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Productivity Environmental Preference Survey (PEPS) of Undergraduate Nursing Students

- A Generational Perspective

Abstract

A change in the generational demographics of college students is occurring throughout the United States. By 2012, the number of Millennial students, those born from 1982 to 2003, will jump from 44 percent to 75 percent of the total college enrollment. It has been suggested that their methods of learning are different from those of previous generations. The purpose of this study was to identify and compare individual productivity and learning style preferences of undergraduate nursing students that fall into the Generation X and Millennial age cohort. Using the Dunn & Dunn Learning Style Model and the Productivity Environmental Preferences Survey (PEPS), the study examined the conditions under which an adult learner is most likely to achieve the highest level of productivity and learning. Seventy-three undergraduate nursing students in their junior year of college were surveyed on twenty different stimuli subscales. Overall results did not demonstrate strong learning style preferences in either group and demonstrated more similarities than differences. Four areas of slightly stronger preferences were noted: Generation X preference for learning from authority figures verses peer learning and the need for frequent snacking for increased productivity and learning. Millennial students demonstrated a greater preference for wanting a more structured learning environment and having afternoon and evenings as the time of their highest level of energy for learning more difficult content. Using a t-test and 2-tailed significance analysis showed a statistical significant difference between the generational cohorts in the subscales referring to "Authority oriented learner", "Time of day" and "Afternoon". Understanding the academic productivity and preferred learning style preferences of these two groups is important for both curriculum planning and policies to help increase student retention.

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Abstract

Generational demographics of college students are changing nationally. It has been suggested that the methods of learning of the Millennial students (born 1982 to 2003) are different from those of previous generations. The purpose of this study was to identify and compare individual productivity and learning style preferences of undergraduate nursing students in the Generation X and Millennial age cohort. Using the Dunn & Dunn Learning Style Model and Productivity Environmental Preferences Survey (PEPS), the study examined the conditions under which an adult learner is most likely to achieve the highest level of productivity and learning. Using data frequencies and t-test with two-tail significance, subscales 10 "Authority-oriented learner" ($p = 0.052$), 17 "Time of day" ($p = 0.040$), and 19 "Afternoon" ($p = 0.040$) showed statistical significance. Other areas of stronger preferences were noted: Generation X preference for learning from authority figures verses peer learning and the need for frequent snacking for increased productivity and learning. Millennial students demonstrated a greater preference for wanting a more structured learning environment and having afternoon and evenings as the time of their highest level of energy for learning more difficult content. Understanding these preferences is important for effective teaching methods.

A change in the generational demographics in college students is occurring. According to the National Center for Education Statistics (NCES) (Coomes & DeBard, 2004), approximately 6.9 million Millenials (born from 1982 to 2003) were registered to attend college and universities around the United States in 2002, and by 2012 the number is anticipated to increase to 13.3 million. This will increase the percentage of millennial students attending college from 44.2 percent of total enrollment to 75 percent (p. 11-13). According to Strauss and Howe (1991), each generation comes equipped with their own "...generational persona recognized and determined by (1) common age location, (2) common beliefs and behavior, and (3) perceived membership in a common generation" (Coomes & DeBard, 2004, p. 8). This anticipated change in generational demographics and persona in Higher Education may create an environment ripe for dissatisfaction and conflict from all participants due to different generational expectations, values and goals (Coomes & DeBard, 2004).

This shift in generational demographics can be further explored in undergraduate nursing classrooms. Baby Boomers (born from 1943 to 1960) and Generation X students (born from 1961 to 1981), which have in the past been a majority in the classroom, are now sharing the classroom with Millennials in greater numbers. This great generational transition has placed a spotlight on nursing education since the majority of educators are predominantly from the Baby Boomer and Silent generation (born 1925 to 1942), while the students are from the Baby Boomer, Generation X and Millennial age cohorts (Walker, Martin, White, Elliott, Norwood, Mangum, et al., 2006, p. 371). If there is a distinction between different generations' preferred learning styles and how they process information, then a reevaluation of the current curriculum is

warranted to potentially create an environment that will recruit and retain newer nursing students for a successful transition into the nursing profession.

Purpose and Design

The purpose of this study was to identify individual productivity and learning style preferences of undergraduate nursing students that fall into the Generation X, and Millennial age cohort. The study examined the conditions under which an adult learner is most likely to achieve the highest level of productivity and learning. A quantitative, descriptive, cross-sectional survey approach was used in this study to survey undergraduate nursing students at a Public University in Northern California. The answer to the following research question was sought:

What are the individual productivity and learning style preferences of Generation X and

Millennials in an undergraduate nursing program as measured by the Productivity

Environmental Preference Survey (PEPS)?

