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Generational differences among associate-degree health students: Retention, academic achievement, and learning perceptions

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Abstract
This research study addresses the problem of reduced retention and academic success of multigenerational allied health students at a Midwestern community college. Decreasing health science student retention and academic achievement can result in a shortage of healthcare practitioners to meet society's growing needs. The purpose of this study was to examine differences among generational cohorts of allied health students at the institution related to retention rates and academic achievement. Results identified no significant differences among generational cohorts for academic achievement. With Baby Boomers as the reference, the Gen X and Millennial groups were significantly more likely to be retained while the Gen Z group did not differ. The results highlight allied health students' homogeneity regardless of their generational category.

Keywords: generational, cohort, community college, higher education, academic achievement

1. Introductions

Today's workforce and higher education environment is comprised of students from five generations, each influenced by the events and beliefs they collectively experienced in their formative years (Boysen *et al*., 2016; Lowell & Morris, 2019; Ruzycki *et al*., 2019; Howe & Strauss, 2000; Williams *et al*., 2017) [2, 23, 35, 46]. College educators, staff, and students at these institutions represent a combination of the following generations grouped by birth year: Silent or Traditional generation (1925-1945), Baby Boomers (1946-1964), Generation X (1965-1980), Millennials (1981-1996), and Generation Z (approximately 1997-2012) (Boysen *et al*., 2016; Dimock, 2019; Lowell & Morris, 2019; Ruzycki *et al*., 2019; Williams *et al*., 2017) [2, 8, 23, 35, 46]. The majority of faculty members in higher education belong to Generation X (Gen X; Parrish, 2016) [29], followed by Baby Boomers, with members of the Silent generation largely retired (Boysen *et al*., 2016) [2]. Millennials have been the largest generational group in the student population (Parrish, 2016; Richards & Velasquez, 2014; Ruzycki *et al*., 2019) [29, 33, 35], however Generation Z (Gen Z), is entering higher education institutions, adding unique viewpoints and expectations to the multigenerational instructional environment (Boysen *et al*., 2016; Chicca & Shellenbarger, 2018) [2, 4]. Traditional-aged college students, those 18-21 years old, belong to Gen Z and form about 70% of the population in higher education (National Center for Education Statistics [NCES], 2019) [25]. On the other end of the spectrum, learners 35 years and older, the leading years of the Millennials, Gen X, and Baby Boomers, represent just over 5% of full-time college students, as well as a more significant cohort of part-time learners at 20% (NCES, 2019) [25]. Higher education institutions and educators face unique challenges when attempting to meet learning needs within multigenerational classrooms.

Because today's higher education classrooms are made up of multigenerational learners, it is vital to consider the impact of the individual cohorts' shared values, beliefs, expectations, and characteristics on these variables (Battersby, 2017; Boysen *et al*., 2016; Chicca & Shellenbarger, 2018; DiLullo *et al*., 2011; Gupta & Goyal, 2018; Hopkins *et al*., 2018; Parrish, 2016; Ruzycki *et al*., 2019; Toothaker & Taliaferro, 2017) [1, 2, 4, 7, 13, 19, 29, 35, 44]. Creating this foundation of knowledge can inform development of best practices for higher education institutions and faculty members in allied health programs, facilitating increased student success.

In higher education, student attrition is a global concern (Goradia & Bugarcic, 2019; Hamshire *et al*., 2013) [11, 15]. There are multiple adverse effects of declining student success in health-related higher education, including those impacting the students, institutions, and individuals in need of healthcare services. Decreased retention and academic achievement impact allied health learners financially and psychosocially while limiting the fiscal and mission-related success of colleges and universities (Gultice *et al*., 2015; Hamshire *et al*., 2013) [12, 15]. This phenomenon also reduces the number of competent practitioners available to deliver healthcare services to individuals in communities across the country (University of Pittsburgh Stern Center for Evidence-based Policy, n.d.). Research to understand and address these trends in student retention and academic achievement is vital to minimize detrimental repercussions at all levels.

