

STUDENT RETENTION RATES IN ASSOCIATE-DEGREE
DENTAL HYGIENE PROGRAMS

by

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ABSTRACT

Dental hygiene is a program that is expensive for a college to operate. Retaining the most dental hygiene students is a financial benefit to a college budget due to the inability to fill open seats. Institutional settings and student barriers may impact the retention rates of associate-degree dental hygiene students. This quantitative, correlational research study examines the relationship between dental hygiene retention rates and the institutional setting and early/rolling enrollment. This study also explores if there is a relationship between student barriers and the instructional setting. A stratified random sample of 150 associate degree programs was used in this study. Fifty-seven programs responded to the survey with a varied amount of usable data; retention data was included from 45 surveys. The research identified no significant difference between institutional setting and associate-degree dental hygiene programs. The research also identified no significant difference between barriers and institutional setting. Future research is needed to investigate remediation strategies that programs have implemented to help improve retention rates.

KEY WORDS: Dental hygiene, retention rates, student barriers

DEDICATION

This work is dedicated to my family and friends who showed continual support even when they just wanted their mom/wife/colleague back. Ken, thank you for doing the laundry; cooking when you didn't want to; and watching TV by yourself while I was on my computer for multiple days, weeks, and months in order to complete my degree and this dissertation: thank you.

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CHAPTER ONE: INTRODUCTION

RETENTION RATE INTRODUCTION

Retention rate, completion rate, attrition rate, and graduation rate are all common terms used in higher education. Retention rate is defined by U.S. Department of Education, Office of Federal Student Aid as the “percentage of a school’s first-time, first-year undergraduate students who continue at the school the next year” (Federal Student Aid, 2018). Attrition is the opposite of retention. Attrition is the percentage of students who fail, dropout, withdraw, or do not continue in their educational program. The graduation rate is different from retention rate. The graduation rate measures a student’s completion of a degree within a certain time period, usually within 150% of the average time to completion. Completion rate is similar to the graduation rate in which a student is successful in achieving their goal within a certain time frame. The completion goal may be a degree but can also include a certificate, transfer credits, or continuing education credits. Data and studies show that retention rates and graduation rates at community colleges are lower than at four-year institutions (Astin, 1999; McFarland et al., 2018).

Retention rates in dental hygiene programs are assessed as graduation rates by the American Dental Association (ADA). The graduation rate of the class of 2014 was 86% (ADA, 2016). This number is high compared to the average four-year institution graduation rate of

60% and the average two-year institution graduation rate of 28% in the same year (Kena et al., 2016). But does this mean that 86% of the students entering into their dental hygiene program graduated in 150% time of completion? A question that remains is how many of these dental hygiene students graduated on time and how many students took extra time to complete but stayed within the 150% time of completion?

Statistically, dental hygiene programs have more applicants than seat availability. In the ten years from 2005-2015, the average acceptance rate into a dental hygiene program was 29% (ADA, 2016). To ensure the students most likely to succeed are admitted into a dental hygiene program, schools have developed preadmission requirements that help identify students who have the potential to be successful. Even with these preadmission requirements, the retention rates in dental hygiene programs have slightly declined in the last three years. According to the ADA, the 2014 average graduation rate of the 335 dental hygiene programs in the United States was 86.0% compared to 86.3% in 2013 and 86.8% in 2012 (ADA, 2014, 2015, 2016).

Dental hygiene programs operate on a pathway curriculum; in other words, courses only are offered in a specific sequence. This type of curriculum results in courses being offered only once a year. Dental hygiene programs typically have only one admission class a year, usually in the fall semester. Two-year associate-degree programs customarily run two cohorts at a time, a first-year class and a second-year class. If a student is unsuccessful in a course and is allowed back into the program as a re-entry, that student will need to wait a full term to re-enter the program, when the course is offered again. Holt 's (2005) research showed "92% of the programs reported students would have to wait a full term to repeat the class(es) in question" (p. 7). In the meantime, their seat is left empty. An empty seat translates to lost tuition. It is in

the best interest of the college, the students, and the program to retain as many students as possible.

Dental hygiene programs typically have the highest operating expenses in an institution's budget. This is due to the operation of an on-site dental hygiene clinic and the Commission on Dental Accreditation (CODA) mandate of a one to five faculty to student ratio. This high budget program coupled with the completion agenda places dental hygiene programs under a microscope. The completion agenda was established by Complete College America to help alleviate the retention issue: "At its founding five years ago, Complete College America (CCA) called on states to take a hard look at their data, recognize the challenges facing students, and set clear goals that prioritized college completion" (Jones, 2015, p. 25).

The impact of the dental hygiene program budget expense, combined with the limited number of students enrolled in the program, results in dental hygiene programs running on a deficit budget. For example, a midwestern two-year dental hygiene program that enrolls 36 students is required to have one faculty member for every five students in all clinical courses. This particular college holds two sections of 18 students, which results in running two clinical sections. These sections require four clinical faculty (5-to-1 ratio) and one clinical dentist to oversee the clinical course. For this example, the pre-clinic/clinic I course runs two four-hour clinical days per section, equaling four clinical courses a week or 16 hours. In order to staff the clinic with the mandated 5-to-1 ratio and one clinical dentist, this midwestern college spends an estimated \$3,840 a week, which equals \$61,440 a semester (see Figure 1). Students pay \$477 for this four-credit hour course. The difference between student revenue and the cost of

employee salaries is an estimated deficit of over \$44,000 per semester. This example does not take into account the three days-a-week Clinic III and Clinic IV that are held in the clinic.

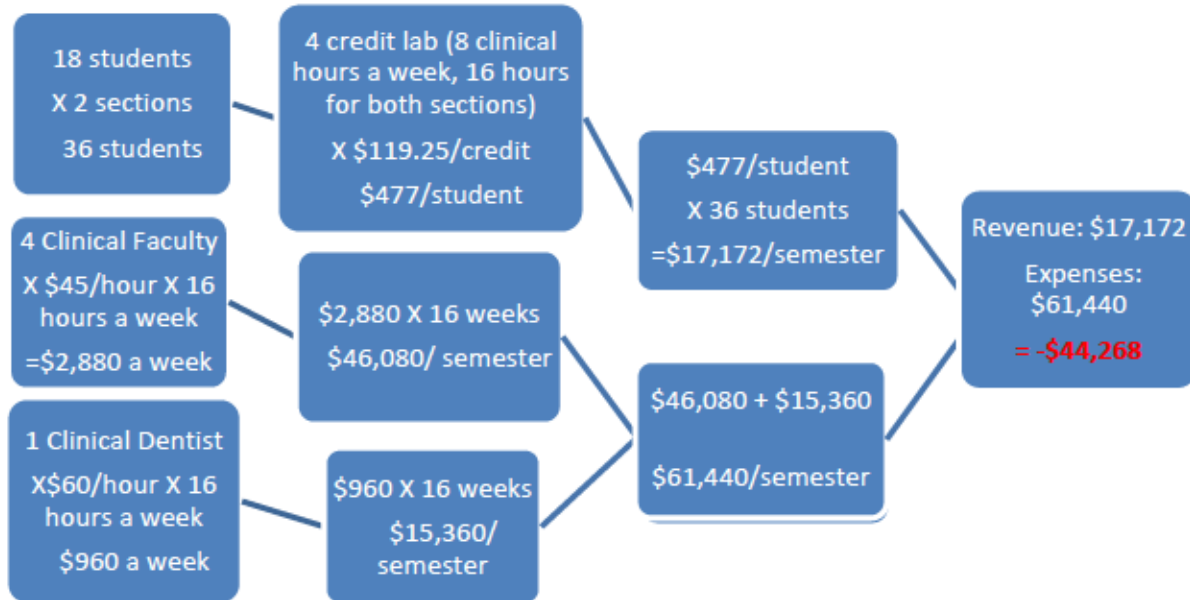


Figure 1. Estimated revenue and expenses of one dental hygiene pre-clinic/clinic I course at a midwestern dental hygiene program.

This underfunded, overbudgeted program can be an issue of concern with Board of Trustee members and the Chief Financial Officer of a college. A solution to the high cost of dental hygiene programs is for institutions to charge more to dental hygiene students. Harper College in Palatine, Illinois has used this solution. Harper College charges double tuition for all dental hygiene courses. In the 2016-2017 academic school year, in-district Harper College students paid \$119.25 per credit hour, while dental hygiene students paid \$238.50 per dental hygiene credit hour (Harper College, 2016). According to the same document, dental hygiene students graduate in five semesters, earn 81 college credits, and incur a total of \$29,205 per student in tuition, fees, books, instrument kits, health requirements, and miscellaneous

material costs (Harper College, 2016). This is comparable to \$14,602.50 per year, over \$10,000 more than the average cost of tuition, fees, books, and supplies of \$4,498 (National Center for Education Statistics [NCES], 2018). Another solution to the budget problem is to charge an extra fee for the clinical courses. Northern Arizona University charges junior and senior students of their dental hygiene program an additional \$400 per semester, totaling \$1,600 additional dollars for tuition and fees per student (Northern Arizona University, 2017). Lewis and Clark Community College in Illinois charges an additional \$301 per clinical course, resulting in a total of \$903 per student for the completion of their program (Lewis & Clark Community College, 2017).

With an 86.0% overall graduation rate in dental hygiene programs, it is important to assess which programs have a higher than average retention rate and which programs are below average. Does the institutional setting of a dental hygiene program affect the graduation rate? Previous studies show bachelor-degree dental hygiene programs have a higher retention rate than associate-degree programs (Moore, Carr, Kearney, & Clutter, 2016). According to the NCES, in 2012 the overall retention rates at four-year institutions were higher than their two-year counterparts. There was a 59% retention rate for a bachelor's degree and a 31% retention rate for a certificate or a two-year degree (NCES, 2014). If an associate-degree program is housed within a four-year university, is their retention rate higher than those programs in a community college setting?

Community college students typically have more barriers to learning than those students in the university setting. "Many community college students face serious barriers to success in college, such as family and work responsibilities and deficient academic preparation. Indeed, it is precisely students such as those who may not have access to baccalaureate

institutions, whom community colleges seek to serve” (Bailey, Calcagno, Jenkins, Leinbach, & Kienzl, 2006, p. 494). Are these barriers the same with dental hygiene students and, if so, are these barriers causing more community college dental hygiene students to be unsuccessful?

PURPOSE OF THE STUDY

An abundance of research details student retention rates in allied health careers but few address retention rates in dental hygiene programs. The purpose of this study is to expand the research encompassing retention rate and focus on dental hygiene students. According to the ADA 2016 database, there are 335 dental hygiene programs in the United States. Of the 335 dental hygiene programs, 248 are in a two-year institution and 87 in a four-year institution (see Table 1). Of the 335 dental hygiene programs, 277 programs award an associate degree, 49 programs award a bachelor’s degree, six programs award a certificate, and three award a degree other than the ones mentioned (ADA, 2016). Of the 277 programs awarding an associate-degree, 181 are from a community or junior colleges, the other 96 programs are spread out among the remaining institutions. The purpose of this research is to determine if there is a correlation between retention rates in associate-degree programs and the institutional setting. A second purpose of this research is to determine if there is a connection between the barriers to success and institutional setting.

Table 1: *Number of Institutions Awarding a Degree in Dental Hygiene*

EDUCATIONAL SETTING	NUMBER OF PROGRAMS
School of Health Science (Four-year institution)	39
Dental School (Four-year institution)	24
Separate Dental Department (Four-year institution)	5
Other: Four-year institution setting	19
Total Four-year Institution	87
Community/Junior College (Two-year institution)	181
Technical College (Two-year institution)	38
Vocational School/Career College (Two-year institution)	26
Other: Two-year institution setting	3
Total Two-year Institution	248

(ADA, 2016)

RESEARCH QUESTIONS

The main objective of this study is to explore whether there is a relationship between institutional setting and associate-degree dental hygiene student retention rates. (The identified institutional factors were chosen due to the accessibility of the data from the ADA.) An additional objective is to identify the reasons a student does not complete the program. The specific research questions that are being asked are the following.

1. What institutional factors affect retention rate?
 - a. Institutional setting?

- b. On-campus housing?
 - c. Public versus private-for-profit institutions?
 - d. Public versus private-not for-profit institutions?
2. Is there a relationship between early/rolling admission and the retention rate?
 3. Is there a relationship between the specific barriers to student success and the institutional setting?
 - a. What are the most common reasons associate-degree dental hygiene students are not successful?
 - b. Which semester is the most common semester an associate-degree dental hygiene student is not successful?

SIGNIFICANCE OF THE STUDY

The significance of this study will be to provide an overview of retention rates based on the institutional setting. These data can be used to determine the institutional setting that is best for the next new dental hygiene program. These data will identify which institutional setting is the most successful in graduating dental hygiene students in a timely manner. This study will identify some of the common reasons a student is not successful in a dental hygiene program. The study will more specifically explore if the reason for lack of success is related to the institutional setting.

DEFINITION OF TERMS

In this paper, the word *retention* is being used instead of the word *attrition*. *Attrition* is the number of students lost during an academic year/program, whereas *retention* is the number of students retained in an academic program. *Attrition* has a negative tone; therefore,

the word *retention*, being more positive, will be used throughout this research when appropriate.

Academic underachievement: A student's failure or lack of success in an academic course or program.

ADA: The American Dental Association, a not-for-profit dental association that has collected and organized data regarding dental hygiene programs.

Associate degree: Identified as a two-year degree awarded by an accredited institution. This degree is not restricted to two years for completion. Some associated degree dental hygiene programs have a five-semester curriculum, a six-semester curriculum, or a curriculum that is two years, but cannot begin until prerequisite courses are completed, thus lengthening the time to complete the two-year degree.

Attrition: The number of students who fail, dropout, withdraw, or do not continue in their educational program.

Bachelor's degree: A four-year degree awarded by an accredited institution that may take longer than four years to complete.

Career/Technical school: An institution that primarily educates students with hands-on trades such as health care, computer technology, and applied sciences.

CODA: "The Commission on Dental Accreditation serves the public and profession by developing and implementing accreditation standards that promote and monitor the continuous quality and improvement of dental education programs" (ADA, 2013).

Community College/Junior College: A two-year institution that awards certificates, associate degrees, and transfer credits. A college that is situated in the community, for the community, and offered as an open-access college for all.

Cohort: "A specific group of students established for tracking purposes" (Integrated Postsecondary Education Data System [IPEDS], 2016).

Completion rate: The rate at which a student completes his/her degree, certificate, or award. This is similar to the graduation rate; the only difference is that some students do not graduate with a degree but complete a certificate or award.

Culture issues/conflicts: A reason a student is not successful that is related to culture, ethnicity, or other diversity issues.

Dental school: A professional college that awards doctorate degrees in dental science. This college can be a stand-alone institution or part of a larger institution.

Dissatisfaction with career choice: A student, in good academic standing, decides that the dental hygiene field is not what she/he wants to pursue.

Early or rolling admissions: A process of admissions that allow students to be accepted into a program as they apply. Early admissions and rolling admission may have a specific deadline, but students are admitted as they apply if they meet the minimum requirement.

Family and personal responsibilities: A reason a student cannot continue in their academic plan that is due to personal or family obligations, whether it be a spouse, children, or parents.

Financial restraint: The inability to pay for college tuition, fees, books, supplies, etc. that inhibit a student from completing their educational goal.

Four-year institution: "A postsecondary institution that offers programs of at least four years duration or one that offers programs at or above the baccalaureate level" (IPEDS, 2016).

Geographical location: The inability of a student to continue their educational goal due to the location of the school. This can include a student moving away from the institution, the institution being too far away to commute, or the inability to obtain transportation to access the institution.

Graduation rate: The rate at which a student completes his/her degree in 150% times the completion rate. A four-year degree completion rate is six years and a two-year degree completion rate is three years.

Health condition: A reason a student cannot continue in their education that is related to a health issue. This can include physical disability, systemic disease, or any condition restricting the ability to continue the academic program.

Limited enrollment: The number of students enrolled in a program/college that is limited. The limit can be due to a number of reasons; one reason can be the number of available seats in a classroom.

Open access: An admission policy that admits more than 80% of the students who apply to the institution.

Open admissions: An enrollment process that is noncompetitive and non-discerning with the only criteria being a high school diploma or GED. Open admissions and open access are used interchangeably in literature as well as in this study.

Persistence: "Is another way of speaking of motivation. It is the quality that allows someone to continue in pursuit of a goal even when challenges arise" (Tinto, 2017, p. 2).

Public school: An educational institution that receives some of their funding from the local, state, and federal governments. Public schools are also funded by student tuition and fees as well as grants, donations, and scholarships.

Private, for-profit school: An institution that is funded privately that receives compensation other than the day-to-day operations of the institution.

Private, not-for-profit school: An institution that is privately funded that receives no compensation other than the day-to-day operations of the college.

Retention: A term used in this study to define a student who has completed and passed all courses on time and remains in academic good standing of the dental hygiene program. This term does not include a student who was unsuccessful in a course and has been readmitted into the program. In dental hygiene research, this term is used interchangeably with graduation rate. In this paper, the author will specify if the word retention means retention rate or graduation rate.

Retention rate: An institutional activity that rates if a student completes and returns the following semester or academic year.

Success: A term used to define a student who started and graduated on time. This does not include the student who failed a course, was readmitted, and graduated behind the initial cohort. This term does not include a student who took a longer academic time to graduate, whether it be a few weeks, a semester, or a full year. For this study, the term success is not defined as passing the national and/or state board licensing examinations. No data was collected in this study relating students passing these licensing exams.

Time restraint due to work commitments: A reason for a student's lack of success due to working too many hours thus reducing the number of hours available to study.

Two-year institution: "A postsecondary institution that offers programs of at least two but less than four years duration" (IPEDS, 2016). This type of institution includes community colleges, junior colleges, technical schools, vocational schools, and other institutions that do not award a bachelor's degree.

ORGANIZATION OF STUDY

Chapter One provides an overview of the study, specifically, a brief background of the issue, an explanation of how the issue is related to dental hygiene, and the current research in practice. Chapter Two details the literature review involving the theory of student retention. It details the retention and graduation rates of two-year institutions versus four-year institutions

as well as public versus private and private for-profit versus private not-for-profit. Chapter Two continues describing the differences in retention rates in dental hygiene programs as well as allied health programs. Chapter Three explains the research methodology, including research design, sample size, research instrument, and data collection method. Chapter Four presents the collected data, and Chapter Five explains the analyses and implications of the collected data. Chapter Six discusses the conclusions and recommendation for further research in the field of dental hygiene retention rates.

