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Analysis of Electronic Teaching and Reflective Learning for Dental Hygiene Education

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ANALYSIS OF ELECTRONIC TEACHING AND REFLECTIVE LEARNING

FOR

DENTAL HYGIENE EDUCATION

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APPROVAL PAGE

This research paper was prepared by Cassandra L. Huffman under the direction of Dr. John M. Ritz in SEPS 636, Problems in Occupational and Technical Studies. It was submitted to the faculty as partial fulfillment for the requirements for the Master of Science degree.

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CHAPTER I

INTRODUCTION

This study analyzed the effect electronic teaching and reflective learning have on students enrolled in a dental hygiene program. Trends and methods of teaching are constantly evolving because of technology's impact upon learning. One goal of educators is equipping students with appropriate information to help them function when they enter the work world. Evaluating the effects of electronic learning on dental hygiene students and implementing the most effective methods of instructional delivery create more efficient practitioners. The only practical way to check the progress and effectiveness is to study the learning strategies that were being utilized in dental hygiene programs to offer instruction to their students.

Some effective educational practices have been ignored in the movement to teach more classes electronically. For example, reflective learning is no longer utilized in many dental hygiene programs. If reflective learning is a proven technique for improving student learning, it may be worth evaluating as a component of distance-delivered courses.

Effectively educating students in the learning environment is most conducive to long-term learning. Once dental hygiene students move into the professional workplace, they may find professional development inefficient in helping them adapt to change.

STATEMENT OF PROBLEM

The problem of this study was to examine if electronic course delivery used reflective learning strategies in educating dental hygiene students.

RESEARCH QUESTIONS

The research questions that guided this study included the following:

RQ_1: What was the impact of electronic learning on dental hygiene students' educational and professional growth?

RQ_2: What was the impact of reflective learning on dental hygiene students' educational and professional growth?

RQ_3: What were educators' attitudes toward reflective learning through electronically delivered courses?

RQ_4: Were dental hygiene educators satisfied with how much electronic learning is being implemented into programs?

RQ_5: Were dental hygiene educators satisfied with the level of reflective learning being implemented into programs?

RQ_6: Did dental hygiene educators feel they have adequate training by their employers to deliver electronic course instruction effectively?

RQ_7: Did dental hygiene educators find success with electronic course delivery and reflective learning?

BACKGROUND AND SIGNIFICANCE

Dental hygiene education is offered by five colleges and/or universities in the Commonwealth of Virginia. Electronic teaching has grown throughout the years, and the extent to which it has entered dental hygiene programs is the basis for this study. Universities have established electronic learning courses within their programs, but the community college setting does not incorporate the same level of electronic learning courses for students. The need for dental hygiene educators is expected to increase, thus creating a necessary mean for postsecondary educators to be trained (Garland, 2010). Postsecondary educators combat issues of full-time jobs, family, cost, and convenience. Electronic learning provides a way for postsecondary educators to receive the training necessary to meet the rise in future educational demand.

The concept of reflective learning is defined as the deeper and greater degree of processing what is to be learned (Copian, 2010). Reflective learning practices are incorporated into the course by journaling, service projects, and critical thinking conclusions about experiences or material. Utilizing these reflective learning practices have shown to increase self-awareness and critical thinking (Brondai, 2010). This higher order of thinking and retention can generate a more prepared practitioner. The receptiveness and understanding of faculty shape how effectively electronic teaching and reflective learning are being used within dental hygiene programs. This study concerning electronic and reflective learning in dental hygiene education will provide insight into the educational college curriculum. What students are being exposed to by

faculty and what they are able to utilize will also provide data concerning the learning institution.

The significance that could be drawn from the study would be a greater understanding of dental hygiene faculty perceptions of electronic teaching and reflective learning, along with preparedness to administer such learning methods. It has been shown through a 2006 study that e-learning is as effective as the traditional classroom setting (Garland, 2010). A more intuitive understanding of learning methods and understanding will stimulate educational and professional growth. A finding that could show a lack of inadequate electronic and reflective learning delivery methods in dental hygiene should heighten the question of awareness of those methods. There may very well be reflective learning taking place within the dental hygiene program at a community college or university, which is hopeful to find, but the emphasis placed on electronic learning can vary from college to college. This can be due in part to funding and also to the location of the dental hygiene school. A college with higher numbers of enrollments is more likely to receive more funding with access to greater means of education.