1.1 Statement of the Problem

The problem addressed by this study is reduced retention and academic success of multigenerational allied health students at a Midwestern community college. Rates of attrition for students in first-year health and allied health courses are recognized as an issue in higher education (Goradia & Bugarcic, 2019; Hamshire *et al*., 2013; Harris *et al*., 2014) [11, 15, 16]. Declining health science student retention and levels of academic achievement have detrimental financial impacts on higher education institutions, as well as emotional effects on instructor morale, but most importantly, students suffer both financial and emotional consequences (Gultice *et al*., 2015; Hamshire *et al*., 2013) [12, 15].

Because higher education students belong to four separate generations, each exposed to events and cultural experiences that influence commonly held values and characteristics, the influence of generational cohort on decreased student retention and academic achievement should be examined (Hopkins *et al*., 2018; Richards & Velasquez, 2014; Ruzycki *et al*., 2019) [19, 33, 35].

1.2 Purpose of the Study

The purpose of this quantitative quasi-experimental ex post facto study was to examine the differences among generational cohorts of allied health students at a small Midwestern community college related to retention rates and academic achievement, as defined by grade point average (GPA) after the first semester. Recognizing the traits of today's multigenerational higher education population is critical to examine relationships between generational cohorts and retention rates and levels of academic success.

2 Literature Review

The purpose of this quantitative quasi-experimental ex post facto study was to investigate differences among generational cohorts of allied health students at a small Midwestern community college as it related to retention rates and academic achievement.

2.1 Generational Theory

In 1952, sociologist Karl Mannheim provided an early definition of a generation as a group of people who experienced similar social events and historical markers, causing a distinct view of the world (Edmunds & Turner, 2005; Hills *et al*., 2017) [9, 18]. Like Mannheim, Strauss and Howe (1991) [41] used a sociocultural approach to define generations in the U.S. and based it on the critical events in the country's history that impacted each birth cohort (Jauregui *et al*., 2020; Rickes, 2016) [22, 34]. Approximately every 20-22 years, a new generation is introduced into the world, with the group forming a collective peer personality that represents the typical cohort members' perspectives on female and male roles, political beliefs, religion, and way of life (Strauss & Howe, 1991; Williams *et al*., 2017) [41, 46]. These groups are affected by social norms and technological trends as they move through their formative years (Hopkins *et al*., 2018; Parrish, 2016; Pendergast, 2009; Richards & Velasquez, 2014) [19, 29, 30, 33].

Although individuals are considered members of their assigned generational cohort by society as a whole, the proportion of individuals who report identifying with their assigned generation has decreased by group (Pew Research Center, 2015; Williams *et al*., 2017) [32, 46]. Each cohort's characteristics may not apply to all of its members, but most individuals who do not identify with their generation recognize their nonconformity (Strauss and Howe, 1991; Williams *et al*., 2017) [41, 46].

2.1.1 Generational cohort differences in higher education

Within current work and educational environments, Ruzycki *et al*. (2019) [35] and Williams *et al*. (2017) [46] described four generations: the Silent or Traditional, Baby Boomers, Generation X, and the Millennials, while Chicca and Shellenbarger (2018) [4] and Shatto and Erwin (2016) [39] added the newest cohort, Generation Z. Educators need to recognize the generational identities of the cohorts to which their students belong as they design their courses (Gupta & Goyal, 2018; Parrish, 2016) [13, 29].

However, it is essential to avoid blindly applying the demographic characteristics outlined in the literature regarding each cohort, which results in a stereotypical view of that group (Hopkins *et al*., 2018; Rickes, 2016; Sánchez & Kaplan, 2014) [19, 34, 37]. With an increasing number of individuals, especially those born in the bordering years deidentifying with their assigned cohort, ignoring a person's unique qualities and making assumptions about a learner's characteristics and preferences based on their birth year alone can be problematic (Rickes, 2016; Sánchez & Kaplan, 2014; Williams *et al*., 2017) [34, 37, 46].

2.1.1.1 The Silent Generation

Although most present-day educators are Baby Boomers or members of Gen X, some educators in the Silent Generation continue to serve in academic and clinical settings, often in leadership positions (Boysen *et al*., 2016; Chaudhuri, 2020; Parrish, 2016; Rickes, 2016) [2, 3, 29, 34]. These individuals, also known as Traditionalists, demonstrate loyalty, a sense of duty to their career and family, belief in respect for leaders, and an expectation for recognition as an expert as they share their knowledge (Boysen *et al*., 2016; Chaudhuri, 2020; Rickes, 2016; Williams *et al*., 2017) [2, 3, 34, 46]. This demographic cohort lives up to its title, utilizing traditional instructional methods such as lectures to impart knowledge to younger generations and focusing on the learning process rather than the outcome (Boysen *et al*., 2016) [2]. These educators expect less experienced colleagues and students to demonstrate a high regard for their experience and are

intolerant of actions that they deem vulgar or inappropriate (Chaudhuri, 2020; Williams *et al*., 2017) [3, 46].