SUMMARY

Student retention rate is important data to collect when analyzing the effectiveness of a college or program. Students use retention rates to investigate the success rate of institutions. Institutions utilize retention rates to evaluate themselves. The number of students enrolled in an institution is directly related to the revenue an institution collects, therefore creating a goal for institutions to retain as many students as possible. This is particularly true with dental hygiene programs. Dental hygiene programs are costly to operate making retention of dental hygiene students an objective for any institution. There are few studies that research retention rates specific to dental hygiene students and the barriers they encounter. This study is designed to increase the knowledge base involving retention rates in dental hygiene programs and the barriers students encounter.

This study is designed to explore the relationship between the retention rates in associate-degree dental hygiene programs and their educational setting. The research was conducted to expose specific factors in the institutional setting that affect retention rates.

Additional exploration was conducted in the specific barriers that students face. These specific barriers were researched to see if there is a relationship between the barrier and the institutional setting.

CHAPTER TWO: LITERATURE REVIEW

INTRODUCTION TO RETENTION THEORY

Retention and graduation rates are a key component of assessing an institution's effectiveness (Millea, Willis, Elder, & Molina, 2018). The 1990 Student Right-to-Know Act requires HEA Title IV participating institutions to report their graduation rates (101st Congress, 1989-1990). The graduation rate is based on first-time students who are enrolled full time when they begin college courses. The graduation rate is the completion of a student's degree within 150% of the normal completion time. Thus, the graduation rate for a bachelor's degree at a four-year institution includes all students who graduate in six years, and the graduation rate at a two-year institution includes all students who graduate in three years for an associate degree. Retention rates differ from graduation rates. Retention rates measure student retention from fall to fall semester and are usually higher than graduation rates.

Student retention in higher education is multifaceted. Numerous theories exist that try to explain why some students complete their coursework and graduate while others drop out. Alexander Astin is an academic known for his input-environment-outcome (IEO) assessment model. In the second edition of his book, titled *Assessment for Excellence: The Philosophy and Practice of Assessment and Evaluation in Higher Education*, Astin and Antonio (2012) explain the IEO model of assessment. THE IEO model explains the input variables, the environmental variables, and the outcome variables that affect assessment. Astin applies the IEO model to

college retention by explaining the input variables as personal characteristics, personal qualities, and personal knowledge brought into the institution at the beginning of the students' higher educational journey. Environment variables are explained as the students' actual experiences that the institution offers students. Examples are freshman orientation class, faculty relationships, on-campus housing, participation in clubs and activities, and anything else an institution offers for students. The outcome variables are the end result such as student attrition rate, retention rates, and graduation rates. When evaluating student attrition, the outcome variable is retention rates or graduation rates.

Student retention theories differ based on the variables studied. Common variables studied can be categorized in Astin's IEO model of assessment. Input variables studied include gender, race, ACT/SAT scores, GPA, preparedness, etc. Students who are prepared for college, on both an academic and a maturity level, succeed more often than students who are not prepared (Brown & Robinson, 1997). Studies show that students who enter a higher education institution with a high GPA from high school have positive retention rates (Berger & Milem, 1999; Millea et al., 2018; Munro, 1981; Pascarella & Chapman, 1983). Incoming ACT/SAT scores also predict a positive retention outcome; the higher the score, the better the chance of student success (Marsh, 2014; Millea et al., 2018; Pike & Graunke, 2015).

Vincent Tinto, an academic, has extensively researched student voluntary and involuntary withdrawal from higher education. His additional research focused on voluntary withdrawal and why students drop out. Tinto initially researched the input variables but found it difficult to isolate each individual variable. Tinto (1982) explains that the student input variables are not always the same: "It is not elitist to recognize that not all those who enter are

equally equipped either in skills (academic, social, or otherwise) and/or intellectual capacities to finish a given course of study” (p. 696). Tinto focused the majority of his research on the environmental variables associated with voluntary withdrawal.

Environmental variables, according to Astin and Antonio (2012), are the actual experiences students have during the education process: “Environmental information is especially critical here, since the environment includes those things that the educator directly controls in order to develop the student’s talent” (p. 19). Tinto’s research in 1982 concluded that it is the students’ social and academic integration that affects retention.

Tinto used the students’ social and academic involvement in the college to develop his student integration theory. Students who become connected to the institution through social activities, such as peer relationships, social activities, and clubs, stay in school more often than students who do not have those connections. Students who become connected to academics, such as university student centers and members of an honor society, show increased retention.

Researchers have used Tinto’s student integration model to explore the validity of the connection of social and academic integration to retention. In 1980, Pascarella and Terenzini utilized Tinto’s model to study the predictive validity of the theory with freshman persisters and voluntary dropouts. The results of their study showed that Tinto’s model successfully predicted, with an average of 80% accuracy, the students who would drop out and the students who would persist.

Berger and Milem studied student retention utilizing Tinto’s integration model and Astin’s (1999) theory of involvement model. Berger and Milem (1999) found that early involvement, faculty involvement, and peer involvement were all positive indicators of student

retention. These findings support Tinto's student integration theory as well as Astin's theory of involvement.

Cabrera, Castañeda, Nora, and Hengstler (1992) researched college persistence applying Tinto's student integration model and Bean's student attrition model. Bean's student attrition model states that external factors play a role in student attrition (for example, family approval, friend encouragement, finances), while Tinto's student integration model states academic integration, social integration, goal commitment, and institutional commitment are high predictors of retention. Cabrera et al. found that Tinto's student integration model was more accurate in predicting retention (70%) as compared to Bean's student attrition model (40%).

Social integration is important for the retention of students. Early involvement in the fall semester is a positive predictor of spring involvement (Berger & Milem, 1999; Tinto, 2017). Early involvement also has "significant indirect effects on social integration, academic integration, subsequent institutional commitment, and persistence" (Berger & Milem, 1999, p. 658). Panos and Astin discovered lack of integration had a negative effect on retention. In their 1968 research, Panos and Astin revealed that if the student had little involvement with extracurricular activities, they had an increased risk of dropping out of college. Social integration was more influential with women than men, while academic integration was more of an influence with men (Pascarella & Terenzini, 1983).

The research supports the positive effect faculty and student relationships have on retention. Faculty interaction is the number one environmental variable that integrates students into college (Astin, 1999). Faculty concern for student development, faculty concern for student career choices, student familiarity with faculty, and faculty contact concerning the

intellectual content of course material show a positive relationship to student retention (Panos & Astin, 1968; Pascarella & Terenzini, 1977, 1980). The interaction between faculty and student is a valuable one in the theory of retention and can be explained as a social integration variable as well as academic integration variable.

Academic integration is important for student retention according to Tinto. Academic integration is when students become involved in the educational side of the college. In 1981, Munro applied Tinto's student integration model for a specific freshman class to determine if the model was accurate. Munro's findings were that academic integration was more related to student retention than social integration. An example of academic involvement includes a student's involvement with the college's honor program. Students involved in a college's honor program showed higher persistence than non-honor program students (Astin, 1999). Astin made this research conclusion due to the strong faculty- student relationships that are built through an honors program.

Tinto continues his research in retention and states it is student persistence that is valued (Tinto, 2012, 2015, 2017): "Persistence or its active form — persisting — is another way of speaking of motivation. It is the quality that allows someone to continue in pursuit of a goal even when challenges arise" (2017, p. 2). Retention is viewed as an institutional issue and persistence is viewed from the student's viewpoint: "Students, however, do not seek to be retained. They seek to persist" (2015, p. 254). Persistence is the student's desire and motivation to continue in their studies: "Without motivation and the effort it engenders, persistence is unlikely" (2015, p. 255).

TWO-YEAR AND FOUR-YEAR INSTITUTIONAL DIFFERENCES

When comparing four-year institutions to two-year institutions, one of the differences is in the enrollment numbers. In 2000, enrollment at college institutions was at 13.1 million nationwide (McFarland et al., 2018). Enrollment increased from 13.1 million to 18.1 million students from 2000 to 2010. In that same time frame, four-year institutions increased by 44% and two-year institutions increased by 29% (McFarland et al., 2018). From 2010 to Fall 2016, enrollment at four-year institutions increased by only 4% while two-year institutions decreased by 21% (McFarland et al., 2018). There were 16.9 million undergraduate students enrolled in higher education in the fall of 2016, according to McFarland et al. (2018). Of the students enrolled in college, 64% were enrolled at a four-year institution, whereas 36% were enrolled at a two-year institution. This longitudinal data indicates a trend favoring enrollment in four-year institutions.

In the 2016-2017 academic year, there were 2,395 four-year institutions of higher education and 1,500 two-year institutions (McFarland et al., 2018, p. 178). The student demographics at two-year institutions are different from the demographics at four-year institutions: "Because of their commitment to provide open-access education to all members of their community, two-year public colleges enroll a disproportionate number of students who face academic, social, and economic challenges" (Bailey, Smith Jaggars, & Jenkins, 2015, p. 52).

Of public two-year institutions, 98% were open access compared to 22% of public four-year institutions (McFarland et al., 2018). Open access, or open admission, provides access to everyone who applies to college. The open-access objective has a different mission than a selective four-year institution. (In the literature, the term "open admission" is often used in

exchange for the term “open access.” Please refer to Chapter One for the definition used in this study.) According to McFarland et al., “The institutional missions of two-year institutions generally focus on providing a range of career-oriented programs at the certificate and associate degree levels and preparing students for transfer to four-year institutions” (p, 178). The different mission statement attracts different students to the two-year institution versus the four-year institutions.

According to the NCES, two-year institutions enroll more part-time students (61%) than four-year institutions (23%) (McFarland et al., 2018). Part-time students have a lower retention rate than students who are enrolled full-time (Marsh, 2014; Pike, 2013; Pike & Graunke, 2015; Scott, Bailey, & Kienzl, 2006). Part-time enrollment lowers the student’s involvement with the college as well as reduces the social integration. Adelman’s 2007 (as cited by Handel, 2009) research findings state that students who earn less than 20 credit hours in the first year of college have lower retention rates. Part-time students can earn fewer than 20 credit hours; this alone can place them in a higher risk of not completing their degree.

Two-year institutions enroll more minority students than four-year institutions. In the fall of 2016, according to McFarland et al. (2018), an average of 56% of two-year college students were non-white and 44% of four-year college students were non-white. In 2006, Bailey et al. researched the graduation rates of community college students. Their findings showed a lower graduation rate among minority students. In another research study, Scott et al. also found that minority students had lower graduation rates.

Two-year institutions enroll more nontraditional students, students who are over the age of 25 and more ethnically diverse (Conley, 2000). In fall 2015, 23% of the full-time two-year

public institutions' student enrollment was over the age of 25 compared to 11% at four-year institutions (McFarland et al., 2018). Nontraditional students, students over the age of 25, have lower retention rates as well (Pike & Graunke, 2015; Scott et al., 2006). Nontraditional students encounter more barriers to success than traditional students (Conley, 2000). Baird's (1990) dissertation stated (as cited by Craig & Ward, 2008),

Community college students are older, attend part-time more often, do not reside on campus, have lower aspirations, have lower high school grades, have more modest financial resources, are employed for more hours, have more family responsibilities, have relatively little interaction with other students outside the classroom, and are not strongly involved in campus activities when compared to students at four-year institutions. (p. 506).

The retention and graduation rates are lower at two-year institutions compared to four-year institutions (Bailey et al., 2006). According to McFarland et al. (2018), the retention from fall semester 2015 to fall semester 2016 at four-year institutions was 81%. Retention rates at two-year institutions for the same time frame was 62% (McFarland et al., 2018). According to the same source, graduation rates at four-year institutions for students starting in the fall of 2010 and graduating by 2016 (150% time), was 60%. The two-year institution graduation rate for the class starting in fall 2013 and graduating by 2016 (150% time), was 30% (McFarland et al., 2018). Astin's 1999 study reported the same conclusion: "The most consistent finding — reported in almost every longitudinal study of student development — is that the student's chances of dropping out are substantially greater at a two-year college than at a four-year college" (p. 524).

HISTORY OF COMMUNITY COLLEGES

William Rainey Harper is considered the founder of the community college/junior college. At the time, Harper was the president of the University of Chicago, and he believed it was important to establish a two-year college that would allow students to start their college education closer to home and then transfer to a four-year institution. Harper collaborated with J. Stanley Brown, principal of Joliet High School, and created the first junior college, Joliet Junior College, in 1901. The concept of the community college developed slowly at first, with only a total of 46 junior colleges — 14 public and 32 private — established by 1914 (Drury, 2003). By 1920, the American Association of Junior Colleges (AAJC, now known as the American Association of Community Colleges, AACC) was established. The AAJC expanded the objective of the junior college from solely a transfer college to a transfer and terminal vocational degree college. Between 1920 and 1930, community college enrollment soared, going from 10,000 to 200,000 students (Kantor & Lowe, 1992).

In the years of the Great Depression, more students entered the junior college system due to their unemployment status. After the Great Depression, the population of the junior college decreased due to World War II. World War II drew hundreds of students away from the junior colleges due to their military obligation. The GI Bill, passed in 1944, allowed World War II veterans to attend college. The GI Bill provides financial assistance for tuition, books, and a monthly stipend. The response to the GI Bill overcrowded the higher education institutions in the 1940s. But the most expanded growth of the junior college system came in the 1960s when World War II baby-boomer generation became college age.

The robust growth is credited to the Truman Commission. The Truman Commission recommended that higher education not restrict due to race, gender, religion, national origin, or financial status (Gilbert & Heller, 2010). The Commission recommended the name change from junior college to community college to accentuate the integration of the community into the school. The Commission emphasized the mission of the community college as terminal vocational education and not just transfer education. This change in mission sparked the growth of community colleges. This growth is estimated to have been one new community college built per week (Drury, 2003).

From 1970 to 1980, the community college enrollment went from 1.6 million students to more than 4.5 million (Drury, 2003). In the 1970s, vocational degree students outweighed transfer students. The 1980s focused on specialty training, customized training, and highly vocational-oriented programs (Drury, 2003). By the year 2000, there were 6.0 million students enrolled in two-year college institutions (McFarland et al., 2018). The numbers have not changed much since 2000. According to McFarland et al. (2018), in 2016, there were 6.1 million students enrolled in two-year institutions.

DEFINITION OF TECHNICAL SCHOOLS

Technical schools are two-year higher education institutions that specialize in trades, careers, or technical programs. According to the Carnegie Classification of Institutions of Higher Education (2018), a high technical/career college is an institution that has over 50% of degrees and certificates in career and technical programs. Career and technical programs focus on a skilled trade, a specific career track, or a specific field of study. These schools can be public or

private, for-profit or not-for-profit. According to Bailey et al. (2006), technical schools have higher retention rates than any other two-year institution.

PUBLIC VERSUS PRIVATE

Public school systems are funded through government funding versus private institutions, which are privately funded. There are more students enrolled at public schools than there are at private schools (McFarland et al., 2018). In 2016, enrollment at all public institutions, both two- and four-year colleges, was 13.1 million students (McFarland et al., 2018). In that same year, private institutions enrolled more than 3.7 million students (see Figure 2). Even though there are more students enrolled in public institutions, there are more private four-year colleges than public four-year colleges (McFarland et al., 2018). The opposite is true for two-year colleges. There are more public two-year colleges than there are private two-year colleges, but the margins are small, 885 public versus 615 private (McFarland et al., 2018), see Figure 3.

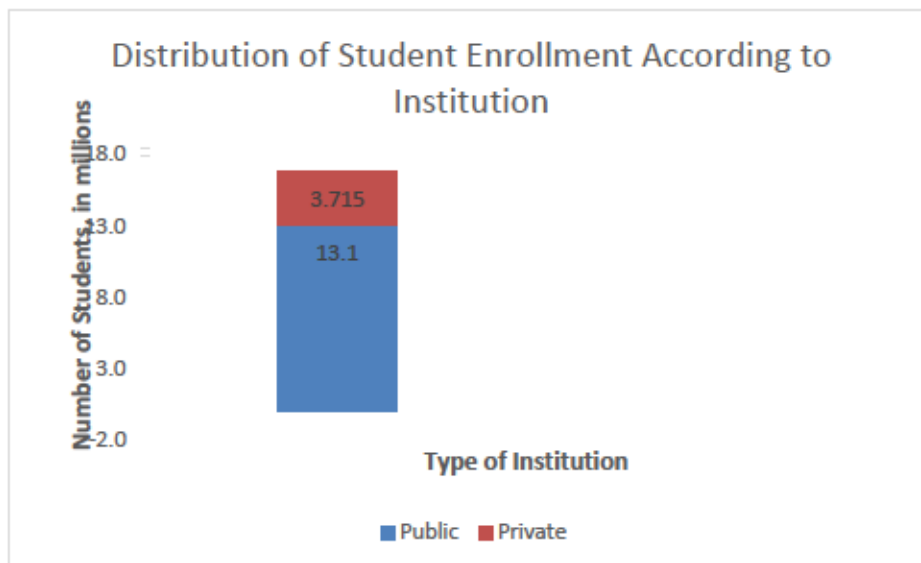


Figure 2. Student enrollment by institution type.

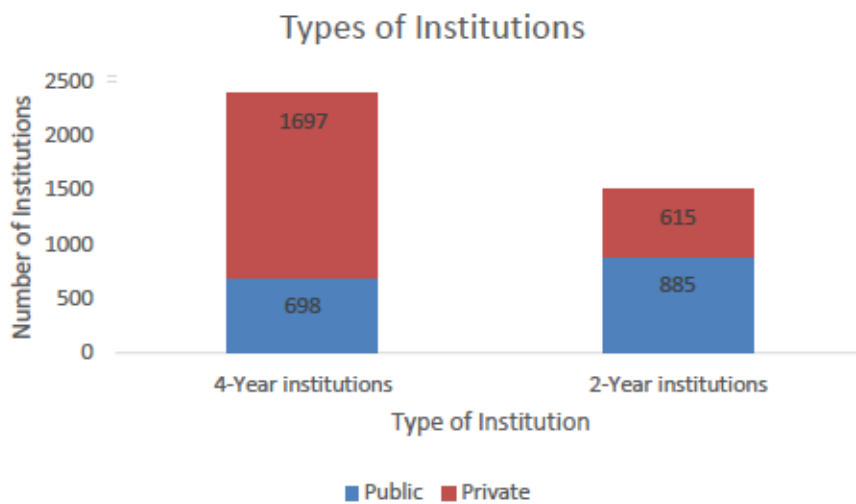


Figure 3. *Number of institutions according to type.*

Retention Rates

The overall retention rates comparing two- and four-year institutions vary widely. The overall retention of students from fall semester to fall semester for four-year institutions was 81% in 2016 according to McFarland et al. (2018). The overall retention of students in the same time frame for two-year institutions was 62% (McFarland et al., 2018). Private colleges have a different retention rate than their public institution counterparts when comparing overall two-year institutions and overall four-year institutions. According to *The Condition of Education 2018*, the overall retention rates of two-year institutions are higher at the private sector (66.5%) versus the public institutions (62%) (McFarland et al., 2018). The opposite is true for four-year institutions where the rates are higher at public institutions versus private institutions. Private four-year institutions have an average retention rate of 69%, whereas public four-year institutions have an average retention rate of 81% (McFarland et al., 2018) (see Figure 4).