Conceptual Framework

The conceptual framework of the study is based on two different theories, one a social science and the other an educational model. The assertion that differences in learning styles affect how the learner looks at and processes information is not new in the literature (Dunn & Griggs, 1998a; Dunn & Griggs, 2000). Dunn & Burk (2006) identify learning styles as "...the way in which each learner begins to concentrate on, process, absorb, and retain new and difficult information. The interaction of these elements occurs differently in everyone" (p. 2). By understanding Strauss & Howe's (1991) generational theory and its impact on generational persona, it is a logical leap that this generational persona may impact and be impacted by the learning environment and the learners' preferred learning styles.

The concept of generational procession has been around for centuries. It is the sharing of the same experiences that contributes to a generation's unique worldview, a generational persona, which remains a powerful and influential force in their lives (Coomes & DeBard, 2004). "The very term birth cohort was not coined until 1863 (by the French sociologist Emile Littre), and the concept attracted little attention over the next hundred years" (Strauss & Howe, 1991, p. 49). The publication of their 1991 book *Generations*, followed by *The Fourth Turning* in 1997 has allowed Strauss and Howe to popularize the generational concept in its current form with a historical perspective of cycles. Strauss & Howe's (1991) generational theory suggests that American history can be viewed through a framework of repeating cycles of attitudes and approaches to life. Observing trends and events in history helps in identifying the generational cohorts. Strauss and Howe (1991, 1997) hypothesize that generations can be understood and viewed in four cycles. These four cycles usually span the length of a human life, about 80 years, or 20 years per cycle. They further hypothesize that although each generation that emerges into society, either into the workplace or in the educational setting, different terms of ethics, values, work attitudes and general worldview are seen causing regular and predictable cyclical patterns. They identify the four generations as follows: Silent, born between 1925 and 1942; Baby Boomers, born between 1943 and 1960; Generation X, born between 1961 and 1981; and Millennials, born from 1982 to 2003 (Strauss & Howe, 1997).

Although there are several ways of measuring learning styles, the Dunn and Dunn model and instrument was selected, primarily because of the multidimensional characteristics of the model (Dunn & Griggs, 1998a; Price Systems, Inc., 2004). The Dunns theorize that learning style is made up of both biological and developmental characteristics that make up the learning

environment (Dunn & Griggs, 2000, p. 8). Although it appears to be a theory based on observation, Dunn & Griggs (2000) claim, "…its roots can be traced back to two distinct learning theories—cognitive-style theory and brain-lateralization theory" (p. 9). Cognitive-Style theory suggests that individuals have the ability to process information in different manners on the basis of either learned or intrinsic traits (Dunn & Griggs, 2000). Brain-lateralization theory is based on the idea that the two separate hemispheres of the brain are responsible for two separate functions, the left-brain for verbal-sequential abilities and the right brain for emotions-spatial processing (Dunn & Griggs, 2000).

The common assumptions of the Dunn and Dunn Learning Style Model are that: (1) most individuals can learn, (2) different instructional environments, resources, and approaches respond to different learning-style strengths, (3) everyone has strengths, but different people have very different strengths, (4) individual instructional preferences exist and can be measured reliably (as sited in Burke, Guatello, et al., 1999/2000), (5) giving responsive environments, resources, and approaches, students attain statistically higher achievement and attitude-test scores in congruent, rather then in incongruent treatments (as sited in Dunn & Dunn, 1992, 1993) (Dunn, 2006; Dunn & Griggs, 2000, p. 11). The theory consists of 20 different elements that, when classified, reveal that students learning and productivity are affected by their environment, emotions, social inclinations, physical characteristics and psychological inclinations (Dunn & Burke, 2006).

Definition of Terms

For the purpose of this study, the following terms have been defined:

- Generation: "Defined as a cohort-group whose length approximates the span of a phase of life and whose boundaries are fixed by peer personality" (Strauss & Howe, 1991, p. 60; Coomes & Debard, 2004, p. 8).

- Peer persona: Defined as "generational persona recognized and determined by (1) common age location, (2) common beliefs and behavior, and (3) perceived membership in a common generation" (Strauss & Howe, 1991,p. 64).