2.1.1.2 The Baby Boomers

In contrast to the rule-conscious Silent Generation, Baby Boomers are distrustful of authority and believe in competition to move their agenda forward, equating recognition and material rewards with job success (Boysen *et al*., 2016; Chaudhuri, 2020; Oomen-Early & Early, 2015; Williams *et al*., 2017) [2, 3, 27, 46]. Like the previous generation, lecture-based education was the approach most Baby Boomers experienced (Ooman-Early & Early, 2015) [27]. As educators, Baby Boomers typically maintain the traditional teacher-centered methods they were exposed to as students, focusing on task-specific knowledge and skill-building in a structured classroom environment (Ooman-Early & Early, 2015; Parrish, 2016) [27, 29]. Baby Boomers prefer to be viewed as experts who impart knowledge to learners and want to learn about technology but not apply it to their teaching (Oomen-Early & Early, 2015; Parrish, 2016) [27, 29]. This generation's tendency to be workaholics, along with their guarded nature and lack of affinity for technology (Parrish, 2016; Williams *et al*., 2017) [29, 46], may limit the level of connection they make as well as their tolerance of 21st-century students (Chaudhuri, 2020; Parrish, 2016; Williams *et al*., 2017) [3, 29, 46].

2.1.1.3 Generation X

Raised as latchkey children, members of Gen X became accustomed to independence (Oomen-Early & Early, 2015; Williams *et al*., 2017) [27, 46]. This generational cohort strives for productivity and competence at work, values work-life balance, demonstrates decreased loyalty for organizations and embraces entrepreneurial opportunities (Boysen *et al*., 2016; Oomen-Early & Early, 2015; Rickes, 2016; Williams *et al*., 2017) [2, 27, 34, 46]. Individuals in Gen X tend to be skeptical, use direct communication, appreciate team-oriented decision-making, and consistent, constructive feedback (Oomen-Early & Early, 2015; Parrish, 2016; Williams *et al*., 2017) [27, 29, 46]. People in this generational cohort desire competent leaders who utilize coaching strategies and inspire others to achieve change (Oomen-Early & Early, 2015; Williams *et al*., 2017) [27, 46].

In addition, Gen X educators' preferences for self-directed learning juxtaposes the 21st-century learners' desire for highly collaborative educational activities, while their blunt communication style may be viewed as overly critical by students belonging to Gen Y and Gen Z (Oomen-Early & Early, 2015; Parrish, 2016; Williams *et al*., 2017) [27, 29, 46]. Currently, educators who belong to Gen X make up a large portion of teachers in higher education (Oomen-Early & Early, 2015; Parrish, 2016) [27, 29].

2.1.1.4 The Millennials (Gen Y)

As the most influential group of learners in today's higher education institutions, Millennials' unique peer personality includes being proficient with and reliant on computers, laptops, and personal devices for all aspects of life (Boysen *et al*., 2016; Chaudhuri, 2020; Desy *et al*., 2017; Oomen-Early & Early, 2015; Parrish, 2016; Rickes, 2016; Williams *et al*., 2017) [2, 3, 6, 27, 29, 34, 46]. As digital natives, Millennials are tech-savvy and rely on being socially connected, welcome diversity, have a strong moral compass, and are competitive but appreciate collaborating with others (Boysen *et al*., 2016; Chaudhuri, 2020; DiLullo *et al*., 2011; Hills *et al*., 2017; Hopkins *et al*., 2018; Oomen-Early & Early, 2015; Parrish, 2016; Williams *et al*., 2017) [2, 3, 7, 18, 19, 27, 29, 46].