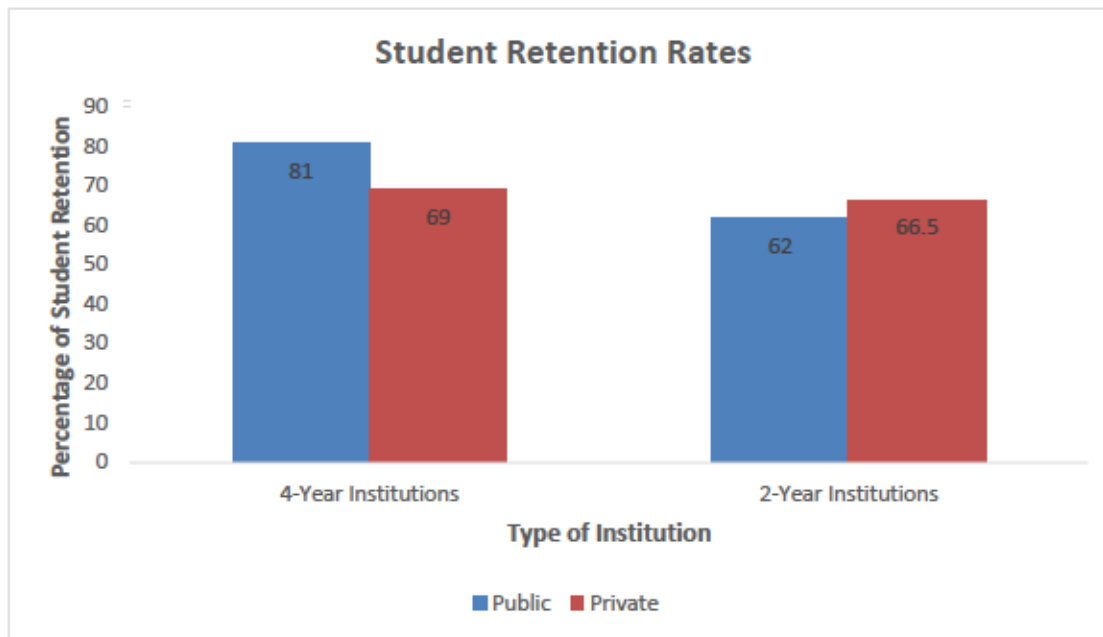


Figure 4. Percentage of first-time, full-time degree-seeking undergraduates retained at two- and four-year institutions distinguished by type of institution, in 2016.

Graduation Rates

Graduation rates at four-year institutions are overall higher than at two-year institutions. *The Condition of Education 2018 Report* (McFarland et al., 2018) as well as research from Pike’s 2013 study and Scott et al.’s 2006 study support the higher graduation rate at four-year institutions. According to McFarland et al. (2018), the overall graduation rate at two-year institutions is 30% while the four-year institutions report a 60% graduation rate. This wide gap of graduation rates between the two institution types can be influenced by the college mission statement. The community college mission is more than graduation, it can be to transfer to a four-year institution to continue a student’s education, to begin or continue in adult education, or to take special interest classes. All of these goals are not considered graduation; therefore, it is considered as a negative influence in the graduation rate. (McFarland et al., 2018, p.178).

The graduation rates vary from public to private institutions. Two-year private institutions have a graduation rate of 60% while the public counterpart has a 24% graduation rate (McFarland et al., 2018). The four-year institution data is reversed. Four-year private institutions have a 46% graduation rate, while the public sector has a higher rate of 59% (McFarland et al., 2018) (see Figure 5).

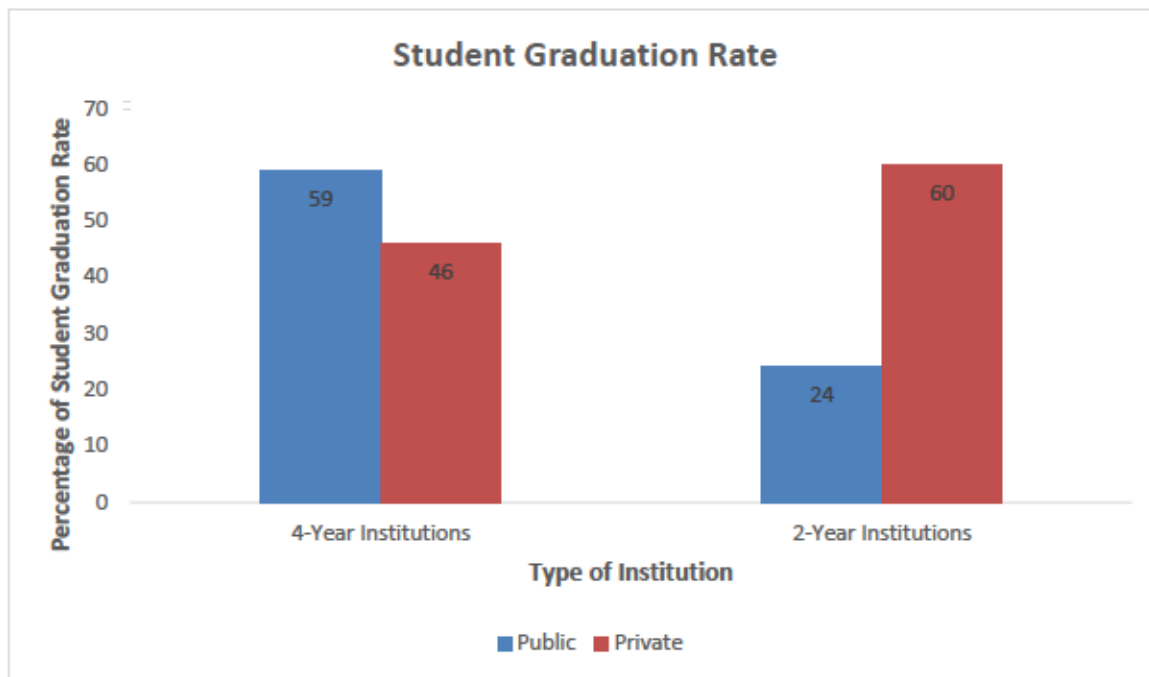


Figure 5. Graduation rates within 150% of normal time of first-time, full-time degree-seeking undergraduates at two- and four-year institutions distinguished by type of institution, in 2016.

NOT-FOR-PROFIT VERSUS FOR-PROFIT PRIVATE INSTITUTIONS

Private institutions are further divided into private for-profit and private not-for-profit schools. Private not-for-profit institutions are schools where the organization that controls the operations of the institution receives no compensation other than the day-to-day operational

cost. Private for-profit institutions are schools where the organization that controls the operations of the institution receives compensation in addition to the day-to-day operational expenses. There were more students enrolled in private not-for-profit institutions in 2016, 2.8 million, than there were in for-profit institutions, 915,000 (McFarland et al., 2018) (see Figure 6). The number of not-for-profit institutions is higher as well. In 2016, there were 1,392 not-for-profit institutions compared to 920 for-profit institutions (McFarland, et al., 2018) (see Figure 7).

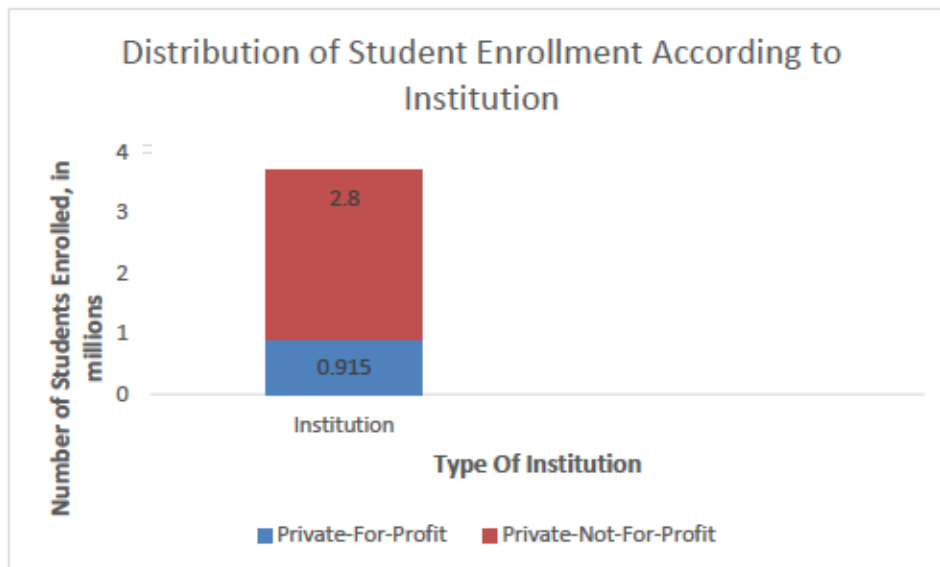


Figure 6. Student enrollment by institution type.

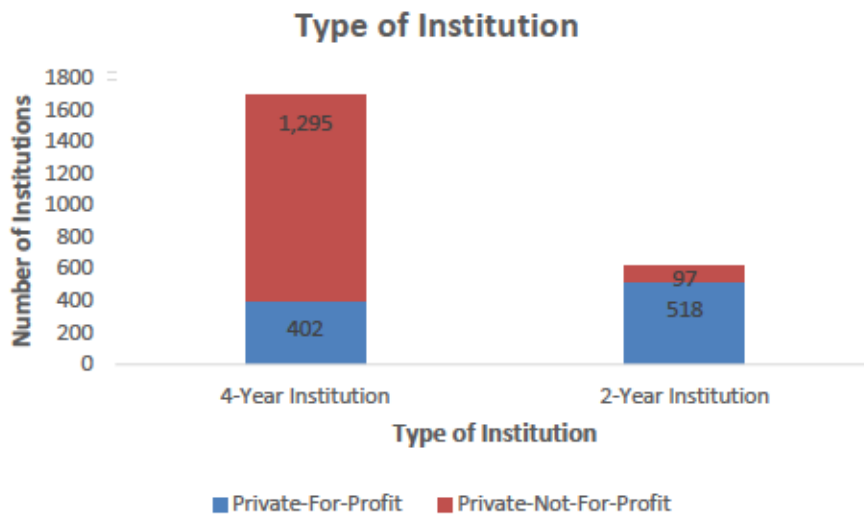


Figure 7. Number of institutions according to type.

Retention Rates

Private not-for-profit institutions have similar retention rates compared to private for-profit institutions in the two-year sector. Two-year institution retention rates between the private for-profit and the private not-for-profit are very comparable at 66% and 67% respectively (McFarland et al., 2018). This retention rate is close to the 62% at the public two-year institutions. The average retention rate at four-year institutions is at 81%; the difference between the two private institutions is staggering. Private for-profit four-year institutions have a 56% retention rate while the private not-for-profit colleges have a retention rate of 82% (McFarland et al., 2018) (see Figure 8). The bigger difference is seen through the graduation rates of two-year institutions.

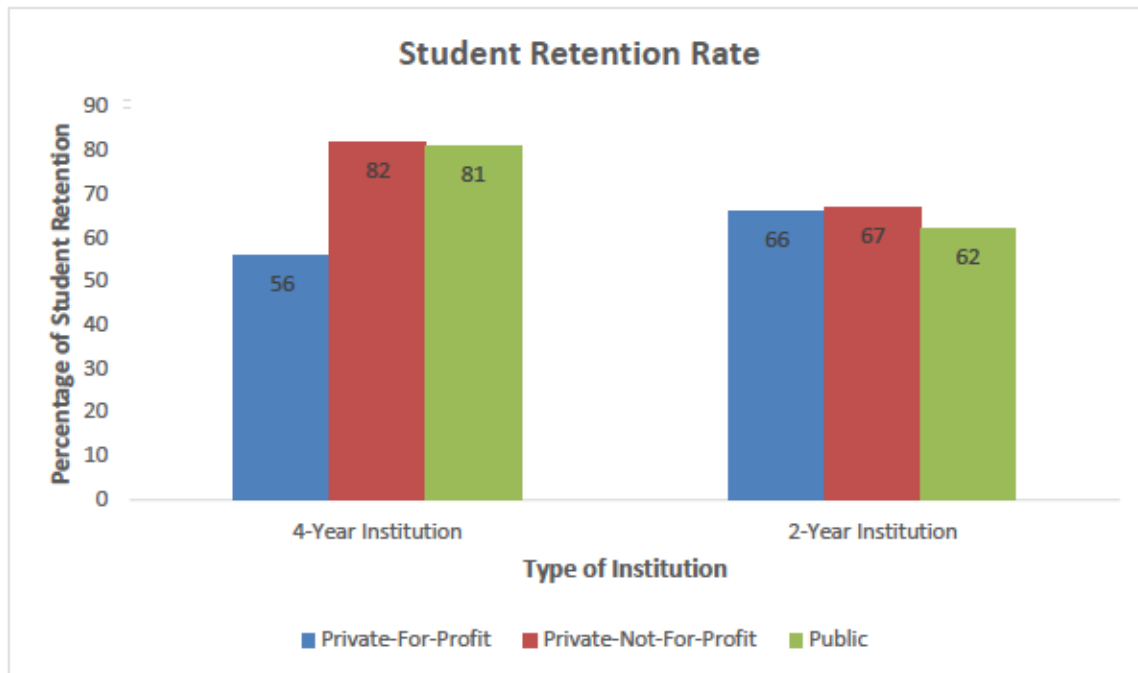


Figure 8. Percentage of first-time, full-time degree-seeking undergraduates retained at two- and four-year institutions distinguished by type of institution, in 2016.

Graduation Rates

Two-year public institutions have a 24% graduation rate, the two-year private not-for-profit as well as the two-year private for-profit graduation rate are both 60% (McFarland et al., 2018). The graduation rate data at four-year institutions are more divided. Four-year public institutions have a 59% graduation rate. Four-year private not-for-profit graduation rates are 66%, more than double that of private for-profit institutions, 26%, (McFarland et al., 2018) (see Figure 9).

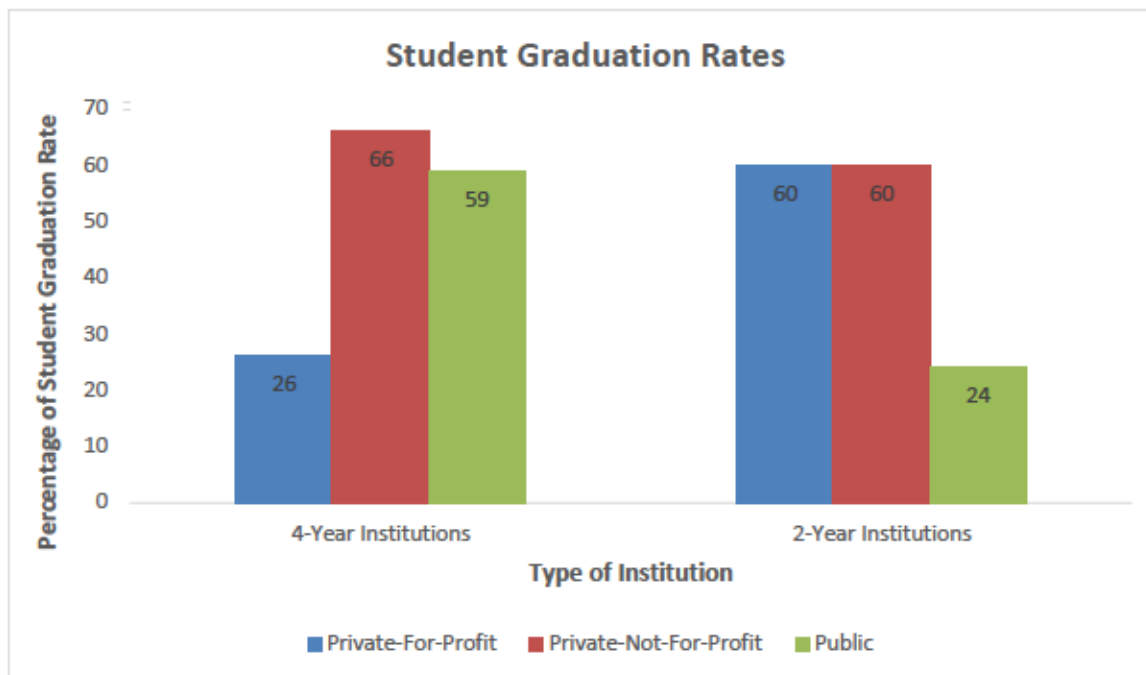


Figure 9. Graduation rates within 150% of normal time of first-time, full-time degree-seeking undergraduates at two- and four-year institutions distinguished by type of institution, in 2016.

OPEN ENROLLMENT VERSUS SELECTIVE ENROLLMENT

College admission policies differ from one institution to another and can have an effect on retention and graduation rates. Open access is defined as an enrollment strategy that grants admission to the institution to all students who wish to enroll, regardless of academic ability. This acceptance practice has been termed by the community college system as open-door policy; the college is open to anyone who wishes to apply. Since two-year institutions are largely made up with this open-door policy (98%), the data that exist in retention and graduation rates are not subdivided into different admission policies (McFarland et al., 2018). Four-year institutions are different. In this study, the category of admission policies used was based on *The Condition of Education Report* (McFarland et al., 2018) six groups: (1) open admission, (2) 90.0% or more accepted, (3) 75-89.9% accepted, (4) 50-74.9% accepted, (5) 25-

49.9% accepted, and (6) less than 25% accepted. Category six is the most restrictive admission policy.

Retention Rates

The Condition of Education 2018 Report (McFarland et al., 2018) analyzed retention data based on admission policies. Comparing four-year and two-year institutions with open access, the retention rates vary. Four-year institutions with open access admissions have an overall retention rate of 59%, 62% from public institutions and 56% from private institutions. Two-year institutions have 62% from public institutions and 66.5% from private institutions (McFarland et al., 2018). Both two-year and four-year public open admissions institutions have a 62% retention rate (see Figure 10).