- Baby Boomers: Baby boomers are defined as those individuals born between the years of 1943 to 1960 (Strauss & Howe, 1991; Coomes & DeBard, 2004).

- Generation X: Generation Xers are defined as those individuals born between the years of 1961 to 1981 (Strauss & Howe, 1991; Coomes & DeBard, 2004).

- Millennial generation: Millennials are defined as those individuals born between the years of 1982 to 2003 (Strauss & Howe, 1991; Coomes & DeBard, 2004). The term was first used to describe the results of an ABC News survey portraying the youngest generation in the United States (Wendover, 2002).

- Learning style: "the way individuals begin to concentrate on, process, internalize, and remember new and difficult academic information or skills" (Dunn & Griggs, 1998a, p. 11).

- Dunn & Dunn Learning-Style Model: A model which describes learning style preferences by:
    - Environmental Stimuli Preferences = Sound versus silence, bright light versus soft light, cool versus warm temperatures, and informal versus formal setting design;

o   Emotional Stimuli Preferences = Motivation, persistence, responsibility

(conformity versus non-conformity), and preference for structure versus choice;

o   Sociological Stimuli Preferences = Alone versus with peers, peer/team, adult, and

varied social interactions versus structured interactions;

o   Physiological stimuli preferences = Perceptual strengths (auditory, visual, tactile,

and/or kinesthetic), intake (snacking while concentrating), time-of-day energy

level, and mobility needs;

o   Psychological Stimuli Preferences = Global/Analytic, hemisphericity, and

impulsive/reflective (Dunn & Griggs, 1998a, p. 9).

<div align="center">Literature Review</div>

Learning Styles and Generations

The implications of Generational Theory on nursing education are paramount. How do

you teach the 19-year old Millennial and still keep the 30 year old Generation Xer and the 48

year old Baby Boomer engaged in the same learning? The paucity in nursing literature regarding

generational diversity in nursing is mostly directed towards administration and staff development

(Stuenkel, Cohen & de la Cuesta, 2005; Hu, Herrick & Hodgin, 2004; Palese, Pantali &Saiani,

2006; Stewart, 2006; Hessler, & Ritchie, 2006; Wieck, 2003; Wieck, Prydun & Walsh, 2002;

Smola & Sutton, 2002). An extensive review was done for learning style preferences of

Generation X and Millenials in the following databases: Academic Research Premier; Eric via

Ebsco; CINAHL; Medline; Education; Education Research Complete; PsycINFO; Wiley

Interscience; PubMed; Blackwell Synergy; Sociological Abstracts; and Social Science. The

following key words were used: generational issues; generation; Generation X; Generation Y;

Millennials; Net Generation; college student expectations; generational theory; generational

differences; student demographic; learning patterns; student expectations; and teaching methods.

Only two empirical studies were found on educational preferences and learning styles of

millennials (Walker, Martin, White, Elliott, Norwood, Mangum, et al., 2006; Borges, Manuel,

Elam & Jones, 2006). Most information found in the literature was on generational

characteristics written by industry leaders such as Prensky (2001), Tapscott (1998), and Oblinger

& Oblinger (2005) and recommendations for teaching based on those identified characteristics.

Some international studies (Abu-Moghli, Khalaf, Halabi & Wardam, 2005; Duff, Johnston, &

Laschinger, 1992; Sutcliffe, 1993) were located that identified preferred learning styles of Baby

Boomers to Generation Xers but little was found in relation to the preferences of Millennials.

One empirical study performed in Canada looked at the popular claim that generations' have

different basic human values. They found that Generation Xers scored higher on Openness to

change and lower on Conservation values. Millennials also scored higher on both, but not by

much from the Baby Boomers and the Matures (Lyons, Duxbury, & Higgins, 2007).

An individual's learning style generally identifies how the learner will approach the

presented material and how they may profit differently from similar types of instructional

delivery (Dunn, 2006). Several studies focused on learning styles of students from Baby

Boomers and Generation Xers. A study done by Brown & Fritz (2001) noted, "…learning styles,

student-teacher interactions, and classroom behaviors of Generation X and Baby Boomers are

different enough to warrant different teaching methods" (p. 58). Interviews with 46 community

college students identified Generation X students to be more visual learners and to need a more

visually engaged component in the classroom than the traditional lecture method. When bored or

disinterested by the material, students tended to start talking to other classmates, doing other

work in the classroom not related to that particular class, or just not showing up for class (p. 59-

60). Understanding these generational differences can help faculty to adjust their teaching styles

and use various strategies to best meet their students' learning style.