Millennials are respectful but assertive in sharing creative ideas that challenge the accepted way of doing things because they value innovative problem-solving (Oomen-Early & Early, 2015; Parrish, 2016; Williams *et al*., 2017) [27, 29, 46]. Millennials are motivated by education and work that is relevant, fast-paced, and challenging, with a desire for constant, supportive feedback (Boysen *et al*., 2016; Oomen-Early & Early, 2015; Parrish, 2016; Rickes, 2016; Williams *et al*., 2017) [2, 27, 29, 34, 46]. Members of this generational cohort tend to establish performance-based rather than mastery goals and are achievement driven (Gupta & Goyal, 2018; Parrish, 2016) [13, 29].

2.1.1.5 Generation Z

The newest generation, labeled Gen Z, started in the late 1990s and is currently beginning to enter higher education (Boysen *et al*., 2016; Chicca & Shellenbarger, 2018; Dimock, 2019) [2, 4, 8]. This cohort has been immersed in technology since childhood, is eager to adopt cutting edge innovations, and impatient with those who are less tech-savvy (Chaudhuri, 2020; Chicca & Shellenbarger, 2018; Shatto & Erwin, 2016) [3, 4, 39]. Generation Z is hyperconnected, globally aware, and the most culturally diverse generation in the United States (Boysen *et al*., 2016; Chicca & Shellenbarger, 2018; Shatto & Erwin, 2016) [2, 4, 39]. They value higher education as a means to a desired career and financial security (Chaudhuri, 2020; Chicca & Shellenbarger, 2018) [3, 4] and prefer authentic learning opportunities that emphasize connections to real-life (Hampton *et al*., 2020, Shatto & Erwin, 2016; Shatto & Erwin, 2017) [14, 39, 40].

2.1.2 Intergenerational Challenges in Higher Education

Intergenerational expectation gaps develop when different cohorts are inflexible, identifying the "best ways" of engaging in or completing activities, including teaching and learning (Williams *et al*., 2017) [46]. Contrasting viewpoints on technology use, work habits, the preferred mode of communication, and clinical approaches can cause gaps between educators and students who are members of the Baby Boomers, Gen X, Gen Y, and Gen Z (Chaudhuri, 2020; Hart, 2017; Parrish, 2016) [3, 17, 29]. To design effective pedagogy for today's multigenerational student population, instructors in higher education classrooms and clinical settings must learn about each cohort's distinct learning preferences, educational challenges, and motivations that facilitate student success (Parrish, 2016; Williams *et al*., 2017) [29, 46]. Educators must balance multiple teaching approaches to accommodate all students' educational needs and expectations, promoting intergenerational learning (Chicca & Shellenbarger, 2018; Montenery *et al*., 2013; Richards & Velasquez, 2014) [4, 24, 33].

2.2 Student Academic Achievement and Retention Rates

Retention rates and academic achievement levels among generational cohorts in higher education allied health programs may be affected by the unique characteristics, learning preferences, challenges, and perceptions of learning success of those generational groups. Health science student attrition in the first year is a common problem in higher

education (Goradia & Bugarcic, 2019[11]; Peterson-Grazioze *et al*., 2016[31]; Thalluri, 2016) [11, 31, 42]. Retaining students from one term or year to another is the direct result of their academic success, so the literature often addresses these concepts together.

2.2.1 Factors Affecting Academic Achievement and Retention Rates

Factors impacting academic success and retention rates in higher education have been investigated and well documented, including: (a) student demographics, (b) educational goals and level of dedication, (c) experiences with faculty, peers, and education-related activities, (d) commitments outside of the classroom, and (e) academic and social integration (Tinto, 1972) [43]. Although Tinto (1972) [43] outlined these variables more than 25 years ago, current literature continues to employ similar categorization of factors impacting college students' retention and academic achievement. However, one area that has changed is the diversity of health science learners due to the current open-enrollment environment promoting access and minimizing strict institutional admission requirements (Goradia & Bugarcic, Gultice *et al*., 2015; Thalluri, 2016) [12, 42]. Students may initiate their health science college careers with a wide variety of academic aptitude (Goradia & Bugarcic, 2019; Gultice *et al*., 2015; Thalluri, 2016) [11, 12, 42] and feel overwhelmed with the complexity of the coursework (Hamshire *et al*., 2013) [15]. Students who performed well academically maintained higher engagement levels, while those who received poor grades experienced burnout and were less likely to persist (Palos *et al*., 2019) [28]. Huerta and Watt (2015) [21] found that community college students were less academically prepared than their 4-year institution counterparts. Although increased age was associated with several challenges related to retention, it was highlighted as a positive factor for health science program academic performance (Schrum, 2015) [38].