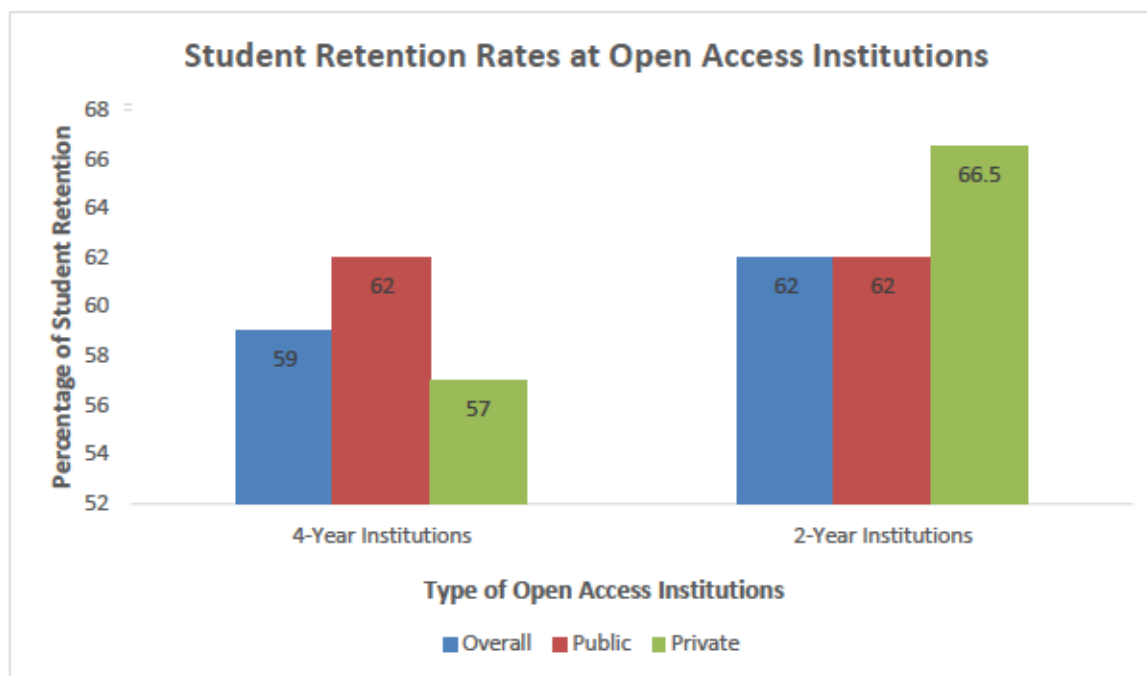


Figure 10. Percentage of first-time, full-time degree-seeking undergraduates retained at two- and four-year institutions distinguished by type of open-access institutions, in 2016.

The data show a wider gap of retention rates when comparing four-year institutions with open access to institutions with a less than 25% acceptance rate. Public four-year colleges with open admission policies had retention rates of 62% while public four-year colleges with selective admissions (less than 25% acceptance rate) had an average retention rate of 96% (McFarland et al., 2018). Private four-year institutions with open admission had an average retention rate of 57% and those private four-year institutions with selective admissions (less than 25% acceptance rate) had an average retention rate of 97.5% (McFarland et al., 2018).

Open-access institutions have a much lower retention than institutions that have a less than 25% selective admission acceptance rate. This is also true when comparing for-profit institutions and not-for-profit institutions. The four-year private institutions that have an open admission policy have a 50% retention rate in the for-profit colleges and a 64% retention rate in the not-for-profit colleges (McFarland et al., 2018). When a less than 25% selective acceptance admission policy is utilized, the retention rates soar. With a less than 25% acceptance policy in place, for-profit four-year institutions have a 100% retention rate, and not-for-profit institutions have a 95% retention rate (McFarland et al., 2018) (see Figure 11).

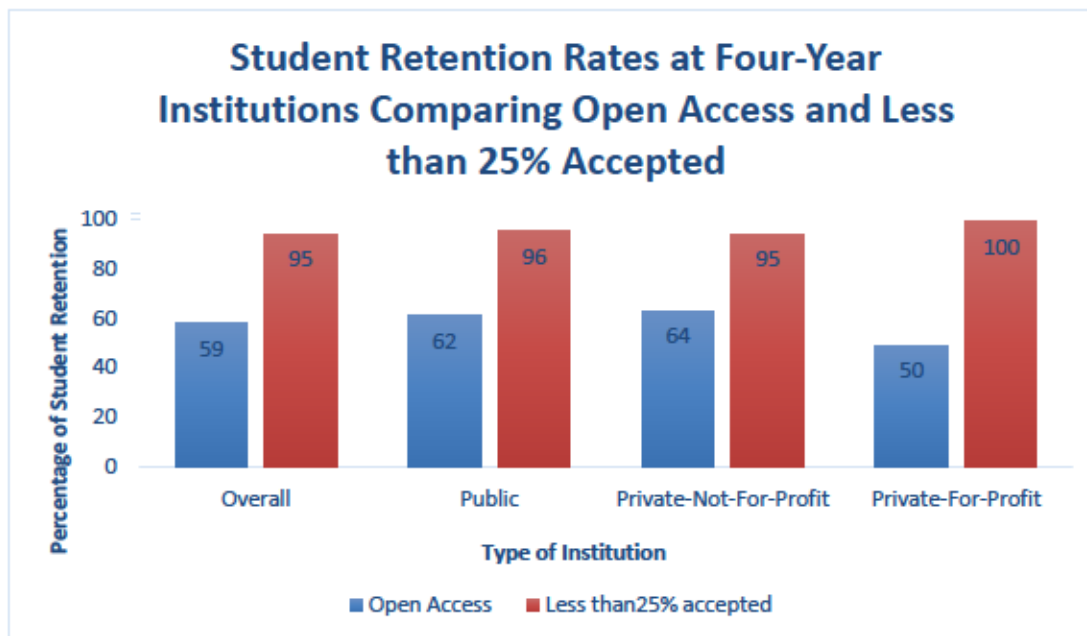


Figure 11. Percentage of first-time, full-time degree-seeking undergraduates retained at four-year institutions distinguished by type of institutions and admission policy, in 2016.

Graduation Rates

According to *The Condition of Education 2018 Report* (McFarland et al., 2018), open-access institutions have comparable graduation rates. Four-year institutions with open access have a 32% graduation rate, and two-year institutions have a 30% graduation rate. When comparing graduation rates with institutions that have open-access admission policies and with those institutions that have a selective, less than 25% acceptance rate, that data is noteworthy. McFarland et al. (2018) reported that in 2016, open-admission four-year colleges graduation rate was 32%, and the graduation rate of selective admission with less than 25% accepted was at 88%. Pike's 2013 research supports this data. Pike stated that when selective admission is used, there are higher retention and graduation rates (see Figure 12).

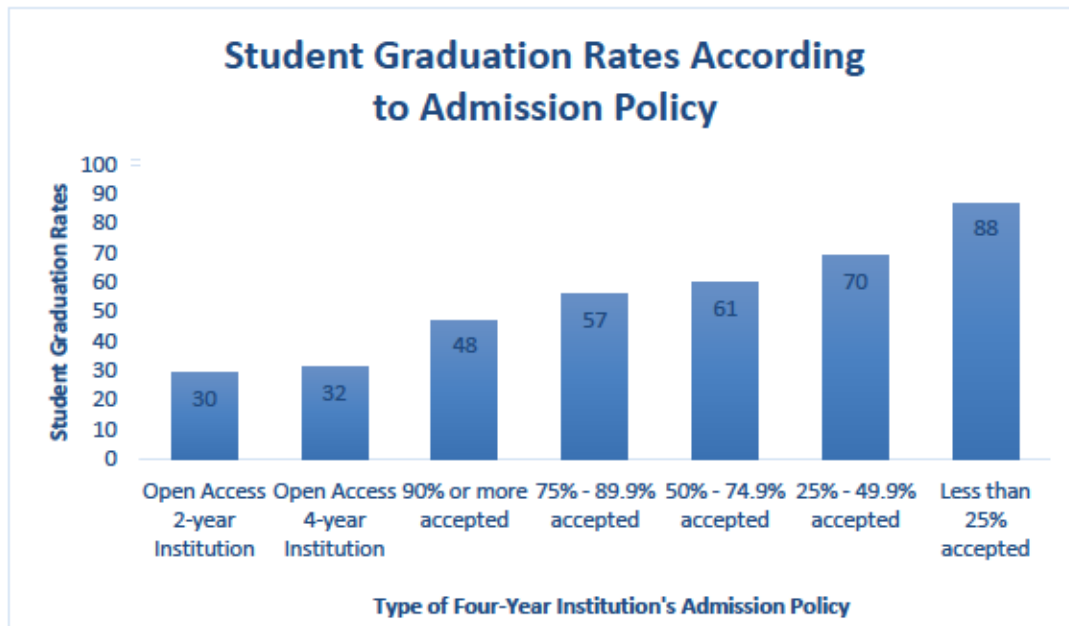


Figure 12. Graduation rates within 150% of normal time of first-time, full-time degree-seeking undergraduates at two- and four-year institutions distinguished by type of institution and admissions policy, in 2016.

ON-CAMPUS HOUSING VERSUS OFF-CAMPUS HOUSING

On-campus housing is typically offered at four-year institutions and typically not an option at two-year institutions. According to the American Association of Community Colleges (2016), in 2015 about 28% of community colleges offer on-campus housing. Less than 1% of all community college students actually live on-campus, according to the same source. On-campus housing is defined as a dorm or apartment that is provided by the institution for the purpose of education. Two-year institutions that provide on-campus housing options are rare. Therefore, most research regarding on-campus housing and retention rates have been with four-year institutions.

Retention Rates

The relationship of on-campus housing and retention has been studied on the four-year college campus. The results support the positive correlation between on-campus housing with retention and graduation rates. Astin's 1999 research showed "living in a campus residence was positively related to retention, and this positive effect occurred in all types of institutions and among all types of students regardless of sex, race, ability, or family background" (p. 523).

Graduation Rates

Additional research explored the effect of on-campus housing on the school's graduation rate. Hajrasouliha and Ewing (2016) discovered a 2.43% increase in graduation rate with a 10% campus-wide increase in on-campus housing residents. Ryan (2004) and Scott et al. (2006) also researched the effects of on-campus housing to the retention rate. Both studies showed a positive correlation between on-campus housing and graduation rate.

INSTITUTIONAL CHARACTERISTICS AS THEY RELATE TO RETENTION AND GRADUATION RATES

In 2016, there were more four-year institutions than two-year institutions (Figure 3). There are more four-year private institutions than four-year public institutions. There are more private not-for-profit four-year institutions than private for-profit four-year institutions (Figure 7). At the two-year institution level, the opposite is true. There are more public two-year institutions than there are private two-year institutions (Figure 3). There are more two-year private for-profit institutions than two-year private not-for-profit institutions (Figure 7).

Of the students enrolled at a postsecondary institution, 64% are enrolled at a four-year institution and the remaining 36% at a two-year institution (McFarland et al., 2018). An

overwhelming number of students enrolled in college are enrolled at a public institution. Of the 16.9 million students enrolled in 2016, 13.1 million of them were enrolled at a public institution, while the remaining 3.8 million were enrolled in a private institution (Figure 2). Private not-for-profit enrollment was higher than private for-profit institution student enrollment (Figure 6).

Overall student retention rate is higher at four-year universities than at two-year institutions (Figure 4). When broken down further, four-year private for-profit institutions is lower than the two-year institutions (Figure 8). With an open-admission policy constant, the public two- and four-year institutions have the same retention rate of 62% (McFarland et al., 2018) (Figure 10). When a selective admission policy is utilized, the stricter the admission policy, only accepting 25% of the applicants, results in higher graduation rates (Figure 11).

Student graduation rates vary between the two- and four-year sector as well as the public and private sector. The highest graduation rates are from the two-year private institution followed by the four-year public institutions (Figure 5). At the four-year institutions where a selective admission policy is applied, the stricter the policy, the higher the graduation rate (Figure 12).

HISTORY OF DENTAL HYGIENE

The creator of dental hygiene was a dentist by the name of Dr. Alfred Fones. Dr. Fones, also known as the father of dental hygiene, trained the first dental hygienist and established the first school of dental hygiene in 1913 in Bridgeport, Connecticut (Memoli & Lorentzen, nd).

Irene Newman became the first licensed dental hygienist and worked under the direction of Dr. Fones. The first class of dental hygiene students graduated in November 1914.

History of Dental Hygiene Educational Programs

The dental hygiene curriculum began as a one-year program and soon evolved to a two-year program at the University of Minnesota in 1919. The first state to license dental hygienists was Hawaii in 1924. By 1926, a mere two years later, the number of states that licensed dental hygienists grew to 30. By 1952, all 50 states licensed dental hygienists. In 1953, there were 21 accredited dental hygiene programs in the United States. In 1939, a baccalaureate degree was designed at the University of Michigan, followed by a master's degree in dental hygiene. Columbia University and the University of Iowa followed by developing their own master's degree in dental hygiene in the 1960s. In 1986, the American Dental Hygienist Association (ADHA) advocated for the minimum degree entry for a dental hygienist to be a baccalaureate degree (ADHA, 2013; Wilkins, 2018). But 30 years later, the majority of dental hygiene education programs (82.69%) are awarding a two-year associate degree (ADA, 2016).

Dental hygiene education was established as a two-year curriculum a year after being established as a profession. This two-year education began in four-year institutions and remained until the 1960s when community colleges were being built at a rate of one per week (Young, 1996). By 1978, there were 196 dental hygiene programs compared to 26 in 1950 (Solomon, 2012). This explosion of programs was being implemented in the community college setting.

According to the ADA (2016), 8,279 first-year students were enrolled in a dental hygiene program in the 2015-2016 academic year. Of these students, 29% (2,409) were enrolled at a four-year institution, while 71% (5,870) were enrolled at a two-year institution. The reason for this shift in demographics compared to the overall undergraduate student is because the number of four-year institutions that provide a degree in dental hygiene is lower than the number of two-year institutions. There are only 87 four-year institutions in the United States that provide a degree in dental hygiene compared to 248 two-year institutions (ADA, 2016).

RETENTION RATES IN DENTAL HYGIENE PROGRAMS

There are few studies on student retention in the field of dental hygiene. However, the ones that do exist focus on attrition versus retention or graduation rate versus retention rate. Those dental hygiene studies that discuss retention rate actually researched graduation rate according to the definition used in this study. Those dental hygiene research studies that identify attrition identify it as the opposite of graduation rate. Therefore, the literature review identifies only graduation rates and attrition rates as the research is only providing these data.

In 2016, according to the ADA, 49 institutions offer a bachelor's degree in dental hygiene; this equals 14.62% of all degree programs (ADA, 2016). Bachelor-degree dental hygiene programs have a lower attrition rate than associate-degree dental hygiene programs (Moore et al., 2016). Associate-degree dental hygiene program retention rates vary depending on the resource used. The ADA publishes annual data that include retention rates. This database revealed the graduation rate of the class of 2014 to be 88% (ADA, 2016). Sanderson's research in 2014 discovered a 91% graduation rate of associate degree, bachelor's degree, and

certificate programs in dental hygiene. In her 2005 study, Holt revealed an 83% graduation rate of associate-degree dental hygiene students.

RETENTION RATES IN ALLIED HEALTH CAREER PROGRAMS

Numerous studies in student retention exist in allied health career programs, especially in nursing. Lancia, Petrucci, Giorgi, Dante, and Cifone (2013) researched retention of nursing students. They discovered an overall graduation rate for bachelor-degree students to be 61.2%. Peruski discovered similar results with associate-degree nursing students. Peruski explored nursing retention rates according to program readiness variables. He determined an overall associate-degree graduation rate of 60.04% (2016). Radiography associate-degree programs have an 81% graduation rate according to Kudlas (2006).

SELECTIVE ADMISSIONS IN ALLIED HEALTH

Limited enrollment programs, such as dental hygiene, often have selective admission policies. This policy takes all applicants and ranks them from top to bottom utilizing specific criteria. The most common preadmission criteria are college science course GPA (251 schools), overall college GPA (240 programs), and college non-science GPA (164 programs) (ADA, 2016) (see Figures 13 and 14). Once students are ranked, the program takes the number of top students the program allows. According to the ADA (2016), in the past ten years, the average acceptance rate according to the number of applications ranged from as low as 26.49% in 2007-2008 to as high as 31.65% in 2015-2016. There have been numerous dental hygiene studies researching admission criteria and retention rate.

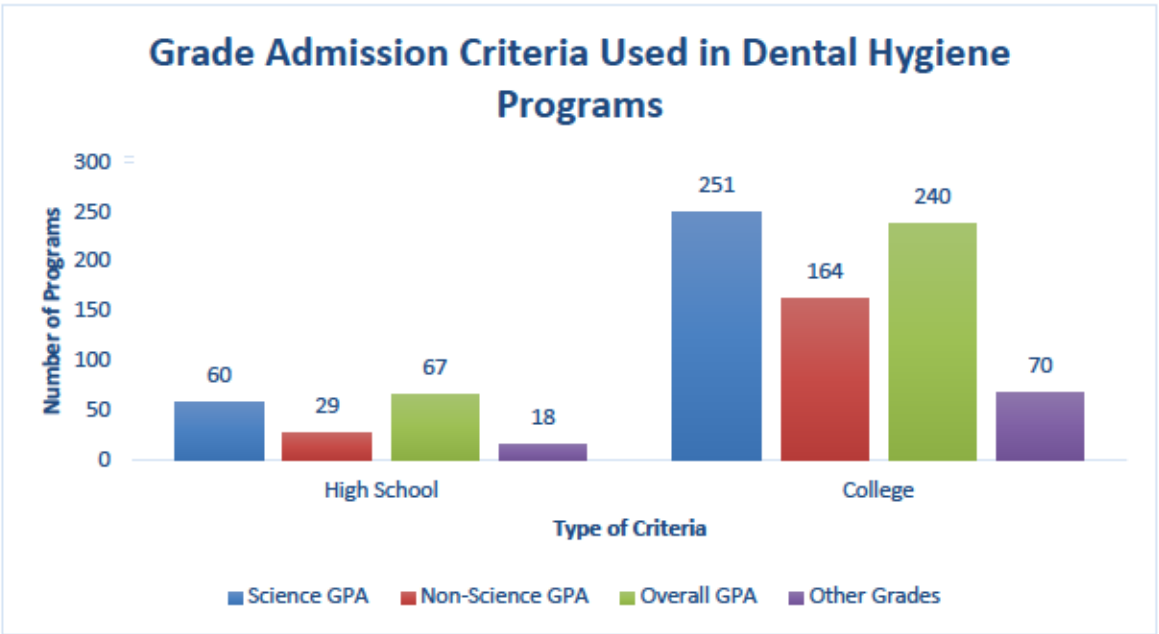


Figure 13. Grade criteria used in the admission process of dental hygiene programs (programs can use more than one criterion). (ADA, 2016)

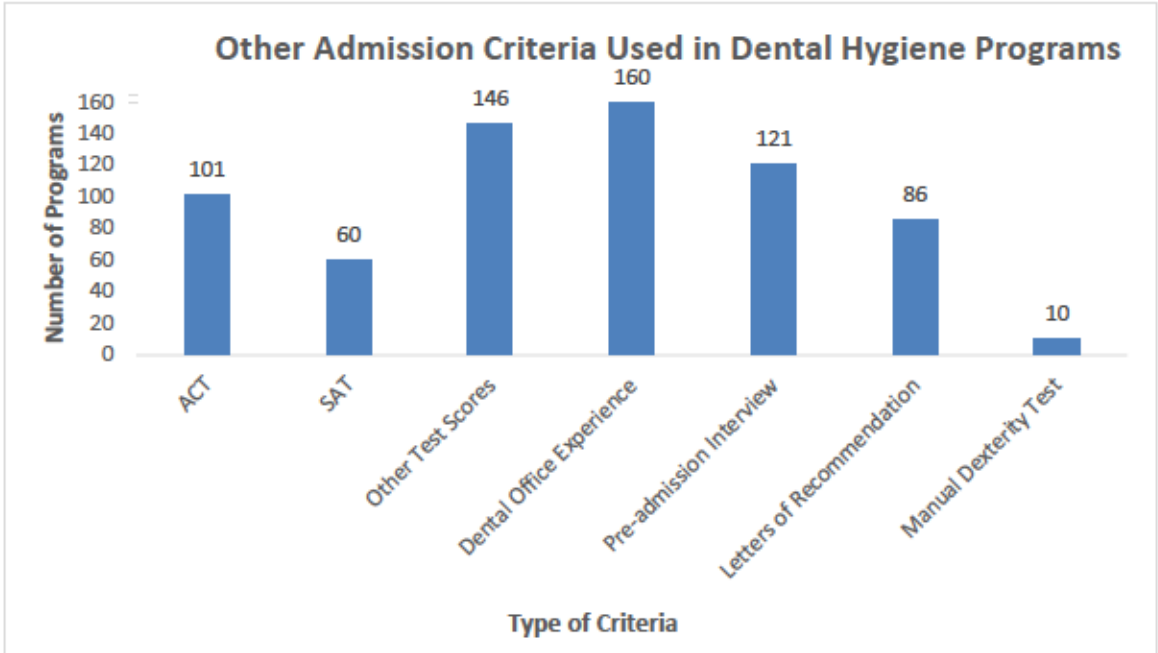


Figure 14. Other criteria used in the admission process of dental hygiene programs (programs can use more than one criterion). (ADA, 2016)

PREREQUISITES VERSUS NO PREREQUISITES

Limited-enrollment programs, such as dental hygiene and nursing, often have prerequisite courses as a stipulation for application. Prerequisite courses can include English composition, chemistry, microbiology, speech, anatomy and physiology, sociology, psychology, etc. The average number of credit hours required prior to the admission into an associate-degree dental hygiene program in 2015 was 15.8 (ADA, 2016). In the 2015-2016 academic year, 76.7% of the all dental hygiene programs required prerequisite courses (ADA, 2016). Seventy-two associate-degree dental hygiene programs out of 282 (25.5%) do not require any prerequisites (ADA, 2016).