Learning Styles Theory: Instrument Selection

The body of knowledge on learning styles and its corresponding theories are too

numerous to allow for a full comprehensive review. In her review of the learning styles field

Hadfield (2006) identified "...no less than seventy-one different theories..." (p. 367). Each

person is said to have learning style preferences, but those preferences vary significantly from

person to person (Dunn & Griggs, 2000). According to Hadfield (2006), learning styles can be

categorized into five groups, from those who consider learning styles to be more fixed to those

who consider them to be mutable, giving the learner an option to move between different

learning styles. The Dunn and Dunn Learning Style Model, the learning style model used for this

research, has an extensive and strong research base three decades in length (Lovelace, 2005;

Kavale & LeFever, 2007; Dunn & Griggs, 1998a; Dunn & Griggs, 2000; Price Systems Inc.,

2004). There is still some debate as to validity of the Dunn and Dunn Learning Style Model after

three decades of strong research foundation, and the debate is primarily based on Lovelace's

meta-analysis (Kavale & LeFever, 2007). Kavale & LeFever (2007) question Lovelace's

findings due to noted problems in interpretation of effect size and narrow focus on a single model

which in turn limited the available literature base for analysis. A literature search identified 78

studies that looked at learning styles in the field of healthcare, 53 of which were specific to

nursing (Dunn & Griggs, 1998a). In these studies, the three learning style instruments most

commonly used were Kolb's Learning Style Inventory, followed by Dunn and Dunn's

Productivity Environmental Preference Survey (PEPS), and Gregorc's Style Delineator (Dunn &

Griggs, 1998a; Griggs, Griggs, Dunn, & Ingham, 1994). Fifty-six of those studies were

correlation in design, exploring the learning style differences between non-traditional and

traditional nursing students, freshmen versus senior students, or correlations of learning styles to

the risk of student termination of studies (Dunn & Griggs, 1998a; Griggs et al., 1994).

Reliability and validity of PEPS is derived from thirty years of extensive and strong

research (Lovelace, 2005). The findings of two primary nursing research studies confirmed

reliability and validity of its use for baccalaureate nursing students (Billings & Cobb, 1992;

LaMothe et al.,1991). Construct validity was established in all 20 subscales except for the

"afternoon subscale" (Billings, 1991; LaMothe et al, 1991). The highest level for construct

validity obtained was for environmental and physical subscales with the lowest reliabilities being

psychosocial and physical subscales (Billings, 1991; LaMothe, et al, 1991). These results on

construct validity were similar to those obtained using PEPS on college students with majors

other than nursing (Billings, 1991). Thus the PEPS was selected for this study.

Methods

Design and Sample

This quantitative study used a descriptive survey design to identify the individual

productivity and learning style preferences of Generation X and Millennials in an undergraduate

nursing program. The sample included 73 undergraduate college juniors enrolled in their second

semester of a nursing baccalaureate program.

Setting

The setting for this study was a large, ethnically diverse, metropolitan State University located in Northern California. This University's School of Nursing offers a generic baccalaureate undergraduate degree, an advanced-placement RN-to-BS degree, and master's degrees in nursing in multiple options. The generic undergraduate baccalaureate program admits 70-80 sophomore students every semester to complete a 3-year curriculum.

Instrument

The Productivity Environmental Preference Survey (PEPS), a broad learning style instrument was utilized for this study and provided information on learning environment preferences in five areas: environmental, emotion, sociological, physiological, and psychological (Price, 1996; Dunn & Griggs, 2000; Dunn & Griggs, 1998a; Dunn, Dunn & Price, 1982). The PEPS survey consists of 100 five-point Likert scale questions that help identify patterns of learning and preferred learning environments that ultimately affect student productivity and learning. Each pattern is further refined into four distinct groups of 20 measurable variables that make up one's learning style preference (Billings, 1991; Price, 1996). Each subscale has a standard score that ranges from 20 to 80 with scores falling 40 or less or 60 or more in a specific variable identifying it as important to the participant when studying (Price, 1996). Individuals having scores that fall between 40 and 60 are varied with respect to how much that variable is important to them in their productivity and learning (Price, 1996). Refer to Table 1 for the listing of the variables measured with PEPS.