2.2.1.1 Personal Challenges

First-year health science students at two-year institutions face multiple personal challenges. These learners must balance competing life commitments, such as demands of family and work expectations (Goradia & Bugarcic, 2019; Gultice *et al*., 2015; Hamshire *et al*., 2013; Harris *et al*., 2014; Schrum, 2015) [11, 12, 15, 16, 38]. Financial concerns were identified as the most significant factor impacting learners' academic success and retention (Hamshire *et al*., 2013) [15], especially when working 20 or more hours per week to meet their obligations (Schrum, 2015) [38]. The biggest challenge for health science students is the cumulative effect of these personal factors on retention rates and academic achievement (Hamshire *et al*., 2013; Harris *et al*., 2014; Schrum, 2015) [15, 16, 38].

2.2.2 Retention Rates in Higher Education

For students who started college in fall 2017, the National Student Clearinghouse Research Center (NSCRC, 2019) [26] reported a 61.7% first-year retention rate for U.S. students, continuing enrollment at the same institution from their first to second fall term. When broken down by age group, students aged 20 years or younger had the highest retention at 63.3%, followed by 21-24 year-olds at 53.6%, and those 25 years of age and older were lowest at 50.6% (NSCRC, 2019) [26]. In all higher education institutions, full-time students were retained at a much higher rate of 73.5% compared to 46.1% of learners enrolled part-time (NSCRC, 2019) [26].

Ohio's colleges and universities achieved an overall 62.1% student retention rate for this cohort of learners, which was slightly higher than the national level (NSCRC, 2019) [26]. In fall 2017, first-time Ohio students aged 20 or younger had a retention rate of 63.1% (NSCRC, 2019) [26]. The state retention rates, like national ones, decreased by age group, with students between 21 and 24 years of age at 56.8% and those aged 25 and older at 53.0% (NSCRC, 2019) [26].

2.2.3 Student Retention in Allied Health Programs

Higher education institutions have increased their focus on retaining students from one term to the next and one year to the following to manage enrollment. The concern regarding high attrition rates in allied health, nursing, and related health programs is global and affects a variety of stakeholders (Goradia & Bugarcic, 2019; Gultice *et al*., 2015; Hamshire *et al*., 2013; Harris *et al*., 2014; Huerta & Watt, 2015; Peterson-Grazioze *et al*., 2016; Ryan & Davies, 2016; Schrum, 2015) [11, 12, 15, 16, 21, 31, 36, 38]. When students are not retained in health and health-related professional education, there are personal, institutional, and societal impacts (Gartrell *et al*., in press; Gultice *et al*., 2015; Hamshire *et al*., 2013; Harris *et al*., 2014; Peterson-Grazioze *et al*., 2016; Ryan & Davies, 2016; Schrum, 2015) [12, 15, 16, 31, 36, 38].

3 Materials and Methods

Quantitative methodology was utilized to investigate differences among generational cohorts in retention and academic achievement of allied health students at a Midwestern community college. A quasi-experimental ex post facto research design was used.

3.1 Population and Sample

This study examined student retention and academic achievement using data from the community college's student database. The sample came from the same population, allied health students in six programs at a small Midwestern community college, including the most recent five groups enrolled in those programs in fall 2015 through 2019.

The inclusion criteria were 1) an allied health student in Health Information Management, Medical Assistant, Medical Laboratory Technology, Occupational Therapy Assistant, Physical Therapist Assistant, or Radiologic Technology program, and 2) enrolled in the first fall term of allied health program between 2015 and 2019. Secondary data was obtained from the institution's student database.

3.2 Operational Definitions of Variables

The following operational definitions describe the variables in the study and the measure used.

3.2.1 Generational Cohort

The generational cohorts addressed in this study included Baby Boomers (born 1946-1964), Gen X (born 1965-1980), Millennials (1981-1996), and Gen Z (1997-2012).

3.2.2 Retention Rates

This dependent variable was defined as participants who were retained from fall to spring semester of the first year of the allied health program.

3.2.3 Academic Achievement
This dependent variable was defined as participants' GPAs for fall semester of the first year of their allied health program.

