PowerPoint presentation;
- using an electronic spreadsheet, such as Excel, to organize, analyze, and calculate data;
- using an electronic spreadsheet, such as Excel, to perform mathematical calculation;
- navigating a Web site or course that is online;
- looking up professors' or fellow students' e-mail addresses using the university's online directory;
- logging on to a university computer to find personal documents and settings; and
- learning new tools and techniques independently.

The second set of questions analyzed whether age was a variant for student beliefs regarding effective teaching methodologies. ANOVA showed that there were significant differences in four questionnaire items. Post hoc analysis indicated that participants in Age Group 2 were significantly more likely to agree with the following statements than participants in Age Group 4:

- Learning university-level course content is effectively done through discussions with the instructor.
- Online courses require less time than face-to-face courses.
- Online courses require students to do all course-related activities, such as reading, writing papers, etc., online.
- Doing class projects in groups with other students means less work for individual students.

No significant differences were found among the four age groups in response to the following questionnaire items:

- Learning university-level course content is effectively done through lectures.
- Learning university-level course content is effectively done through reading.
- Learning university-level course content is effectively done through discussions with other students (peers).

In a follow-up analysis, we used paired-samples t-tests to compare the whole group's beliefs about learning. Results showed that students across all age groups agreed significantly more with the statement "Learning university-level course content is effectively done through lectures" than with the statement "Learning university-level course content is effectively done through reading." Similarly, results also indicated that students across all age groups agreed significantly more with the statement "Learning university level course content is effectively done through discussions with instructors" than with the statement "Learning university-level course content is effectively done through discussions with other students (peers)."

The third set of questions explored student attitudes about who is responsible for different learning/teaching activities.

No significant differences in response were found among the four age groups in responses to any of the following six questionnaire items:

- evaluating course effectiveness, for example, the quality of the course materials;
- evaluating student learning, for example, how well students learned important concepts;
- finding gaps in student learning;
- moderating/leading discussions;
- preparing questions about course content and material; and
- presenting course content.

Additionally, follow-up analysis compared the whole group's attitude toward learning responsibility using paired-samples t-tests. The results showed that students across all age groups tended to consider "coming up with course assignments" and "presenting course content" as instructor responsibilities whereas evaluative activities, such as "evaluating course effectiveness" and "evaluating student learning," were seen as the responsibility of students.

What Do the Differences Mean?

The results reported here were drawn from a sample of students enrolled in newly developed hybrid courses; therefore, the implications of these findings for other student populations may be limited. We do, however, find these results useful in making inferences about how older students and younger students may differ in their approaches to online learning techniques. These inferences can lead to conclusions about how age differences might impact university-level teaching in the online environment.

Older students (36 years old and older) were generally less comfortable than Net Gen students (ages 21 to 25 years old) with technological learning tools, such as online discussions, course navigation, and presentation software. They were also less comfortable with computer networks and were more accustomed to being isolated computer users. Net Gen students had the highest level of comfort with technological tools, particularly with advanced tools such as Web page design software and spreadsheets. These results imply that older students may need more time and clearer instructions when asked to perform online tasks outside of their comfort zone; these students may also require guidance while navigating a course Web site or participating in a networked environment.

With regard to learning beliefs, however, the results indicated an area of similarity as well as an area of divergence in the student populations. On the one hand, participants of all ages subscribed to traditional ideas about effective ways to learn; they tended to believe that university-level course content was more effectively learned through lectures than readings, and through discussions with instructors as opposed to discussions with other students. On the other hand, younger students were more inclined to regard group projects as less demanding than individual work, implying that students need explanation of and exposure to more non-traditional, team-oriented techniques so that they can learn to thrive in online and hybrid learning environments. Although younger students have more facility with online learning tools, they seem to view the online learning environment as a collection of shortcuts to learning that require less time than face-to-face courses. Therefore, course assignments in online learning courses should be plentiful and rigorous and include clearly articulated expectations as well as transparent links to learning objectives.

In turn, participants of all ages agreed on the distribution of responsibility for course activities. Activities such as designing course assignments, presenting course content, and leading discussions were considered the responsibilities of instructors. In general, participants viewed evaluative activities as the students' responsibility. These results imply that in order to foster self-regulation and independence in students, courses should be designed to give learners more responsibility for developing discussion activities, presenting content, and creating learning activities.

Conclusion

Understanding learners in depth is essential to creating learning environments that optimize learners' strengths and minimize their weaknesses (Oblinger and Oblinger 2005). Today's multigenerational student body requires that

educators understand generational differences, particularly in terms of technological ability. The findings of this study show that although Net Generation and older students differ in terms of their comfort levels with technological learning tools, student preferences and attitudes towards effective learning and teaching activities are consistent across age groups. These findings thus support the Moskal, and Dziuban (2005) study that found no generational differences in what attributes students perceived as effective university teaching.

What does this mean to higher education? On one hand, it means that educators can expect to find that students, young or old, share common values regarding pedagogical practices, which educators may take as reassurance that Net Gen students, even though they are more electronically adept, still feel comfortable with traditional learning models. A more critical conclusion, however, is that educators in all media need to do more to expose students to novel approaches and provide them with opportunities to take responsibility for learning activities. Only when university-level learning is perceived as equivalent to independent and self-regulatory learning will students be prepared to take responsibility for their own learning and excel in online, hybrid, and other electronically mediated delivery modes.

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