Data Collection

After the university's Protection of Human Subjects Institutional Review Board and the School of Nursing's Program Evaluation and Research Committee granted permission to conduct

the study, the data collection procedure was implemented. The survey was distributed to all

undergraduate college juniors enrolled in their second semester of the nursing baccalaureate

program during the Fall 2008 Medical-Surgical theory course. A cover letter and written

informed consent was distributed to each participant along with a verbal description detailing the

purpose and importance of the study and study confidentiality. The Productivity Environmental

Preferences Survey (PEPS) was then distributed to all students willing to participate in the

research along with a #2 pencil provided by the researcher. The questions were answered on a 5-

point Likert scale from strongly agreed to strongly disagree. The survey was taken in the

presence of the researcher immediately after the informed consent was given and took

approximately 20 to 30 minutes for the participants to complete.

Data Analysis

The completed inventories were forwarded to Price Systems, Inc. in Lawrence, Kansas

for analysis. Price Systems compiled an individual computerized profile of each participant's

responses to the PEPS along with a Group and Subscale summary. The demographic data of age,

gender and place of birth was cross-referenced with the survey items. Data frequencies were

extrapolated from the results received from Price Systems, Inc. and a t-test with two-tailed

significance was run on the 20 individual subscales to detect patterns and examine similarities

and differences among the following age cohorts: Millennials (18 to 26 year olds) and Generation

X (27 to 47 year olds). This statistical method was used because of its ability to compare

whether the average difference between two groups is really significant or if it is due instead to

random chance.

Results

Demographics

A total of 73 undergraduate nursing students were originally surveyed. Out of those 73 participants sampled, 52 completed a usable survey providing a 71% response rate. Twenty-three percent (n = 12) of the final participants represented Generation X, and 77% (n = 40) represented Millennials. Regarding gender, 85% (n = 44) were female and 15% (n = 8) were male. Seventy-nine percent (n = 41) of the students in the final sample were born in the United States, 19% (n = 10) foreign born, and 2% (n = 1) did not specify.

Learning Style Profile

Table 1 depicts the 20 individual subscale frequencies per age cohort, identifying the mean and the standard deviation. Each subscale has a standard score that ranges from 20 to 80 with scores falling 40 or less or 60 or more in a specific variable identifying it as important to the participant when studying (Price, 1996). Individuals having scores that fall between 40 and 60 are varied with respect to how much that variable is important to them in their productivity and learning (Price, 1996). The data frequencies depicted in Table 1 did not demonstrate strong learning style preferences in either group and demonstrated more similarities than differences. Four areas of slightly stronger preferences were noted: Generation X preference for learning from authority figures verses peer learning and the need for frequent snacking for increased productivity and learning. Millennial students demonstrated a greater preference for wanting a more structured learning environment and having afternoon and evenings as the time of their highest level of energy for learning more difficult content.

As noted in Table 2, of the 20 t-tests, only the subscales 10 "Authority-oriented learner" (p = 0.052), 17 "Time of day" (p = 0.040), and 19 "Afternoon" (p = 0.048) showed a statistically

significant difference between the generational cohorts. It is widely accepted that a Two-tailed

Significance result of $p = 0.05$ or lower justifies a claim of statistical significance (Campbell,

2004). The "Authority-oriented learner" subscale captures the individual preference for learning

from an authority figure for increased productivity and learning (Price, 1996). The "Time of

day" subscale refers to the time of day in which the participant has the most available energy

level and finds it most productive. The "Time of day" identifies either morning or evening as

times of the highest energy level for participants, while the "Afternoon" subscale identifies

afternoons as such (Price, 1996).

There were not enough participants within each cohort to provide meaningful comparison

in the area of gender learning style preference. The same limitation holds true when comparing

learning style preferences of foreign-born and U.S. born participants due to the small sample

size.

Limitations

Project limitations consisted of a small, non-random sample size, as well as participant

characteristics, and instrument issues. Sample size is often a concern in nursing education

research due to small class sizes in most institutions. With a small sample size there are

limitations in accurately identifying the effects of age cohort on learning style preferences.

Another limitation is the homogeneity of the sample in the study as the participants came from

one college in an urban area in a western region of the United States. The distribution of gender

is also a noted limitation since a large portion of the participants were female with only 15% of

the sample size being male.

There were also issues with the instrument. Although the PEPS survey appeared to be the most appropriate and inclusive instrument for measuring individual preferred learning styles and environmental influences that affect productivity, the PEPS survey was not originally created to account for generational variables and their affects on learning style preferences. This limitation may have produced results not reflective of the affect of the generational age cohort variable on individual preferred learning environments.