3.3 Data Collection
Secondary data analysis examined the allied health students' retention rates and academic achievement. This data was readily available for all participants in the study population from the institution's database.

The researcher requested that the Director of Institutional Research (DoIR) define the sample based on the study's inclusion criteria and collect data from the student database. The dataset included variables of participant's year of birth, entrance GPA, previously earned semester credit hours, allied health program of enrollment, and their current status in that program. The DoIR also provided retention data for each year's group of allied health students indicated by enrollment in fall and spring semesters of the first year in the health profession programs. The DoIR reported academic achievement data in the form of the fall semester GPA for each participant. The entire dataset was deidentified and supplied to the researcher.

3.4 Data Preparation
Secondary data was collected from the Midwestern community college's student database (n=408). During data analysis, 68 participants who did not have data for entrance GPA in the allied health program data were removed, for a total sample size of n=340.

SPSS® for Mac, Version 26 (IBM Corporation, Armonk, NY) was used for all statistical analysis. Data analysis was conducted in three phases. First, all study variables were presented using descriptive statistics, such as, means (M), standard deviation (SD), and range or minimum/maximum (MIN/MAX) values for continuous variables (Interval/Ratio level) and frequencies and percentages for categorical variables (Nominal/Ratio level).

Next, a series of bivariate tests were used to identify which explanatory variables were related to each dependent variable at a statistically significant level ($p<.05$). Because the Baby Boomer cohort (n=1) made up only 1.9% of the sample, it was collapsed with the Gen X cohort (n=8; 14.8%) for data analysis purposes.

3.4.1 Validity and Reliability of the Data
Within the final inferential analysis presented, all test assumptions related to parametric and non-parametric testing were examined and revealed no significant problems, including normality, linearity, and undue influence of outliers scores (Cousineau, & Chartier, 2010) [5]. The non-normal distribution of GPA at End of the Fall Semester was examined to determine the effect of five outlier scores. Violation of the test assumption of normal distribution did not skew the findings.

3.5 Descriptive Statistics
3.5.1 Descriptive Analysis for Retention and Academic Achievement Sample
Descriptive analysis was performed to evaluate the characteristics of the allied health students (n=340). A descriptive analysis of categorical study variables are presented in Table 1. Independent variable Generational Cohort data indicated that almost two-thirds (n=208, 61.2%) of the sample belonged to the Millennials cohort. Regarding the dependent variable Retention, 88.5% (n=301) had been retained.

Table 1: Descriptive Analysis of Categorical Study Variables

Variable	N	%
Generational Cohort		
Baby Boomer (1946-1964)	9	2.6
Gen X (1965-1980)	30	8.8
Gen Z (1997 or later)	93	27.4
Millennials (1981-1996)	208	61.2
Retention		
Retained	301	88.5
Not Present/Switched Major	39	11.5

Note. n=340. N = number of participants in each category. Gen X = Generation X; Gen Z = Generation Z.

In Table 2, a descriptive analysis of continuous study variables are represented.

Table 2: Descriptive Analysis of Continuous Study Variables

GPA at the End of Fall Semester	M (SD)	Minimum/ Maximum	Skew (SE)	Kurtosis (SE)
GPA With Outliers	3.30 (.52)	0.06-4.00	-1.60 (.13)	5.79 (.26)
GPA Outliers Removed	3.34 (.44)	2.00-4.00	-.53 (.13)	-.19 (.27)

Note. n=340.

All analysis were repeated with the modified version of the dependent variable to ensure that the non-normal distribution and outlier scores did not change the statistical significance of the findings.

4 Results
The data were analyzed with the results applied to the research questions and null hypotheses addressed in this study.

4.1 Research Question 1
RQ1. Is there a significant difference among generational cohorts in the retention rates after the first semester while controlling for Entrance GPA in Allied Health Programs in a Midwestern community college?

Table 2 presents a binary logistic regression model that indicates that while controlling for Entrance GPA in Allied Health Programs, Retention was significantly associated with Generational Cohort, where in reference to Baby Boomers, the Gen X group was 16.66 (95% CI=1.44-193.18) times more likely to be retained, B=2.81, SE=1.25, Wald X^2=5.06, $p<.05$, and the Millennials group was 5.31 (95% CI=1.19-23.67) times more likely to be retained, B=1.67, SE=.76, Wald X^2=4.79, $p<.05$. The Gen Z group did not differ in rates of Retention from the Baby Boomer reference group at a statistically significant level, B=1.36, SE=.79, Wald X^2=2.98, p=.09.