The studies show that high school GPA is a good predictor of success (Bauchmoyer, Carr, Clutter, & Hoberty, 2004; DeAngelis, 2003; Sanderson, 2014; Ward, Downey, Thompson, & Collins, 2010). Science GPA has shown a positive correlation to retention rates in dental school (Sandow, Jones, Peek, Courts, & Watson, 2002). Incoming SAT and ACT scores have also been shown to predict positive retention rates in dental hygiene programs (DeAngelis, 2003; Ward et al., 2010). Once admitted into a dental hygiene program, a student's grade in oral pathology is predictive of success in degree completion (Alzahrani, Thompson, & Bauman, 2007).

Nursing programs also have selective admission policies similar to dental hygiene. ACT and SAT scores predict successful nursing program completion as well as dental hygiene program completion (Gilmore, 2008; Grossbach & Kuncel, 2011). Admission GPA is also a positive predictor for retention in nursing (Grossbach & Kuncel, 2011; Timer & Clauson, 2010). Grades in psychology (Abele, Penprase, & Ternes, 2013), anatomy and physiology (Gilmore, 2008), and science courses predict success in nursing programs (Pitt, Powis, Levett-Jones, &

Hunter, 2012). Students who have language barriers or have English as a second language have a higher risk of failing (Porter, 2008; Rogstad, 2014). Radiography program results are similar to nursing and dental hygiene programs. Studies in radiography confirm incoming GPA as a predictor of retention (Kudlas, 2006) and Kwan, Childs, Cherryman, Palmer, and Catton's (2009) research discovered undergraduate math scores to be a positive predictor of graduation rates.

BARRIERS TO SUCCESS

Retention and graduation rates can vary for a number of reasons. As Tinto (1998) explains with his student integration theory, social and academic integration of a student to the college can help a student persist with their educational goal.

Evidence suggests that academic and social integration are more important to persistence in the four-year institutions than in the two-year ones. But such differences are more likely the reflection of the varying academic and social attributes of institutions and the students they serve than of the underlying process of persistence. (p.169)

Students who attend four-year institutions have different barriers than students at two-year institutions. The barriers that community college students face are serious and can determine if a student will graduate (Bailey et al., 2006). These community college student barriers cannot be "fixed" by the institution or its policies. Students who do not have a defined educational goal, who anticipate having financial issues, and who are highly active outside of college have higher attrition rates (Hawley & Harris, 2005). Students who delay college entry (Hawley & Harris, 2005) and nontraditional students have lower retention and graduation rates (Bean & Metzner, 1985; Brock, 2010; Scott et al., 2006). According to Bailey et al. (2006), "Studies consistently find that the typical characteristics of community college students are

those that predict lower graduation rates. Yet, as indicated, attempting to improve graduation rates by becoming more selective would violate one underlying mission of the colleges” (p. 499).

Dental hygiene students have their own unique barriers to success. Lack of advancement of clinical skills and not being satisfied with career choice are two of them (Holt, 2005). Clinical skills are complex and involve dexterity, tactile sensitivity, and psychomotor skills (Freudenthal & Bowen, 2010). These skills are difficult to acquire and require hours of practice to obtain. There are other barriers dental hygiene students face that are similar to community college students: academic underachievement, responsibilities with family, financial issues, and too many work-hour commitments are all barriers to success that have been identified through Holt’s 2005 research. Rogstad (2014) studied the attrition rates in associate- degree nursing students and found that the students who dropped out did so because of family responsibilities.

Critical thinking skills are needed in dental hygiene as well as nursing. Critical thinking skills enable nurses and dental hygienist to assess, diagnose, and treat their patients’ conditions. Pitt et al. (2012) found that nursing students who lack critical thinking skills had higher attrition rates. Problem-solving skills are also needed in managing the nursing or dental hygiene course load: “The demands of juggling heavy semester-hour course loads, course examinations, clinical competencies and requirements, presentations, projects, and national and regional/state board preparations can be taxing” (DeAngelis, 2003, p. 53).

CHAPTER THREE: METHODOLOGY

INTRODUCTION

The dental hygiene retention rate is a factor in budgetary concern at institutions. Efforts to increase retention in dental hygiene programs is a benefit to the program as well as the institution. This study examined the relationship between institutional setting and retention rates at associate-degree dental hygiene programs. This research identified the reason associate-degree dental hygiene students are not successful and determined if the reason is related to the institutional settings. This chapter describes the research questions, research design, sample, instrument design, and method of analysis.

RESEARCH QUESTIONS

Determining if there is a relationship between retention rate and institutional setting is valuable information for the future of dental hygiene. Additionally, determining if the reason a student is not successful is related to the institutional setting can be helpful to programs planning for future cohorts.

1. What institutional factors affect retention rates?
 - a. Institutional setting?
 - b. On-campus housing?
 - c. Public versus private-for-profit institutions?
 - d. Public versus private-not-for-profit institutions?

2. Is there a relationship between early/rolling admission and the retention rate?
3. Is there a relationship between the specific barriers to student success and the institutional setting?
 - a. What is the most common reason associate-degree dental hygiene students are not successful?
 - b. Which semester is the most common semester an associate-degree dental hygiene student is not successful?

HYPOTHESES

The hypotheses in this research are the following.

- There will be a difference in retention rates of students between associate-degree dental hygiene programs who are in four-year institutions and two-year institutions. There will also be a difference in student retention rates between dental hygiene programs that are in community/junior colleges, technical/career colleges, and four-year institutions.
- There will be a difference between the retention rates of associate-degree programs that have early/rolling enrollment and programs that have selective enrollment, on-campus housing and off-campus housing, and public versus private institutions.
- The main reason an associate-degree dental hygiene student is not successful will be a different depending on the institutional setting.

RESEARCH DESIGN AND PROCEDURES

Methodology

The main purpose of this research is to determine if there is a relationship between retention rate and institutional setting. An additional purpose of this study is to explore if there is a connection between the barrier to success and institutional setting. Does the institutional setting make a difference on associate-degree dental hygiene student retention rates? Does the institutional setting make a difference in the reason associate-degree dental hygiene student is not successful?

Research Design

The objective of this research is to determine if there is a relationship between the institutional setting and the retention rate of associate-degree dental hygiene students. The design for this research is a non-experimental with a quantitative structure and a correlational design. This study uses the institutional setting as the independent variable and retention rate as the dependent variable. The independent variable is comprised of nominal data: community college, technical/career college, dental school, or four-year institution. The dependent variable contains ratio data. A correlation design is chosen to explore the relationship between the type of institution and retention rate.

The research continues this correlational design in exploring the other objectives associated with retention rates and institutional setting. The dependent variable remains the same with retention rate containing ratio data. The changed independent variables contain nominal data: on-campus housing versus commuter schools, public versus private institutions, and early/rolling enrollment versus standard enrollment.

Another objective of this research is to determine if there is a relationship between the barriers to student success and the institutional setting. This research is non-experimental with a quantitative structure and correlational design. The study uses the institutional setting as the independent variable and the dependent variable as the reason students are not successful in an associate-degree dental hygiene program. The independent variable contains the same nominal data variables as stated above: community college, technical/career college, dental school, and four-year institution. The dependent variable includes nominal data. The specific categories of the dependent variable contains the top ten reasons students in dental hygiene

are not successful as determined by the research of Holt (2005) and Moore et al. (2016): clinical skills not developing, academic underachievement, dissatisfaction with career choice, family and personal responsibilities, time restraint due to work commitments, not adhering to departmental or college policies, health condition, financial restraint, cultural issues/conflicts, and geographic location.

The research continues this correlational design to explore the other objectives associated with the reason a student is not successful and the institutional setting. The dependent variable is the same nominal data of the top ten barriers to success. The independent variable changes to on-campus housing versus commuter schools, early/rolling enrollment versus standard enrollment, and public versus private, not-for-profit and private, for-profit schools.

Additional associate-degree dental hygiene program data was collected and showed the average number of semesters in a curriculum, most frequent semester students are not successful, the average number of credit hours awarded at graduation, the number of programs that require prerequisites, and the average number of cohorts accepted in an academic year. This additional data collected will aid in future associate-degree dental hygiene program planning.

The researcher has chosen a non-experimental design since the groups are not randomly assigned and there is no control group or multiple measures. This type of design is the weakest in providing a causal relationship. The research's purpose is to determine a correlation between two variables, not a causal relationship. Therefore, a non-experimental, correlational design is a good choice.

The researcher is aware of the weak internal validity and reliability threat of this type of design. Efforts were made to reduce these risks by implementing strategies in the design of the study. The survey was piloted and edited prior to administration. This piloted survey aided in the validity of the survey questions by assuring the questions that were asked resulted in the needed information to be measured. The distributed survey was the same throughout the study, thus reducing the reliability threat. Since generalizations were made to describe the correlation between the variables and not causal, external validity is not a concern.

Sample

According to the ADA (2016), 277 dental hygiene programs in the United States award an associate degree in dental hygiene (Table 5). The population the research is targeting is these 277 associate-degree dental hygiene programs. The sample size needs to be large enough to endorse external and internal validity, but not too big that the researcher is incapable of concluding the research in a timely manner. The sample was chosen through a stratified random selection method. This method assured that the sample is reflective of the entire population. According to the ADA (2016, Table 2), 248 associate-degree dental hygiene programs are offered in a two-year institution, which correlated to 89.53% of the population. According to this same source, there are 29 associate-degree dental hygiene programs affiliated with a four-year institution. This correlated to 10.47% of the population (see Figure 15). To maintain a 5% error margin and a 95% confidence level, the target sample size is 150 associate degree institutions. In this stratified sample, 135 surveys were delivered to two-year

institutions (90% of the sample size) and 15 surveys were distributed to four-year institutions (10% of the sample size). Utilizing a 5% error margin will strengthen the research validity.

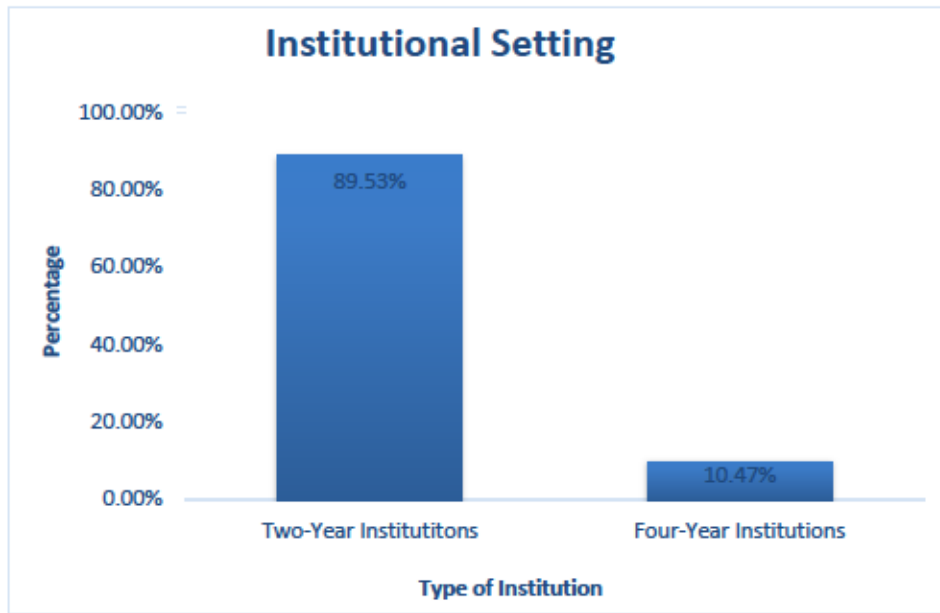


Figure 15. Type of institution setting of associate-degree dental hygiene programs.

Instrumentation

The main purpose of the research is to determine if there is relationship between associate-degree dental hygiene student retention rates and institutional setting. The second purpose is to explore whether there is a connection between barriers to student success and the institutional setting. The level of measurement was an online survey. The target respondents of this survey were program directors of an associate-degree dental hygiene program. The survey was initially piloted to increase the validity of the instrument and distributed through SurveyMonkey. SurveyMonkey is an independent company that launches the survey, stores data, and provides data access to the researcher, all while maintaining the

anonymity of the participants. The program directors were given a four-week time frame to complete the survey. A reminder e-mail was distributed after two weeks and again after three weeks. The survey was closed after the four-week time frame has expired.

The online survey consisted of structured and unstructured questions. Multiple choice and open-ended questions were included to help aid in collecting the needed information. Making sure the survey questions were clear and concise without confusion increased reliability. What aided in the reliability and validity of the instrument was to ensure that answers to the survey questions did not overlap, that all possible answers were provided, and providing an “other” option so respondents had the opportunity to write in an answer of their choosing (see appendix A).

Data Collection

The data from the survey was collected by SurveyMonkey and provided to the researcher. SurveyMonkey reported the data in a Microsoft Excel spreadsheet so the researcher could download the results. The program data could not be traced to the institution it originated from as this is a feature of SurveyMonkey and a trustworthiness aspect of the research design. If there was any issue relating to validity and reliability, it would be due to the manipulation of data through the Excel spreadsheets. This issue can be reduced if the Excel data is double checked with the SurveyMonkey data by an independent source.

Data Analysis

The descriptive statistics utilized for the main objective of the research are the mean retention rates per program. The range and standard deviation were also used in the data

analysis. A *t* test was used when there were only two variables being analyzed: retention rate and another variable. ANOVA is utilized to determine if there is a relationship between multiple variables. An alpha value of 0.05 was used throughout the study to analyze significance. The descriptive statistics utilized for the secondary objective of the research was the mode of the barriers to success.

The mode was chosen to use for the barriers to success because both variables involve nominal data; therefore, a central tendency of the most frequent answer is appropriate. The mean retention rate was chosen to acquire the average of ratio data. This ratio data was then utilized in the ANOVA test to explore if there is any relationship between retention rate and institutional setting.

LIMITATIONS AND DELIMITATIONS

The primary limitation of this study is the self-reporting of the institutions through the survey. Trust is being placed in the reporting of the data by the dental hygiene program's director. Data was triangulated with the ADA database to help sift through inaccuracies. An additional limitation of this study is the possibility that the definition of retention is misunderstood by the program directors responding to the survey. Defining the term retention and placing this definition in the survey question reduced misunderstanding.

CONCLUSION

The implications of this research can be plentiful for dental hygiene. If the research demonstrates there is a relationship between institutional setting and retention rates or institutional setting and the barriers to student success, the future in dental hygiene education

may change. This data may influence the placement of new dental hygiene programs to specific institutional settings that yield higher retention rates. The results of this survey may question the open-access admission policy of community colleges and question whether a community college is the best institution for a successful dental hygiene program.

The results of this study may spark future studies involving dental hygiene retention and remediation strategies. Future studies detailing specific barriers to success for dental hygiene students in associate-degree program might emerge. These identified barriers may lead to remediation strategies that are specific to the institutional setting, thus leading to an overall increase in associate-degree dental hygiene student retention rates.

The implications of the study may influence the admission process of dental hygiene programs. The results of this research may explain if there is a relationship between retention rates and open/rolling enrolment. If a relationship is identified, dental hygiene programs may change their admission policies to align with the admission policies of higher retention rate institutions. The study also describes if there is a relationship between the required prerequisites and retention rate. This conclusion may change programs process of admissions.

The results of the data may influence the curriculum of dental hygiene programs. The data described in this study will inform dental hygiene programs the average credit hours awarded for an associate degree in dental hygiene and the average number of semesters the curriculum includes. This data may guide programs to make changes in their curriculum in the direction of the collected data.

The implications of this research may be useful in other allied health career programs. Institutions have multiple associate degree applied science programs that may experience

retention issues. The framework and design of this study can be replicated and applied to these programs to gain an understanding of the relationship between institutional setting and student retention rates in a specific health career.

CHAPTER FOUR: RESULTS AND FINDINGS

INTRODUCTION

The purpose of this study was to explore the relationship between institutional setting and student retention rates in dental hygiene associate degree programs. Retention rates play an important part of a college's image, ranking, and perception of quality of education. Retention rates at two-year institutions are lower than four-year universities (Astin, 1999; McFarland et al., 2018). Thus, this study was created to investigate the retention rates of associate-degree dental hygiene programs in two-year institutions and four-year institutions.