Evaluation of participants' current computer literacy and use of information technology was not evaluated by the researcher. It has been asserted by experts in both neuroscience and sociology, that the current explosion of digital technology not only is changing the way we live and communicate but also is rapidly and profoundly altering our brains and how we process information and learn (Prensky, 2001; Oblinger & Oblinger, 2005; Johnson, 2006; Small & Vorgan, 2008). Since information regarding computer literacy and the use of information technology was not collected, it is impossible to determine if this variable had any influence on the results obtained.

Discussion / Implications for Nursing Education

As evidenced by the results obtained, there appears to be more similarities between Generation X and Millenials than previously anticipated. This is especially true when looking at learning style preferences and self identified environmental preferences for productivity of the participants of this study. Standard deviations ranging anywhere from 4 to 14 points from the mean were noted in all measured subscales, confirming the presence of multiple learning styles and environmental preferences among the students in this one nursing theory course. This

finding lends to current recommendation of using multiple modes of teaching to engage students through auditory, visual, tactile and kinesthetic ways.

New college students, who have had 12 years to acclimate to the expectations and teaching styles of primary and secondary education, can sometimes find themselves lacking the appropriate tools for a successful transition into college life. Nursing education should explore providing undergraduate nursing students with a comprehensive learning style assessment to help better identify their preferred learning strengths and individual environments that promote productivity. The obtained results would allow for each student to become aware of his or her own learning style strengths and ultimately use those strengths for better academic achievement and ultimately increase student retention within the nursing program.

Two of the three subscales that showed a statistical difference related to the preferred time of day students were most productive and efficient at task completion. Time of day energy levels vary greatly from person to person. Some students may find themselves more attentive and mentally clear during the early morning hours, while others may fall somewhere else during the 24-hour day. Research has shown that accommodating time of day preferences usually results in higher grade-point average and improved academic performance (Dunn & Griggs, 2007; Dunn & Griggs, 1998b). On average, for about 30% of students time of day preferences are not a critical variable, but for the remaining 70%, they are able to concentrate better on new and difficult academic material at specific times during the day (Dunn & Griggs, 2007; Dunn & Griggs, 1998b). The study findings confirm that there is a notable difference between Generation X and Millennial.

The third subscale that showed statistical significance pertained to students' preference to learn from an authority figure versus peer learning. With increasing focus on student centered curriculum and active learning through small group and team based activities, students' increased preference for an authority figure present while learning shows the perceived importance of the educator role in the learning process. Accommodating this student preference does not mean changing the curriculum to reduce frequency of team, peer based, small group and individual learning. By doing such a thing, students may be hindered in their ability to grow when presented with different situations requiring learning styles outside of their comfort zone (Thompson & Crutchlow, 1993).

Recommendations for Future Research

The findings of this study suggest future research in the following areas:

1. Replication of this research with a larger, randomly selected, and more diverse sample, representing more than just one institution and one geographical area.

2. Further exploration into the relationship between learning style preferences and learning environments that promote productivity in relation to different age cohorts.

3. Tool development to measure generational nuances in respect to learning style preferences and environments the promote productivity.

Conclusion

Great emphasis has recently been placed on teaching nurse educators and educational institutions the appropriate skills to teach to the new generation, the Millennials. Numerous resources have been made available to help transition this new group of students into higher education for greater academic success. Generational and Learning theories have postulated that

by recognizing patterns, we can better understand and assist in the transition. By looking at learning style preferences and preferred learning environment for this particular group of undergraduate nursing students, more similarities than differences were noted. But could the changes that have been reported and noted in the new Millennial student be just a matter of expectation and not a matter of generation? Further research with updated tools to measure and quantify possible undetermined variables will need to be explored.