4.1.1 Bivariate Analysis for Research Question 1

Table 3 presents a chi-square analysis of Retention (Yes/No) by generational cohort. Bivariate analysis indicated Retention was not related to Generational Cohort at a statistically significant level, $X^2(3) = 6.42$, p=.09. Table 4 presents an independent samples t-test analysis indicating that Retention (Yes/No) was related to Entrance GPA in Allied Health Programs at a statistically significant level, t(338)=4.01, p<.001, where those who were retained (M=3.40, SD=.47) evidenced a higher mean GPA score relative to those students who switched majors or were not present (M=3.06, SD=.71).

Table 3: Chi-Square Analysis of Retention by Generational Cohort

Variable	Retained N (%)	Not Present N (%)	X^2(df)	p
Generational Cohort			6.42(3)	.09
Baby Boomer	6 (66.7)	3 (33.3)		
Gen X	29 (96.7)	1 (3.3)		
Gen Z	81 (81.7)	12 (12.9)		
Millennials	185 (88.9)	23 (11.1)		

Note: n=340. N = number of participants in each category. This table demonstrates the data analysis for Research Question 1. Retention is a categorical variable with Yes/No responses.

Table 4: Independent Samples T-Test Analysis of Retention by GPA at the End of the Fall Semester

Variable	N	M (SD)	t(df)	p
GPA at the End of the Fall Semester			4.01 (338)	.001*
Retained	301	3.40 (.47)		
Not Present/Switched Major	39	3.06 (.71)		

Note: n=340. N = number of participants in each category. This table demonstrates the data analysis for Research Question 1. Retention is a categorical variable with Yes/No responses. Students who were not present or switched major from original allied health program were considered not retained. * p<.05

4.1.2 Multivariate Analysis for Research Question 1

Table 5 presents a binary logistic regression analysis examining Retention. The overall model was statistically significant, $X^2(4) = 19.75$, p<.001, with 88.8% of cases being categorized correctly. In terms of individual predictors, a greater likelihood of retention was associated with higher Entrance GPA in Allied Health Programs, B=1.12, SE=.31, Wald X^2=13.21, OR=3.05 (95% CI=1.67-5.58), p<.001.

Table 5: Logistic Regression Analysis Examining Retention

Variable	B (SE)	Wald X^2	OR (95% C)	p
Entrance GPA in Allied Health Programs	1.12(.31)	13.21	3.05 (1.67-5.58)	.001*
Generational Cohort				
Baby Boomers (Reference Group)				
Gen X	2.81(1.25)	5.06	16.66 (1.44-193.18)	.02*
Gen Z	1.36(.79)	2.98	3.90 (.83-18.27)	.09
Millennials	1.67(.76)	4.79	5.31 (1.19-23.67)	.03*

Model: $X^2(4)=19.75$, p<.001. 88.8% of cases were categorized correctly.
Note: n=340. This table represents the examination Retention by Generational Cohort while controlling for Entrance GPA in Allied Health Programs. Retention is a categorical variable with Yes/No responses. * p<.05

A significant association was also identified between Retention and Generational Cohort using Baby Boomers as a reference group. Retention of Gen X was 16.66 times more likely and Millennials was 5.31 times more likely while Gen Z did not differ in rates of Retention from Baby Boomers.

4.2 Research Question 2

RQ2 Is there a significant difference among generational cohorts in academic achievement as measured by GPA after the first semester while controlling for entrance GPA in allied health programs in a Midwestern community college?

4.2.1 Multivariate Analysis for Research Question 2

Table 6 presents a multiple linear regression analysis examining GPA at the End of the Fall Semester by generational cohort while controlling for Entrance GPA in Allied Health Programs.