This study further investigated the relationship between the institutional setting and the factors relating to a student being unsuccessful in an associate-degree dental hygiene program. Multiple studies show a lower retention rate among students in two-year institutions due to the multiple barriers these students face compared to students in four-year institutions (Bailey et al., 2006; Baird, 1990). This study attempted to identify if there is a relationship between the reason a dental hygiene student was not successful and the institutional setting.

DESCRIPTIVE STATISTICS RESULTS

SurveyMonkey was used to distribute the research survey to 150 associate-degree dental hygiene programs around the United States. Ninety-five programs opened the survey, 50 program surveys were unopened, and five programs opted out of taking the survey. Fifty-seven programs responded to the survey in the four-week time frame the survey was open. Of the 57

programs that completed the survey, one program identified itself as a bachelor-degree granting program; therefore, this survey was excluded from the data collection. Of the 56 programs that responded to the survey, 39 completed the entire survey and 17 partially completed the survey.

Educational Setting Section: Survey Question #1: Findings and Results

Research question number 1 stated: How would you describe the educational setting of your dental hygiene program? The exact setting of the dental hygiene program is relative given that the data was analyzed with regard to the institutional setting. All 56 respondents answered this question. Forty programs, or 71.43%, identified their institutional setting as a community college or a junior college. Ten respondents stated their program was affiliated with a technical college or career college. Five programs responded that their program is in a four-year institution, one program answered other and identified the institution as offering four baccalaureate programs and over 20 associate-degree programs. Figure 16 shows the distribution of institutions.

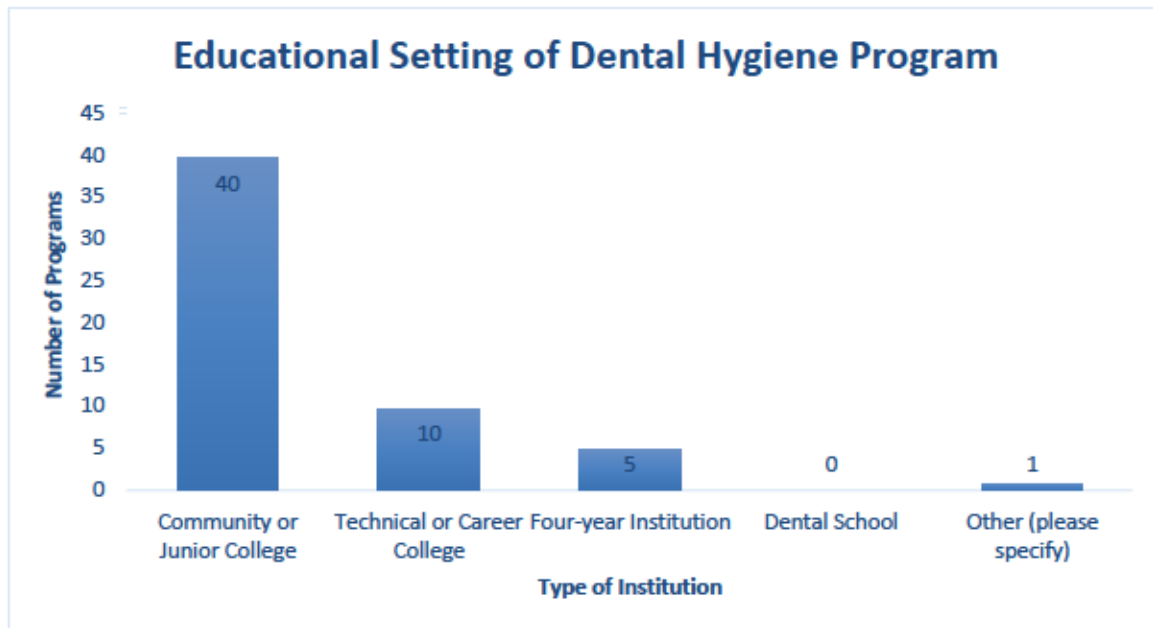


Figure 16. Distribution of dental hygiene educational setting.

Educational Setting Section: Survey Question #2: Findings and Results

Research question number 2 stated: Which of the following describes your institution?

This question was asked to see if there is a correlation between public, private for-profit, and private not-for-profit institutions regarding retention rates. All of the respondents in the survey answered this question. The majority of the institutions, 91.07%, identified as public institutions. Four institutions stated they are affiliated with a private for-profit institution and one identified as a private not-for-profit institution. See Table 2 for the type of distribution.

Table 2: Type of Institution

Institution Type	Number of Responses	Percent
Public	51	91.07
Private, for-profit	4	7.14
Private, not-for-profit	1	1.79
Other (please explain)	0	0.00
Total	56	100.00

Educational Setting Section: Survey Question #3: Findings and Results

Research question number 3 asked: Does your institution provide student housing on campus? This question was asked to explore the relationship between on-campus housing and dental hygiene retention rates. Everyone participating in the survey answered this question. Fourteen of the 56 programs responded that their institution has on-campus housing, while 39 programs do not have on-campus housing available for their dental hygiene students. Three programs responded as other. Two programs explained that the available housing is located on the main campus, not the one in which the dental hygiene program is located. The third program explained the on-campus housing available is a half-mile off campus. Figure 17 shows the distribution of on-campus housing in the survey results.

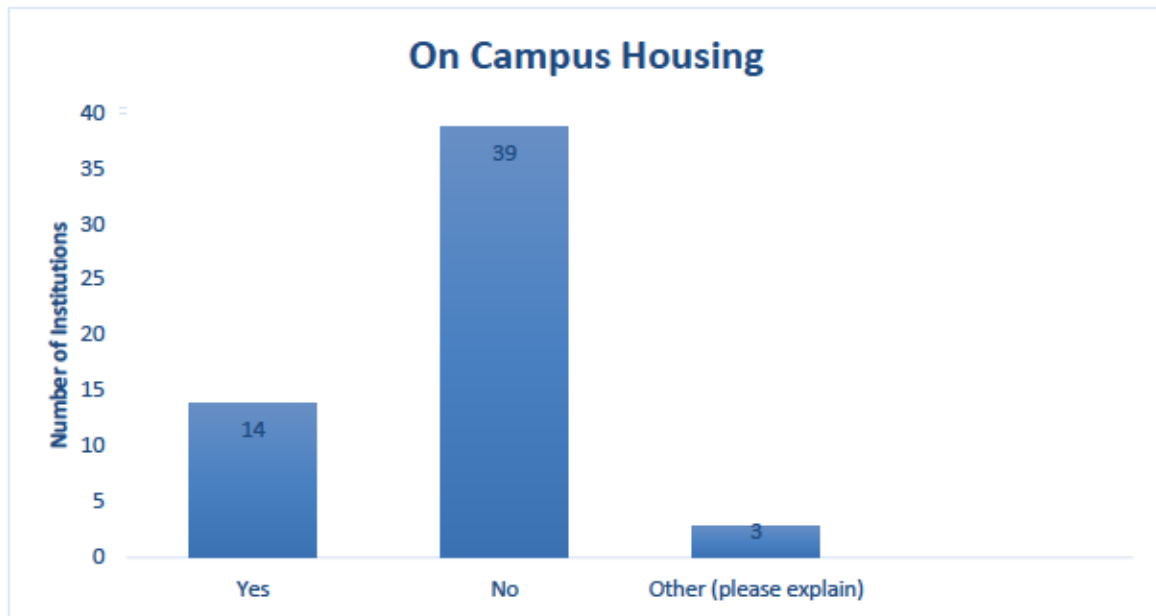


Figure 17. On-campus housing.

Educational Setting Section: Survey Question #4: Findings and Results

Research question number 4 asked: What degree do the students in your dental hygiene program earn at the end of your curriculum? This question was included in the survey to verify that the data only included associate-degree programs. All 56 programs included in this study answered this question. The majority of institutions, 55 out of 56, stated that associate degree was the end degree for their dental hygiene program. One program stated other and explained the end degree as either an associate degree or a bachelor's degree. (One survey returned stated bachelor's degree as their terminal degree and was eliminated from the data collection due to this information.)

Dental Hygiene Program Section: Survey Question #1: Findings and Results

This survey questions asked: How many semesters is the curriculum in your dental hygiene program, not including prerequisites? (If your program is not on a semester format, please estimate the number of semesters it would be using a 15/16-week semester format.) This question was asked to investigate the relationship between the number of semesters in an associate-degree program and student retention rate. Two respondents skipped this question leaving fifty-four responses. Half of the programs that responded run a five-semester format, followed by a four-semester program, 29.63%, and a six-semester program, 11.11%. One program operates with a seven-semester program. Four respondents marked other as the option on the survey. One program wrote that their program was six quarters and it was estimated at four semesters. Another program reported their program is four semesters, but 17-weeks long. The third program indicated their program was four full semesters and one summer term. The fourth program identified their program containing four semesters and two summer terms. Table 3 illustrates the findings.

Table 3: *Number of Semesters in Curriculum*

Number of Semesters	Number of Responses	Percent
Three	0	0.00
Four	16	29.63
Five	27	50.00
Six	6	11.11
Seven	1	1.85
Other (please specify)	4	7.41
Total	54	100.00

Dental Hygiene Program Section: Survey Question #2: Findings and Results

Research question two in this section asked: What are the minimum required credit hours to graduate from your associate-degree program? This question was included to determine if the number of credit hours is related to student retention rate. Two surveys did not respond to this question. The responses to this question varied widely. The required credit hours ranged from 52 credit hours to 98 credit hours, with a mean of 76.17 credit hours and a median of 73 credit hours. The mode is 88 credit hours. The data is illustrated in Figure 18.

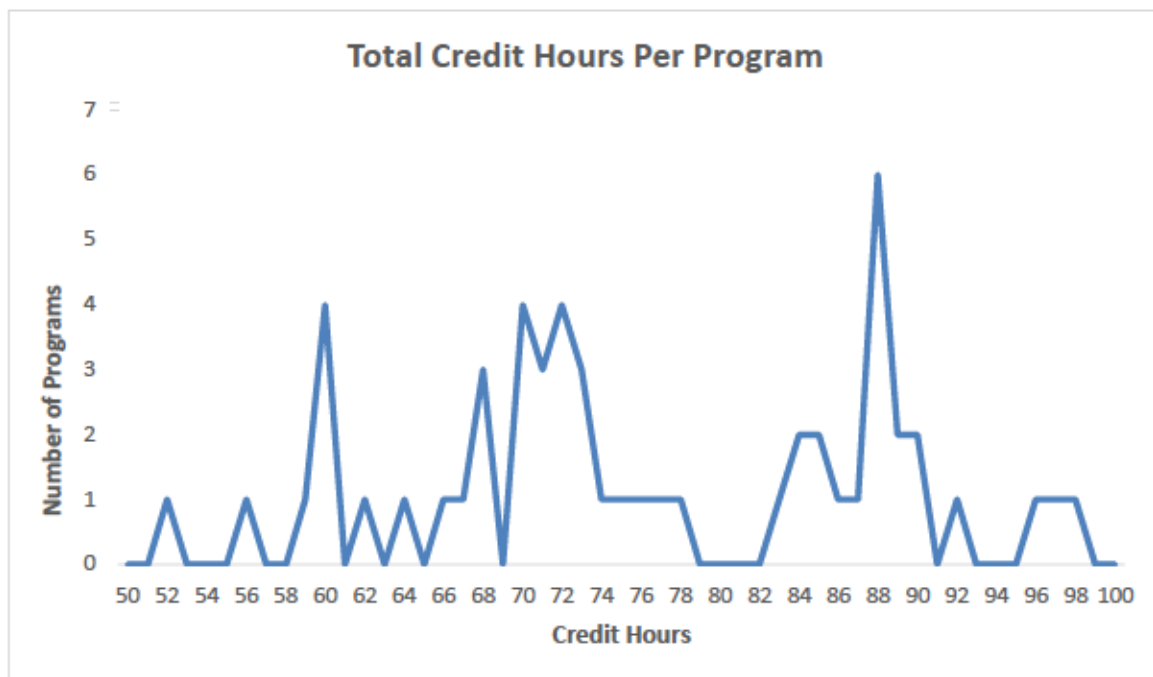


Figure 18. Total credit hours per program

Dental Hygiene Program Section: Survey Question #3: Findings and Results

Research question three in the dental hygiene program section asked: Does your dental hygiene program require prerequisites? This question was included to determine the number of programs that require higher education credit prior to admission into an associate-degree

program. Two programs elected not to answer this question, resulting in 54 responses. Forty-eight out of the 55 respondents, 88.89%, who responded to this question answered yes. Five dental hygiene programs stated their programs did not require prerequisites, and one program marked the other category. The program that marked the other category stated that general education courses were not required as they were integrated into their curriculum. The data is illustrated in Table 4.

Table 4: *Programs that Require Prerequisites*

Answer Choices	Number of Responses	Percent
Yes	48	88.89
No	5	9.26
Other (please explain)	1	1.85
Total	54	100.00

Dental Hygiene Program Section: Survey Question #4: Findings and Results

This question asked: Does your dental hygiene program offer early or rolling admissions? The survey defines early admission as admission into a program before general admissions or earlier than the original deadline. The survey defines rolling admission as admission into a program through a set window of time. One program chose not to answer this question resulting in 55 programs that responded. All but one of the 55 programs, 98.18%, indicated that their program does not offer rolling or early admissions.

Dental Hygiene Program Section: Survey Question #5: Findings and Results

Research question number 5 in the dental hygiene program section asked: How many cohorts does your program accept in one academic year? This question was asked to determine the total number of cohorts graduating in a given academic year. All but one of the programs responded to this question, leaving 55 answers to this question. Fifty-one out of the 56, 92.73%, answered one cohort per academic year. Four respondents responded as other. One program misinterpreted the term cohort. One program admits one cohort every other academic year. Another cohort accepts one cohort one year and the following year two cohorts, then going back to one cohort. The fourth program accepts three cohorts every two years.

Dental Hygiene Program Section: Survey Question #6: Findings and Results

This question asked: When does the cohort(s) begin? This survey question was asked to determine the common start of dental hygiene programs. All but one program responded to this question: 78.18% of the 55 respondents stated that the cohort began in the Fall semester; eight programs, 14.55%, responded with Summer semester, and four marked Other. One program misinterpreted the term cohort. One program welcomes a new cohort every eight months: in January, September, and May. A third program stated their program accepts a cohort of students every 70 weeks. The fourth program that marked other stated their program accepts in the Fall quarter of six quarters in a two-academic-year program. The data is illustrated in Table 5.

Table 5: *The Number of Programs that Accept Cohorts of Students by Semester*

Answer Choices	Number of Responses	Percent
Fall Semester	43	78.18
Spring Semester	0	0.00
Summer Semester	8	14.55
Other (please specify)	4	7.27
Total	55	100.00

The remaining questions on the survey asked about specific retention rates and reason of attrition by specific academic year. The survey spans three years, including the incoming class in the academic year of 2012, 2013 and 2014.

Retention Section 2014, 2013, 2012: Survey Questions #1: Findings and Results

Research question number 1 in the retention section for 2014, 2013, and 2012 was asked in three parts. The first question asked: How many students were accepted in your program in 2014, 2013, and 2012? This question was to gain retention data. Forty-six responses were recorded for 2014, 37 responded to this question for 2013, 36 directors answered this question for 2012. The smallest cohort in 2014 was 12 students, and the largest was 50 students. In 2013, two programs did not accept a cohort. The largest cohort that year was 60 students. The smallest cohort in 2012 was ten and the largest program accepted 38 students. The mean in 2014 was 24; in 2013 and 2012 the mean was 23. The mode for all three years was 20. Table 6 demonstrates these numbers.

Table 6: Number of Students Accepted in a Cohort for each Academic Year

Accepted Students	2014	2013	2012	Three Year Average
Mean	24	23	23	23.8
Median	23	22	23	24
Mode	20	20	20	20
Smallest	12	0	10	-
Largest	50	60	38	-

The second question asked: Of those accepted, how many graduated in the prescribed amount of time, without delay, according to schedule. This question was included in order to determine the actual retention rate. Forty-six directors answered this question for 2014. For 2013, 36 program directors answered this question, and for 2012, 34 respondents answered this question. The mean number of students graduating in 2014 was 20.5; 20.9 in 2013; and in 2012, the mean number of students graduating was 19.5. The range was 31, starting at the minimum of 9 and the maximum number of students was 40. Table 7 shows this data.

Table 7: Number of Students Graduating On-Time in a Cohort Beginning Year

Graduating Students	2014	2013	2012	Three-Year Average
Mean	20.5	20.9	19.5	20.8
Median	18.5	20	19	20
Mode	12	27	15	20
Smallest	9	0	1	-
Largest	40	58	36	-

Part three of the retention section question one asked: Of the 2014, 2013, 2012 cohort of students, how many stopped-out of the program for any length of time? The survey further defined the term “stopped-out” as students who did not complete in the prescribed amount of time, without delay, according to schedule. The answer to this question varied among respondents. Zero was the most common answer, and 13 was the highest reported number of students who stopped-out in 2014.

Retention Section 2014, 2013, 2012: Survey Question #2: Findings and Results

This question asked: In the year 2014 (2013) (2012), how many students left due to the following reasons. Ten options were listed, and the eleventh option was other. Forty-three programs responded to this question on the survey for 2014. The 43 programs reported a total of 159 students dropped out of a dental hygiene program. The most common reason in 2014, reported for 66 of the 159 students, was an academic underachievement. Thirty-nine students were not successful because the clinical skills were not developing. The remaining students are shown in Figure 19.