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Table 1

PEPS 20 Subscale Means for Generation X (n = 12) and Millennials (n = 40)

PEPS Subscale	COHORT	n	Mean	Std. Deviation
SCALE1 NOISE LEVEL	1 GENERATION X	12	54.67	10.526
	2 MILLENNIAL	40	49.60	9.125
SCALE2 LIGHT	1 GENERATION X	12	56.25	7.736
	2 MILLENNIAL	40	54.65	9.206
SCALE3 TEMPERATURE	1 GENERATION X	12	55.67	11.292
	2 MILLENNIAL	40	58.62	9.086
SCALE4 DESIGN	1 GENERATION X	12	49.92	11.572
	2 MILLENNIAL	40	51.68	8.456
SCALE5 MOTIVATION	1 GENERATION X	12	52.08	7.440
	2 MILLENNIAL	40	51.95	7.799
SCALE6 PERSISTENT	1 GENERATION X	12	54.92	7.354
	2 MILLENNIAL	40	52.98	5.503
SCALE7 RESPONSIBLE	1 GENERATION X	12	50.17	8.963
	2 MILLENNIAL	40	44.85	9.236
SCALE8 STRUCTURE	1 GENERATION X	12	57.58	7.845
	2 MILLENNIAL	40	60.80	6.438
SCALE9 ALONE-PEERS	1 GENERATION X	12	55.58	14.526
	2 MILLENNIAL	40	55.48	10.863
SCALE10 AUTHORITY FIGURES	1 GENERATION X	12	59.67	8.184
	2 MILLENNIAL	40	54.85	7.109
SCALE11 SEVERAL WAYS	1 GENERATION X	12	47.25	7.653
	2 MILLENNIAL	40	49.90	6.259
SCALE12 AUDITORY	1 GENERATION X	12	52.75	10.481
	2 MILLENNIAL	40	53.90	11.015
SCALE13 VISUAL	1 GENERATION X	12	48.08	6.921
	2 MILLENNIAL	40	50.78	7.751

Table 1 Continued

PEPS 20 Subscale Means for Generation X (n = 12) and Millennials (n = 40)

PEPS Subscale	COHORT	n	Mean	Std. Deviation
SCALE14 TACTILE	1 GENERATION X	12	53.50	12.435
	2 MILLENNIAL	40	55.90	7.669
SCALE15 KINESTHETIC	1 GENERATION X	12	57.42	5.334
	2 MILLENNIAL	40	56.18	4.471
SCALE16 INTAKE	1 GENERATION X	12	60.50	6.922
	2 MILLENNIAL	40	57.68	9.926
SCALE17 TIME OF DAY	1 GENERATION X	12	50.75	9.928
	2 MILLENNIAL	40	43.05	11.408
SCALE18 LATE MORNING	1 GENERATION X	12	47.92	11.572
	2 MILLENNIAL	40	47.88	7.997
SCALE19 AFTERNOON	1 GENERATION X	12	54.42	14.563
	2 MILLENNIAL	40	61.85	9.994
SCALE20 NEEDS MOBILITY	1 GENERATION X	12	52.33	7.499
	2 MILLENNIAL	40	54.95	6.397

Note: Generation X students were born between 1961 and 1981; Millennial students were born between 1982 and 2003.

Table 2

PEPS 20 Subscale t-Test for Generation X (n = 12) and Millennials (n = 40)

	t-test for Equality of Means			
	t	df	Sig. (2-tailed)	Mean Difference
SCALE1 NOISE LEVEL	1.629	50	0.110	5.067
SCALE2 LIGHT	0.546	50	0.587	1.600
SCALE3 TEMPERATURE	-0.935	50	0.354	-2.958
SCALE4 DESIGN	-0.579	50	0.565	-1.758
SCALE5 MOTIVATION	0.052	50	0.958	0.133
SCALE6 PERSISTENT	0.990	50	0.327	1.942
SCALE7 RESPONSIBLE	1.760	50	0.084	5.317
SCALE8 STRUCTURE	-1.443	50	0.155	-3.217
SCALE9 ALONE-PEERS	0.028	50	0.978	0.108
SCALE10 AUTHORITY FIGURES	*1.989*	*50*	**0.052*	*4.817*
SCALE11 SEVERAL WAYS	-1.222	50	0.228	-2.650
SCALE12 AUDITORY	-0.321	50	0.750	-1.150
SCALE13 VISUAL	-1.079	50	0.286	-2.692
SCALE14 TACTILE	-0.816	50	0.418	-2.400
SCALE15 KINESTHETIC	0.807	50	0.424	1.242
SCALE16 INTAKE	0.918	50	0.363	2.825
SCALE17 TIME OF DAY	*2.108*	*50*	**0.040*	*7.700*
SCALE18 LATE MORNING	0.014	50	0.989	0.042
SCALE19 AFTERNOON	*-2.024*	*50*	**0.048*	*7.433*
SCALE20 NEEDS MOBILITY	-1.195	50	0.238	-2.617

Note. All scales with equal variances assumed; * Statistically significant p = 0.05