Table 6: Multiple Linear Regression Analysis Examining Academic Achievement

Variable	B (SE)	β	p
Entrance GPA in Allied Health Programs	.85 (.03)	.85	.001*
Generational Cohort			
Baby Boomers (Reference Group)			
Gen X	.04 (.09)	.01	.67
Gen Z	.02 (.05)	.01	.69
Millennials	-.06 (.03)	-.05	.10

Model: F(339)=221.26, p<.001. R^2=.73, Adjusted R^2=.72.
Note: n=340. This table the examination GPA at the End of the Fall Semester by Generational Cohort while controlling for Entrance GPA in Allied Health Programs. * p<.05

Analysis indicated that although the overall regression model was statistically significant, F(339)=221.26, p<.001. R^2=.73, Adjusted R^2=.72, GPA at the End of the Fall Semester did not vary at a statistically significant level by Generational Cohort categories. Specifically, in comparison to the reference group Baby Boomers, there was not a statistically significant difference in GPA at the End of the Fall Semester values regarding Gen X, B=.04, SE=.09, β=.01, p=.67, Gen Z, B=.02, SE=.05, β=.01, p=.69, and Millennials, B=-.06, SE=.03, β=-.05, p=.10.

5. Conclusion

There was a statistically significant difference in student retention in reference to Baby Boomers when Entrance GPA in Allied Health Programs was controlled for. Gen X and Millennials were 5.31 and 16.66 times more likely to be retained, respectively, but Gen Z's level of retention did not differ. Current literature reported that attrition of allied health students was a concern globally (Goradia & Bugarcic, 2019; Gultice *et al*., 2015; Hamshire *et al*., 2013; Harris *et al*., 2014; Huerta & Watt, 2015; Peterson-Grazioze *et al*., 2016; Ryan & Davies, 2016; Schrum, 2015) [11, 12, 15, 16, 21, 31, 36, 38]. However, in 2017, retention rates in two-year health professions or clinical-related science programs in the United States were 54.7% (NSCRC, 2019) [26]. The overall retention rate of allied health students between 2015 and 2019 at the Midwestern community college was 88.5%, nearly 34% higher than the national average in 2017 (NSCRC, 2019) [26].

This study did not identify a statistically significant difference among generational cohorts of allied health students' academic achievement after the first semester when controlling for Entrance GPA in Allied Health Programs. However, data demonstrate that 73% of the variance in GPA at the End of the Fall Semester for all allied health students' was explained by GPA at entrance to the program. Existing evidence associated students who performed well academically with higher levels of engagement in learning while lower grades were linked to student burnout and a lack of persistence (Palos *et al*., 2019) [28]. Contrary to this study's findings, Schrum (2015) [38] reported that learners with increased age had improved academic outcomes in health science programs.

5.1 Contributions to the Literature

One statistically significant difference was found among generational cohorts for retention in reference to Baby Boomers when controlling for GPA at program entrance. Gen. X and Millennial allied health students were significantly more likely to be retained. Specifically, Gen. X and Millennials were 16.66 and 5.31 times more likely to be retained, respectively, compared to those in the Baby Boomer cohort when GPA at the beginning of the allied health program was controlled using a binary logistic regression model. In the model, Gen Z learners' retention did not vary at a statistically significant level in reference to Baby Boomers. The regression model also found that overall GPA at entrance to the allied health programs was significantly associated with likelihood of retention (p=.001) at the end of the semester. Gultice *et al*. (2015) [12] investigated two-year college student's success in prerequisite science courses required of many allied health programs, finding that increased age, higher high school and college GPAs, and higher course credit hour load positively affected learner performance in anatomy and physiology. Similar to this research study, the investigators used a convenience sample of pre-allied health students at a Midwestern community college and identified that higher GPAs when entering the semester in which they took anatomy and physiology as being significantly associated with passing the course (Gultice *et al*., 2015) [12].

The study findings that identified a lack of significant differences among generational cohorts of allied health students at this Midwestern community college also contribute to the literature by examining this less frequently targeted learner population. Most previous studies examining generational differences among college students focused on learners in four-year institutions, with some emphasizing the importance of avoiding assumptions about learners' preferences or characteristics based on their year of birth (Rickes, 2016; Sánchez & Kaplan, 2014; Williams *et al*., 2017) [34, 37, 46]. They encouraged a more tailored approach due to inconsistencies in the established start and end dates of generational categories and the growing trend for younger individuals to deidentify with their designated cohort (Rickes, 2016; Sánchez & Kaplan, 2014; Williams *et al*., 2017) [34, 37, 46].

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