Several studies have been completed concerning electronic teaching and reflective learning. This study combines both aspects in relation to dental hygiene education. Interviews were completed during the fall semester of 2013. Faculties were encouraged to share thoughts and ideas concerning these topics.

LIMITATIONS

The limitations in this study involve the location of a community college program versus a university program. This can limit the amount of faculty and access to certain environments. Another limitation due to the community college setting will also be the number of faculty to interview. For example, a community college dental hygiene program may only have ten faculty members. Interviews should generate results applicable to educational research understanding. One possible weakness with external validity in this study might be geographical location. The availability of technological advancements can vary according to location, which can also impact the amount and type of electronic training received by faculty. The dental hygiene faculty educators in a rural community setting may not have access to the same cutting edge technological exposure as those in a metropolitan area. This factor will in most cases affect the amount of electronic teaching utilized by dental hygiene faculty. The characteristics of the faculty and student population can also be impacted by location. The ethnic backgrounds and socio-economic status of the subjects can alter the results to this study. The geographical demographics could also play a part in how faculty will respond to the interview. The geographic location can impact the resources dental hygiene faculties have to utilize and expand student learning. The type of professional development faculty can gain from yearly continuing education courses would also impact the knowledge concerning electronic teaching and reflective learning. Obtaining this type of education program knowledge will provide data for necessary upgrades, so

a dental hygiene student in one region of Virginia has the same exposure and skill development as a dental hygiene student who attends another Virginia program.

The design of this study is appropriate to gather results that could provide further insight into dental hygiene education. Because education has already been studied and evaluated in the areas of reflective and electronic learning, the interview method should provide results on effectiveness, whether in a community college or in a university setting. Testing methods have been developed in previous dental hygiene learning studies. It can be inferred that such methods would effectively assess students' usage and comprehension levels.

The limitations of the interview technique can affect how faculty would respond. A personal interview approach may make faculty feel cautious about answering questions. In addition, interviewing only one faculty member per dental hygiene program might also limit the amount of varied responses that would be generated from a greater insight into electronic teaching and reflective learning practices.

ASSUMPTIONS

The researcher believes the following assumptions to be true. The assumptions include the following:

- Electronic learning can positively impact dental hygiene students' educational and professional growth.

- Dental hygiene students' educational and professional growth can be enhanced through reflective learning practices.
- Dental hygiene educators can develop a positive attitude toward reflective learning delivered through electronic courses.
- Dental hygiene educators are satisfied with the amount of electronic learning their program implements.
- Dental hygiene educators are satisfied with the amount of reflective learning implemented into their program.
- The amount of training provided by employers to deliver electronic course instruction is sufficient.
- Electronic course delivery includes reflective learning practices taught by dental hygiene educators.

PROCEDURES

Data were collected in the fall of 2013. A Likert-scale type answering for interviewees was designed to assist with data analysis. The procedures for this study were to conduct the interviews with faculty of dental hygiene to evaluate their use of electronic and reflective learning methods within their dental hygiene curriculum. There are nine closed-ended questions and one open-ended question in the interview template. An example of a closed-ended question is: *I am familiar with electronic learning methods.* This is followed by a Likert-scale style of answers to choose. A

blueprint for the points to address within the research topic was determined through literature review. Faculty educators will be contacted to be interviewed.

DEFINITION OF TERMS

The following section defines the terms that are pertinent to this study:

Dental Hygienist: is a preventive oral health professional who has graduated from an accredited dental hygiene program in an institution of higher education, licensed in dental hygiene who provides educational, clinical, research, administrative, and therapeutic services supporting total health through the promotion of optimal oral health (ADHA, 2013).

Electronic Learning: the use of internet technologies to deliver a broad array of solutions that enhance knowledge and performance (Rosenberg, 2001).

Learning: defined as a process of making sense of life's experiences and giving meaning to whatever 'sense' is made; using these meanings in thinking, solving problems, making choices and decisions (MacKeracher, 2004).

Reflective: skills and attitudes calling on individuals to accurately describe not only their own physical and social activities, but also their mental activities and emotional responses in learning situations (MacKeracher, 2004).

Reflective Learning: a greater or deeper degree of processing of material to be learned - as opposed to non-reflective learning, in which material is simply taken in with little or no active thinking (Copian, 2013).