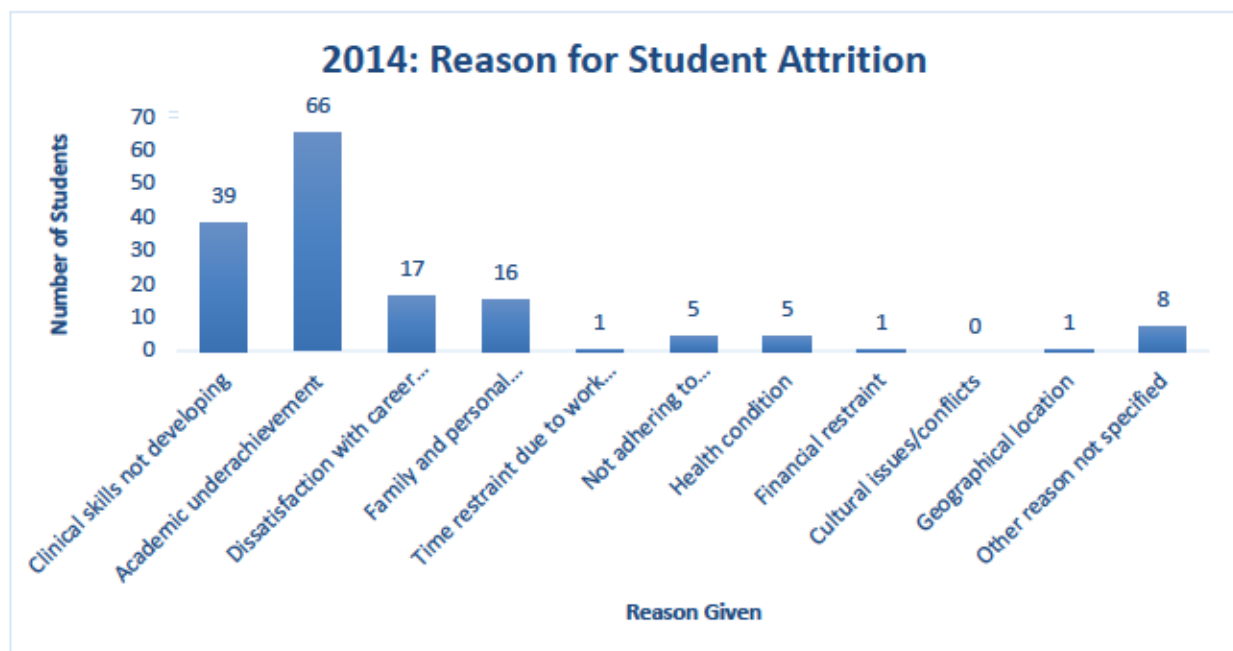


Figure 19. Reason for student attrition in 2014.

Thirty-two directors answered the question requesting data for 2013 and 31 directors answered the question for 2012. For both 2013 and 2012, academic underachievement was the top reason students were not successful, with clinical skills not developing as the second most popular reason. Table 8 displays each year’s responses to these questions.

Table 8: Number of Students Who Were Unsuccessful and the Reason for this Unsuccessfulness in 2014, 2013, 2012

Reason for unsuccessfulness	2014	2013	2012	Total
Academic underachievement	66	51	40	157
Clinical skills not developing	39	19	20	78
Family and personal responsibilities	16	13	10	39
Dissatisfaction with career choice	17	5	12	34
Time restraint due to work commitments	1	0	0	1
Not adhering to departmental or college policies	5	0	9	14

Reason for unsuccessfulness	2014	2013	2012	Total
Health condition	5	7	0	12
Financial restraint	1	0	1	2
Cultural issues/conflicts	0	0	0	0
Geographical location	1	0	0	1
Other reason not specified	8	6	8	22
Total	159	101	100	360

Retention Section 2014, 2013, 2012: Survey Questions #3: Findings and Results

Research question number three in the retention section for 2014, 2013, and 2012 asked how many students left at each of the following. This question was included to discover the specific semester in the educational program that was the most common for students to not be successful. It was also used to explore what the earliest time and the latest time frame for students not to be successful. Figure 20 illustrates the number of students across all three years.

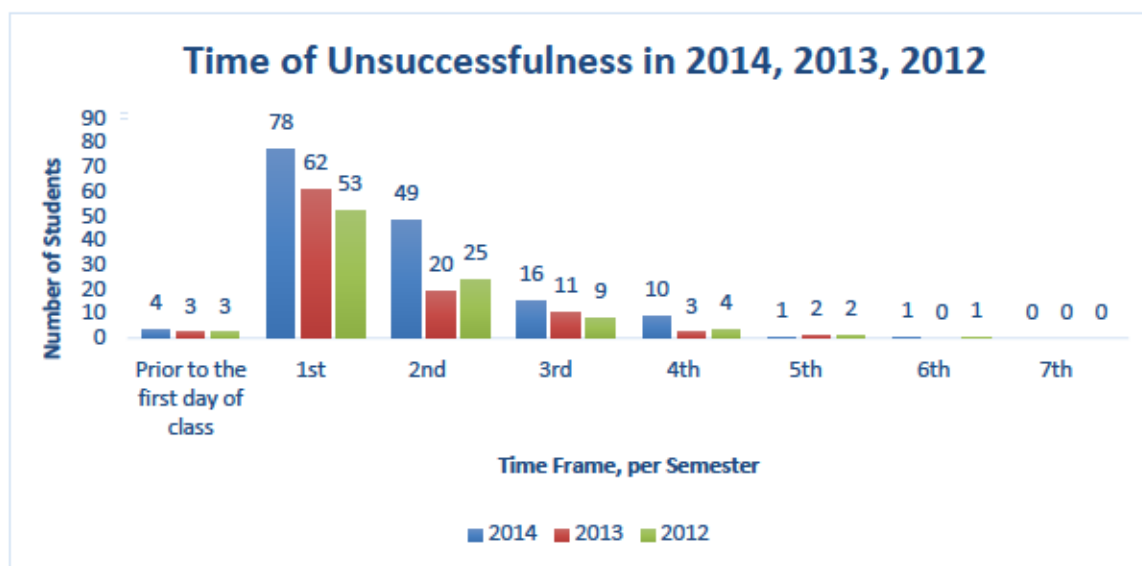


Figure 20. Time of unsuccessfulness over the years: 2014, 2013, 2012.

SUMMARY

The survey in this research was randomly distributed to directors of associate-degree programs. There were 150 surveys distributed through stratified random sampling measures. Fifty-seven directors responded back within the four-week time span the survey was available. Fifty-six of the 57 respondents reported an associate degree as their program end degree; one director indicated that a bachelor's degree was the end degree (that program was eventually eliminated from the analytical data).

Most questions were answered by all respondents with the exception of the specific attrition data of 2014, 2013, and 2012 involving questions 11 through 19. The data gathered is summarized in this chapter and analyzed in Chapter Five.

CHAPTER FIVE: DATA ANALYSIS

INTRODUCTION

This study explored the relationship between the retention rate of students at associate-degree dental hygiene programs and the institutional setting. This study also investigated the barriers affecting the retention rate at each institution. The hypotheses for this study are that there is a difference between retention rates of associate-degree dental hygiene students and the type of institution and early enrollment versus selective enrollment. An additional hypothesis is that there are different reasons why associate-degree dental hygiene students are not successful that are related with the institutional setting. The findings from this research are important for the dental hygiene programs to understand if there is a difference in retention rates between programs due to the institutional setting and to understand what the barriers are that students face in a dental hygiene program. These findings will influence the future of dental hygiene education in where the next programs will be established. These findings will also continue the conversation regarding barriers that students face during their educational journey.

A survey was emailed via SurveyMonkey to a stratified sample of 150 dental hygiene programs that award an associate degree. Of the 150 surveys distributed, 55 were returned. Of the program directors who returned the surveys, 45 completed all of the questions that included retention data, reasons for students' departure, and other questions regarding their

program. Ten program directors completed the survey but did not include all the information needed to analyze retention data. The 45 surveys that were returned with retention data are representative of the stratified sample of the 227 associate-degree dental hygiene programs. These 45 surveys that were returned represent the population demographics of two-year institutions and four-year institutions that award associate degrees. Of these 45 surveys, 42 (91.11%) were from a two-year institution and 4 (8.89%) originated from a four-year institution.

ANALYSIS OF RESEARCH QUESTION 1 AND 1A

The hypothesis stated: There will be a difference in retention rates of students between associate-degree dental hygiene programs that are in four-year institutions and two-year institutions. There will also be a difference in student retention rates between dental hygiene programs that are in community/junior colleges, technical/career colleges, and four-year institutions.

In this study, 41 of the 45 surveys derived from two-year institutions and 4 originated from four-year institutions. This 91.11 to 8.89% division is similar to the overall representation of 89.5–10.47% split of the 227 associate-degree dental hygiene programs nationwide (ADA, 2016). According to the survey data, the average retention rate of two-year associate-degree dental hygiene students was 86.59%. The average retention rate for four-year associate-degree dental hygiene students was 84.07%. These results are not consistent with the national average of students enrolled at two- and four-year institutions as reported by McFarland et al. (2018). McFarland et al. (2018) found an overall 81% retention at four-year institutions and a 62% retention at two-year institutions. McFarland et al. (2018) also found graduation rates to be

higher at four-year institutions than at two-year institutions: 60% compared to 30% respectively.

Data was analyzed using a *t* test with results that showed there is no significant difference between the two-year institutions and the four-year institutions retention rates. When comparing two- and four-year institutions, the *t* test showed a *p* value of 0.70, which is greater than the alpha value of 0.05. The *t* test results failed to reject the null hypothesis indicating there is no relationship between student retention rates and the institutional setting.

Further analysis was performed comparing specific institutional type: community or junior college, technical or career college, and four-year institution. An ANOVA was utilized to analyze the relationship between retention rates and institutional setting. The ANOVA indicated a *p* value of 0.80, which is greater than the alpha value of 0.05, when comparing the three groups. This result is consistent with the *t* test comparing two- and four-year institutions; failure to reject the null hypothesis. The results indicate there is no statistical difference between community or junior college, technical or career college, four-year institutions, and their retention rates.

The average retention rate for associate-degree dental hygiene students at community or junior colleges was 87.11%, technical or career colleges was 84.45%, and four-year institutions was 84.07%. Although this data is not statistically significant, the data does not support the 2006 research that identified the highest retention rates at two-year institutions to be at technical schools (Bailey et al., 2016).

ANALYSIS OF RESEARCH QUESTION 1B

The hypothesis stated: There will be a relationship between student retention rates of associate dental hygiene programs with and without on-campus housing.

In the research, 12 out of the 45 surveys responded that their institutions provided on-campus housing for students. On-campus housing was defined as housing that is available for students to live in that is on the campus where the dental hygiene program is located. Identifying available housing on the main campus, away from the dental hygiene program, did not qualify as on-campus housing.

According to the survey data, programs that had on-campus housing available for dental hygiene students had an average of 86.92% retention rate compared to an 86.16% retention rate of no available on-campus housing. A *t* test was performed with a standard deviation between 0.10 and 0.13 and a variance of 0.011 and 0.017. The *t* test resulted in a *p* value of 0.84, above the 0.05 alpha value set for this study. Therefore, the conclusion to fail to reject the null was made indicating there is no significant difference between retention rates and the availability of on-campus housing. This finding supports Millea, Wills, Elder, & Molina's (2018) research that on-campus housing did not affect retention or graduation rates.

ANALYSIS OF RESEARCH QUESTION 1C

The hypothesis stated: There will be a relationship between student retention rates of associate dental hygiene programs and the public or private institutional setting.

In this study, 41 of the 45 dental hygiene program directors described their institutions as a public institution, four stated the institution was a private institution. All four private institutions were identified by the program director as for-profit institutions.

The surveys indicated an average retention rate of dental hygiene students for the public institution to be 86.77% and for private institutions an 82.15% retention rate. A *t* test was used to determine if there is a statistical difference in retention rates at public and private institutions. The *t* test indicated a *p* value of 0.41, which failed to reject the null hypothesis. Therefore, this study showed no statistical difference in dental hygiene program retention rates at public and private institutions.

In this study, the retention rate at public institutions was higher than at private institutions, this agrees with four-year institution retention rates according to McFarland et al. (2018). But the results contradict the same author who published *The Condition of Education 2018 Report* of retention data at two-year institutions as well as graduation rates at both two- and four-year institutions (McFarland et al., 2018). Pike's (2013) research also showed support of McFarland et al. (2018) data that private institutions had a positive influence on graduation rates.

ANALYSIS OF RESEARCH QUESTION 1D

The hypothesis stated: There will be a relationship between student retention rates at associate dental hygiene programs and the private for-profit or private not-for-profit institutional setting. This analysis could not be completed because the surveys returned containing retention data did not identify the institution as a not-for-profit private institution.

All four institutions that were identified as private also identified as private for-profit institutions.

ANALYSIS OF RESEARCH QUESTION 2

The hypothesis stated: There will be a relationship between early/rolling admission and the retention rate of associate-degree dental hygiene students. The data analysis could not be completed because the only program that responded to having an early enrollment policy did not contain retention information. Of the 55 surveys returned, 54 programs did not practice an early or rolling admission policy. Fifty-four of the programs that responded to this survey have a set deadline that applicants have to abide by. Once the deadline passes, the next cohort is determined by selecting the top number of applicants from the applicant pool.

ANALYSIS OF RESEARCH QUESTION 3

The hypothesis stated: There will be a relationship between the barriers to success and the institutional setting.

The research results showed that the three types of institutions — community/junior colleges, technical/career colleges, and four-year institutions — reported a variety of reasons why students were not successful. Clinical skills not developing, academic underachievement, dissatisfaction with career choice, family and personal responsibilities, time restraint due to work commitments, not adhering to departmental or college policies, health condition, financial restraint, geographical location, and other reason not specified were all identified as reasons why a student was not successful. Cultural issue or conflicts was the only option that none of the dental hygiene program directors chose as a reason why a student was not

successful. The survey only provided the eleven choices and did not allow for a written description for the “other not specified” option.

Community and junior colleges reported that 225 students stopped-out of their educational pathway and disclosed their reason for being unsuccessful. Technical and career colleges reported 90 students, while four-year institutions reported 44 students. Community and junior colleges reported over twice as many reasons, but also represented 73.33% of the survey respondents.

ANALYSIS OF RESEARCH QUESTION 3A

The research question asked for the most common reason associate-degree dental hygiene students are not successful. The research showed that academic underachievement was the number one reason students were not successful in associate-degree dental hygiene programs. There were 359 barriers that were identified in the survey by community/junior colleges, technical/career colleges, and four-year universities. Of the 359 barriers, 157 were identified as academic underachievement or 43.73% (see Tables 9 and 10). All of the institutional settings — community and junior colleges, technical and career colleges, and four-year universities — reported academic underachievement as the number one reason students were not successful. Academic underachievement was also the number one reason students were not successful in Holt’s 2005 research. Holt found that 88% of the students ($n=25$) were not successful due to academic underachievement. Moore et al.’s (2016) research was conducted with the class of 2011 and 2012 and included 99 surveys from all types of dental

hygiene programs. Moore et al discovered that 57% of students (n=470) were unsuccessful in their dental hygiene education due to academic underachievement.

Table 9: *Number of Students, by Institutional Type, Who Were Unsuccessful and the Reason for Their Departure, 2012-2014*

Identified Barriers	Community or Junior College	Technical of Career College	Four-Year Institution	Total
Academic underachievement	103	34	20	157
Clinical skills not developing	46	18	14	78
Family and personal responsibilities	24	8	7	39
Dissatisfaction with career choice	21	11	1	33
Other reason not specified	14	8	0	22
Not adhering to departmental or college policies	5	8	1	14
Health condition	8	3	1	12
Financial restraint	2	0	0	2
Time restraint due to work commitments	1	0	0	1
Geographical location	1	0	0	1
Cultural issues/conflicts	0	0	0	0
Total	225	90	44	359

The second most common reason for not advancing in an associate-degree dental hygiene program was due to clinical skills. Again, this was the most common response across all institutional types, with 21.79% of the respondents reporting clinical skills being deficient. In Holt's 2005 study, clinical skills not developing represented 56% of students' reason for not being successful, which was rated number four on the list preceding dissatisfaction with career choice and family and personal responsibilities. Moore et al. (2016) organized the choices

differently on their survey, separating preclinical course failure and clinical skills. The results showed clinical skills as the third most common reason for students not being successful (28.5%) and preclinical course failure as the fourth most common reason (23.23%) (Moore et al., 2016).

Table 10: Percentage of Students Who Were Unsuccessful and the Reason for Their Departure by Institutional Type, 2012-2014

Identified Barriers	Community or Junior College (%)	Technical of Career College (%)	Four-Year Institution (%)	Overall (%)
1. Academic underachievement	45.78	37.78	45.45	43.73
2. Clinical skills not developing	20.44	20.00	31.82	21.73
3. Family and personal responsibilities	10.67	8.89	15.91	10.86
4. Dissatisfaction with career choice	9.33	12.22	2.27	9.19
5. Other reason not specified	6.22	8.89	0.00	6.13
6. Not adhering to departmental or college policies	2.22	8.89	2.27	3.90
7. Health condition	3.56	3.33	2.27	3.34
8. Financial restraint	0.89	0.00	0.00	0.56
9. Time restraint due to work commitments	0.44	0.00	0.00	0.28
10. Geographical location	0.44	0.00	0.00	0.28
11. Cultural issues/conflicts	0.00	0.00	0.00	0.00

The third and fourth most prevalent reason for a student not continuing in an associate-degree dental hygiene program depended on the institution. Technical and career colleges reported career choice as the third most popular reason a student dropped out of the program, followed by family and personal responsibilities. Community and junior colleges and four-year institutions identified family and personal responsibilities as the third most common reason a student would not complete the program, followed by career choice in fourth place. The third

and fourth place were similar for the community and junior colleges: 24 students dropped out due to family and personal responsibilities, and 21 students dropped out due to career choice. Four-year institution data was not as close as the community and junior colleges reported. Four-year institutions reported family and personal responsibilities as the third popular barrier to success with seven students dropping out of the program, career choice was in fourth with only one student reporting this reason. Holt's (2005) study discovered dissatisfaction with career choice (76%) as the third common reason a dental hygiene student was unsuccessful and family and person responsibilities (72%) as the number four most common reason. The more recent study by Moore et al. (2016) stated personal issues (including medical and family responsibilities) as the second most common reason and career choice as the fifth reason.

Other reasons students were not successful in completing their dental hygiene education on time varied throughout institutions. Geographic location and work commitments were the lowest reported barriers with cultural issues and/or conflicts having no respondents. The community and junior college reported only one student in both geographical location and work commitments that prevented the student from being successful. Geographic relocation also was the least common reason in Moore et al study (2016). Holt's (2005) research also showed geographic relocation at the bottom of the list.

When comparing student barriers and campus housing, the results were very similar to the above. The top four reasons students are not successful in an associate-degree dental hygiene program were the same regardless of the availability of on-campus housing and commuter schools. Academic underachievement was the top reason, followed by clinical skills

not developing, family and personal responsibilities, and career choice. These top four are the same across all institutional settings.

The barriers to success between private and public institutions were different than the rest of the analysis. Public institutions had the same top four reasons for unsuccessfulness as the others: academic underachievement, clinical skills not developing, career choice, and family/personal responsibilities. Private institutions' top four barriers were different. The top reason an associate-degree dental hygiene student at a private institution was unsuccessful was academic underachievement. The second most common reason was a tie between family and personal responsibilities and not adhering to department or college policies. The fourth most common barrier was identified as "other" (see Table 11).

Table 11: Number of Students Who Were Unsuccessful and the Reason for Their Departure by Private versus Public Institutions, 2012-2014

Identified Barriers	Private Institutions	Public Institutions
1. Academic underachievement	20	137
2. Family and personal responsibilities	8	31
3. Not adhering to departmental or college policies	8	6
4. Other reason not specified	7	5
5. Clinical skills not developing	4	74
6. Health condition	3	9
7. Dissatisfaction with career choice	1	32
8. Financial restraint	0	2
9. Time restraint due to work commitments	0	1
10. Geographical location	0	1
11. Cultural issues/conflicts	0	0

ANALYSIS OF RESEARCH QUESTION 3B

The research question posed at the beginning of the study was to explore the most common semester students are not successful. Forty-four surveys returned contained retention data as well as the length of the program measured in semesters. The number of students who were unsuccessful from 2012-2014 was reported to be 356. This research study found the most common semester that students are not successful is the first semester; 53.93% (n=192) of all students who dropped out of dental hygiene dropped out in the first semester; followed by the second semester, 26.40% (n=94); the third semester, 10.11% (n=36); and the fourth semester, 4.78% (n=17). Ten (2.81%) of the respondents had students who dropped out before the first day of class. One community or junior college program reported as many as three students in 2013 did not attend the first day of class. One technical or career college stated in 2014 their program lost as many as eleven students in the first semester of the program. In the same year, a community or junior college reported losing ten students in the second semester of the program.

As expected, there is a fewer number of unsuccessful students as the students' progress in their dental hygiene program. Three dental hygiene programs reported losing students in the last semester of the program, one of these programs stated losing five students in the last semester in 2014. Of the 44 surveys returned, 27.27% (n=12) documented student attrition in the second-to-last semester of the program.

SUMMARY

It was determined in this research study that there is no significant difference between retention rates of associate-degree dental hygiene students and the institutional setting. It was determined that two- and four-year institutions that include an associate-degree dental hygiene program in their curriculum do not have a statistical difference in their dental hygiene student retention rates. It also was determined that public, private, community or junior college, technical or career college, and four-year institution classification had no statistical difference with retention rates. On-campus housing also was determined to have no significant difference in retention rates of dental hygiene students.

There was not enough data to determine if there is a significant difference between private for-profit and private not-for-profit institutions. None of the 46 surveys returned with retention data stated using an early or rolling admission strategy. Therefore, data analysis could not be performed.

Students' barrier to success was also studied in this research. Common barriers to success were consistent with Holt's (2005) research and Moore et al.'s (2016) research. Academic underachievement, clinical skills not developing, dissatisfaction with career choice, and personal or family responsibilities were the top four reasons students are not successful according to this research as well as Holt's and Moore et al.'s research. Geographic relocation and culture conflicts/issues remain the least common reason a student is unsuccessful. This is consistent with research by Holt (2005) and Moore et al. (2016).

According to this research, students were unsuccessful in all semesters of a dental hygiene curriculum. The first and second semesters were the most common, followed by the

third and fourth semester. Students who dropped out of the program prior to the first day of class was the fifth most common time frame of withdrawal. The last semester was the least likely semester for a student to leave the program.

CHAPTER SIX: DISCUSSIONS AND RECOMMENDATIONS

INTRODUCTION

The purpose of this study was to investigate if there is a relationship between associate-degree dental hygiene student retention rates and the academic setting. Prior research has been completed involving associate-degree and bachelor-degree dental hygiene programs, but the researcher could not find any current studies involving the same credentials and the institutional type. This study also explored the relationship between the reason an associate-degree dental hygiene student was not successful and the institutional setting. These data will be helpful with future new programs and will aid program directors in solving the retention issue.

When a dental hygiene student is not successful, it is almost impossible to find another student to fill the seat in the cohort. This leads to lower cohort numbers and lower tuition revenue. This can be an issue in a dental hygiene program when trying to staff a course or a clinic with the 1 to 5 faculty to student ratio mandated by CODA. This can also be a concern with an institution trying to budget a program that mandates a high faculty to student ratio when there are empty seats and lost revenue.

According to the *2015-2016 ADA Survey of Allied Dental Education Report*, (ADA, 2016), the average retention rate for all dental hygiene programs in the class of 2014 was 86.0%. The report stated that 7,416 students originally enrolled, and 6,381 students graduated from that

original class (ADA, 2016). But according to this same source, the number of students enrolled in a dental hygiene program does not match the 7,416 stated in Figure 13 of the ADA report (2016). Every year, from the 2005-2006 academic year to the 2015-2016 academic year, the enrolment numbers are in the tens of thousands (see Table 12). This same source provides the number of graduates (also in Table 12). The exact retention rates cannot be calculated using the numbers from this table due to the lack of knowledge of which enrolled students graduated with an associate degree and which students graduated with a bachelor's degree. One can make a generalized conclusion that the enrollment figures include all cohorts in a given year. It is difficult to ascertain the retention rate. So the debate on retention rates begins. The biggest obstacle faced in this study is the definition of retention rate and graduation rate.

Table 12: *Number of Dental Hygiene Students Enrolled and Graduated by Academic Year, 2005-2016*

Academic Year	Students Enrolled	Graduates
2005-06	14,012	6,273
2006-07	14,795	6,652
2007-08	15,010	6,723
2008-09	15,194	6,777
2009-10	15,385	7,000
2010-11	15,521	6,929
2011-12	15,771	7,097
2012-13	16,256	7,277
2013-14	16,162	7,298
2014-15	16,365	7,323
2015-16	16,169	n/a

Source: American Dental Association. (2016). *2015-2016 Survey of Allied Dental Education-Report 1: Dental Hygiene Education Programs (data file)*, Table 3 and Table 4.

LIMITATIONS

Definitions

One of the limitations of this study is the definition of retention and graduation rates. The definition of retention rate given by Department of Education is “A measure of the rate at which students persist in their educational program at an institution, expressed as a percentage” (McFarland et al., 2018, p. 341). The graduation rate is the rate of which a student completes their degree in 150% time of entering their first institution (McFarland, et al., 2018). In dental hygiene research, the terms retention and graduation rate are used interchangeably. Most studies refer to retention rates but after further review of the research, what is being explored is graduation rate. In this study, the Department of Education’s definition of graduation rate was not used. The definition of retention used in this study was a student who graduated on time, with their original cohort, without stopping-out or extending the educational time frame. This definition was used due to the financial loss the institution endures when a student cannot be replaced. This difference in definition can be misunderstood by the program directors completing the research survey. Every effort was made by the researcher to identify the clear definition on the survey so that confusion was kept to a minimum, but misunderstanding can be a limitation in this research.

For example, Freudenthal and Bowen researched the dental hygiene remediation and retention practices for a nine-year period, 1999-2008, at a specific institution. An overall 92.7% retention rate was stated by the research in this nine-year period (Freudenthal & Bowen, 2010). Out of the 219 students enrolled in this nine-year time period, the researchers found 55 students who withdrew or failed to meet academic standards. Twenty-seven of these 55

students had an individualized remediation plan that they completed that did not delay their graduation date. Six students withdrew, 12 students were dismissed, and ten students graduated with an extended graduation date. The retention rate (graduation rate), according to this research's definition of graduating in the appropriate amount of time without delay, would have been 87.21% and not 92.7% as stated in the study. This is an example of the comparison difficulty when different definitions are used to collect data.

In Holt's 2005 research, she discovered that if a student was not successful, either due to academic underachievement or underachievement in clinical skills, that 100% (n=25) of the respondents provided the student another opportunity to re-enter the program (Holt, 2005). This re-entry may or may not be considered by program directors as a failure or attrition when disclosing retention rates. This is another example of a possible confusion between different definitions.

Number of Returned Surveys

A stratified sample of the population was used in this research using a 5% error margin, totaling 150 surveys. Fifteen surveys were given to four-year institutions (10% of the sample size) and 135 surveys were given to two-year institutions (90% of the sample size). This stratified random sample represented the 89.53-10.47% split of the associate-degree population. Fifty-seven programs returned the survey but due to missing information, only 45 survey were able to be used for retention rate data analysis. Four of the 45 institutions were identified as four-year institutions (8.89%), close to the original stratified sample size. However, with data from only four surveys generalized conclusion cannot be drawn. Public versus private

institution data analysis had the same limitations, only four programs identified as private institutions. This limited data cannot be used to analyze and draw generalizations to the population as a whole.

Self-Reporting

The structure of this research was for program directors to self-report information about their associate-degree dental hygiene programs. It is assumed that program directors were honest in their disclosure and understood the questions as this was an anonymous survey that could not be traced to the original program. If program directors were not honest in their disclosure or answered differently because of their misunderstanding of the question, then the data is inaccurate.

Prerequisites and Total Credit Hours

As disclosed in the surveys, the program directors who responded to this survey stated their associate-degree dental hygiene program curriculum consists of between four and six semesters. This semester count does not include prerequisites if the program requires them. Five out of the 45 surveys returned (11.11%) do not require college credit prior to admission. Does prerequisite course completion affect the retention rates? This study did not explore this question.

According to this research, the average number of total credit hours required for graduation from an associate-degree dental hygiene program is 76.55, with a range of 52 to 98. The highest retention rate (96.36%) was in programs that had a range of 91-98 credit hours. The second highest retention rate (88.38%) were programs with 52-60 credit hours. The lowest

retention rates (84.89%) were the programs with 71-80 credit hours. Could the total number of credit hours effect retention rates? This question was not explored in this research.

On-Campus Housing

The survey distributed to program directors asked if there was on-campus housing available for dental hygiene students. The survey did not ask if dental hygiene students lived in on-campus housing. This difference in wording can affect the analysis of data by comparing prior research regarding on-campus housing students and the availability of on-campus housing. Furthermore, a generalized conclusion of the effect of on-campus housing to retention rates is difficult to make.

Barriers

Eleven options were given on the survey in regard to barriers students faced that forced them to be unsuccessful. The eleventh item on the list was "other not specified." Fourteen community or junior colleges responded to this option as well as eight technical or career colleges for a total of 22 students not successful for another reason. The survey did not provide a write-in box for the program director to explain the "other" reason. This restriction limits the knowledge of why students failed.

The most common barrier to success identified in the survey was academic underachievement. The survey did not define academic underachievement, which can be due to multiple reasons. Some of the reasons a student could not meet the grade requirement could be that their clinical skills were not developing resulting in a lower grade. Another reason a student would receive a failing grade is if the student has other outside responsibilities like

work, family, or personal time restraints that limit the amount of study time which would result in a lower grade. This survey assumed that academic underachievement was a student who tried to be successful and had no other barriers to succeed but was still earning a failing grade at the end of the term. Because this was assumed and not clarified, some of the barrier data may not be accurate.

RECOMMENDATIONS FOR THE FUTURE

This research was conducted to explore if there was a difference in retention rates at associate-degree dental hygiene programs and the institutional setting. This research's results were that there is no statistical difference between retention rates and institutional setting. This study also revealed that students were not successful because of the same four reasons in all institutions. This discovery is important to know when developing new dental hygiene programs.

Retention in dental hygiene programs is an important topic for all stakeholders: students, faculty, program directors, deans, administrators, and college financial officers. Producing competent, skilled hygienists while helping students to be successful along with the pressure of administration to keep retention numbers high can be challenging. Exploring the dental hygiene program's remediation structure and options would instill more understanding of how programs are staying above the average retention rate. An example of this is Freudenthal and Bowen's 2016 research of retention rates in one program over a nine-year period. This study described the remediation structure of a four-year dental hygiene program. The process described in the research article can provide ideas to programs that are looking for

new solutions. The researched program's remediation process graduated 27 students on time who might not have done so without the process in place. The process also graduated another ten more students with a delay in their graduation time. There were 37 students in nine years who benefitted from a remediation program established at one institution. It is recommended to concentrate on improving the dental hygiene program's remediation structure to aid students in their educational goal.

Institutions need to look at their own retention and graduation rates and analyze why the rate is where it is. It is easy to blame the students and suggest they are not as prepared as they used to be, or that there are more barriers to success for some students than for others. All of this might be true, but this research showed that students across all institution types and settings had the same barriers. At some point, a program needs to look within to determine if the program is doing everything it can to help their students be successful. Are there formal remediation plans set to help students who need extra help? The researcher believes this is the direction to focus on in the future.

FUTURE RESEARCH

Sample Size

It is recommended that if this research were to be duplicated that the entire population of associate-degree dental hygiene programs (277) be included in the distribution of the survey. This would hopefully allow more data from private institutions as well as four-year institutions into the data analysis. Generalized conclusions can be made easier if more than four data are analyzed to represent the entire population.

Remediation

Remediation was not studied in this research. This is not because the researcher did not find remediation as a valuable part of a dental hygiene program, the complete opposite is true. Remediation was not studied because of the time restriction of the vast subject and the many avenues programs use to help students be successful. It is recommended that separate studies be conducted to solicit remediation plans and ideas. Holt's 2005 study identifies program ideas but does not formulate a complete plan like Freudenthal and Bowen's (2016) study. Branson and Toevs' (1999) research explained how clinical remediation is structured and how faculty are compensated in dental hygiene programs. Again, an overall remediation program is not discussed, only pieces of one. Wood, Mitchell, Holt, and Branson (2014) studied remediation practices in dental hygiene programs and discovered that nothing has changed much since the 1998 research by Branson and Toevs: "This study was based on concepts presented in a 1998 report on clinical skill remediation. It appears that little has changed in this area of remediation in the past 15 years" (p. 18).

CONCLUSIONS AND IMPLICATIONS

This research discovered that average associate-degree dental hygiene retention rates are higher at two-year institutions than a four-year institution, higher at community or junior colleges than technical or career colleges and four-year institutions, and higher at on-campus housing campuses versus no on-campus housing. Due to the small number of surveys returned and because the analysis did not demonstrate statistical significance, it is not possible to draw

conclusions that can be generalized to the greater population. What can be concluded from this study is that there is no difference in the institutional setting when comparing retention rates.

The implications of this research are plentiful. Recommendations for future new dental hygiene programs do not have to be made specifically related to the institutional setting.

Future research has been recommended to focus more on remediation strategies and programs versus retention and graduation rates. Remediation strategies appear to be the answer to the retention issues in dental hygiene programs.

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APPENDIX A: SURVEY

Survey

Educational Setting

1. How would you describe the educational setting of your dental hygiene program? 


- Community or Junior College
- Technical or Career College
- Four-year Institution
- Dental School
- Other (please specify)

2. Which of the following describes your institution? 

- Public
- Private, for-profit
- Private, not-for-profit
- Other (please explain)

3. Does your institution provide student housing on campus? 

- Yes
- No
- Other (please explain)

4. What degree do the students in your dental hygiene program earn at the end of your curriculum? 

- Certificate
- Certificate plus
- Associate Degree
- Bachelor Degree
- Master Degree
- Other (please explain)


Dental Hygiene Program

If your institution awards more than one degree, please answer the remaining questions as they relate to the associate degree program.

1. How many semesters is the curriculum in your dental hygiene program, not including prerequisites?

*If your program is not on a semester format, please estimate the number of semesters it would be using a 15/16-week semester format. 

- Three
- Four
- Five
- Six
- Seven
- Other (please specify)

2. What is the minimum required credit hours to graduate from your associate degree program? 

3. Does your dental hygiene program require prerequisites? 

- Yes
- No
- Other (please explain)

4. Does your dental hygiene program offer early or rolling admissions?

*Early admissions is defined as admission into a program before general admission or earlier than the original deadline. Rolling admission is defined as admission into a program through a set window of time. In both early and rolling admission, admission is granted as qualified applicants are accepted. 

- No
- Yes (please explain)

5. How many cohorts does your program accept in one academic year? 

- One
- Two
- Three
- Four
- Other, please explain.

6. When does the cohort(s) begin?

*Click all that apply 

- Fall Semester
- Spring Semester
- Summer Semester
- Other (please specify)

The next series of questions are related specifically to retention in relationship to the calendar year, January 1 to December 31, 2014.

1. Answer the following questions regarding the 2014 calendar year. 

a.) How many students were accepted in your program in 2014?

b.) Of those accepted in 2014, how many graduated in the prescribed amount of time, without delay, according to schedule?

c.) Of the 2014 cohort of students, how many 'stopped-out' of the program for any length of time?

2. In the year 2014, how many students left due to... 

Clinical skills not developing

Academic underachievement

Dissatisfaction with career choice

Family and personal responsibilities

Time restraint due to work commitments

Not adhering to departmental or college policies

Health condition

Financial restraint

Cultural issues/conflicts

Geographical location

Other reason not specified

3. In the year 2014, how many students left during each of the following? 

Prior to 1st day of class	<input type="text"/>
1st semester	<input type="text"/>
2nd Semester	<input type="text"/>
3rd semester	<input type="text"/>
4th semester	<input type="text"/>
5th semester	<input type="text"/>
6th semester	<input type="text"/>
7th semester	<input type="text"/>

Retention in 2013

The next series of questions are related specifically to retention in relationship to the calendar year, January 1 to December 31, 2013.

1. Answer the following questions regarding the 2013 calendar year. 

a.) How many students were accepted in your program in 2013?

b.) Of those accepted in 2013, how many graduated in the prescribed amount of time, without delay, according to schedule?

c.) Of the 2013 cohort of students, how many 'stopped-out' of the program for any length of time?

2. In the year 2013, how many students left due to... 

Clinical skills not developing	<input type="text"/>
Academic underachievement	<input type="text"/>
Dissatisfaction with career choice	<input type="text"/>
Family and personal responsibilities	<input type="text"/>
Time restraint due to work commitments	<input type="text"/>
Not adhering to departmental or college policies	<input type="text"/>
Health condition	<input type="text"/>
Financial restraint	<input type="text"/>
Cultural issues/conflicts	<input type="text"/>
Geographical location	<input type="text"/>
Other reason not specified	<input type="text"/>

3. In the year 2013, how many students left during each of the following? 

Prior to 1st day of class	<input type="text"/>
1st semester	<input type="text"/>
2nd Semester	<input type="text"/>
3rd semester	<input type="text"/>
4th semester	<input type="text"/>
5th semester	<input type="text"/>
6th semester	<input type="text"/>
7th semester	<input type="text"/>

The next series of questions are related specifically to retention in relationship to the calendar year, January 1 to December 31, 2012.

1. Answer the following questions regarding the 2012 calendar year. 

- a.) How many students were accepted in your program in 2012?
- b.) Of those accepted in 2012, how many graduated in the prescribed amount of time, without delay, according to schedule?
- c.) Of the 2012 cohort of students, how many 'stopped-out' of the program for any length of time?

2. In the year 2012, how many students left due to... 

- Clinical skills not developing
- Academic underachievement
- Dissatisfaction with career choice
- Family and personal responsibilities
- Time restraint due to work commitments
- Not adhering to departmental or college policies
- Health condition
- Financial restraint
- Cultural issues/conflicts
- Geographical location
- Other reason not specified

3. In the year 2012, how many students left during each of the following? 

Prior to 1st day of class

1st semester

2nd Semester

3rd semester

4th semester

5th semester

6th semester

7th semester