OVERVIEW OF CHAPTERS

Chapter I of this study provides an introduction to the topic of dental hygiene education delivered through electronic learning, including reflective thinking methods. A statement of the problem and research goals provides awareness of why dental hygiene education merits study. The extent of education and learning modalities change with each generation; consequently, research is necessary to discover where the faculty and learning institutions stand. Background and significance information help establish the reasons for investigating the university and community college faculty. Electronic teaching is present in dental hygiene programs, but whether it is used to full capacity is one component of the study. Chapter I also includes the known limitations and assumptions derived from the aspects of the research process concerning the interview. An interview was used to gather data.

Chapter II will include a literature review that provides greater insight into this topic. It will review previous studies that contribute a greater understanding about dental hygiene education, reflective learning, and electronic course delivery. Chapter III will contain methods and procedures section to be used in this study. The style and type of questions listed in the survey will be provided. The characteristics of the participants by nature of location and amount of input are given in detail. Chapter IV reports findings gathered through the study. Chapter V contains summary, conclusions, and recommendations, with evidence and greater insight for dental hygiene education about electronic and reflective learning.

CHAPTER II

REVIEW OF LITERATURE

In the literature review, the research identified select studies concerning reflective learning, technology, and dental hygiene education. Each section describes at least one of the topics, if not all three. The dental hygiene profession is being molded each year to waves of change by demand within society and the use of technology, so each topic will prove important for the professional growth of current and future dental hygiene students. The methods employed in learning and continuing education will have continuing effects as their students enter the workplace. Dental hygiene educators are also being held to higher standards and expectations to provide cutting-edge learning techniques with each generation of graduates. Keeping up with change and keeping an open mind about making improvements are important aspects of dental hygiene education. The only way to ensure such progress is by adapting to learning modifications and self-improvement.

Dental Hygienist

The first definition of a Dental Hygienist dates back to the year of 1912 (ADHA, 2013). When this profession began, dental hygienists stood while treating patients, did not wear gloves, and had no evacuation system in place. Throughout the decades vast improvements have been implemented within the dental profession to adapt to changing times. Those adaptations are caused not only by technology but also by research findings as well as how society's standards have altered. In the past decade,

the trend has been for dental professionals to become increasingly knowledgeable about technology. To be on the cutting edge of dentistry, utilizing digital radiographs, charting, and administrative skills is a must. Another aspect of change each year is the description of delegated functions a dental hygienist can perform. The only way to prepare dental hygiene professionals for entry into the workforce is to expose them to these skills through the undergraduate curriculum. Following graduation, it is then up to employers, educators, and the hygienists themselves to update their skills with necessary courses.

E-Learning versus Classroom Instruction in Infection Control

Garland (2010) conducted a study on distance education with dental hygiene students. Few such studies are available about dental students. The demand for dental hygiene educators in our society is expected to increase, so more postsecondary dental educators will be needed. One way to combat the shortage of postsecondary educators is through e-Learning. Some utilize the term *distance education*, which is equally applicable. Postsecondary demands on education include the students' desires, costs, convenience, enrollment, and pressure on administrators and/or faculty (Garland, 2010). The idea of implementing distance technology for instruction of dental hygiene students who are working toward a master's degree seems promising for several reasons. Dental hygiene master's degree students are likely to become educators themselves. One reason to provide this type of distance learning is its potential to reach students with full-time jobs and family commitments. Another reason for distance

learning is to provide access to higher education for interested students who live in the rural areas.

A study in 2006 revealed that learning can be just as effective with e-learning as in the classroom setting (Garland, 2010). Evidence of positives to e-learning are the convenience for students, flexibility of time, easier student tracking, lessened costs, ease of updating materials by faculty, and an increase in course information retention. Possible negatives of e-learning include the time necessary to develop the programs, insufficient technical resources, and technical difficulties.

Infection control is a topic that can be studied through the e-learning approach. The Commission on Dental Accreditation (CODA) has set the standard for infection-control achievement for dental hygiene. The Occupational Safety and Health Administration (OSHA) have also stated its requirements necessary for dental professionals. The required materials are appropriate for the knowledge level of the learner; they are also specific and not generic. The materials are re-issued annually, and they must be interactive for question availability. OSHA mandates that educators be knowledgeable and that proper documentation is retained for validation of compliance.

This study dealt with two small groups of first-year students who were enrolled in a two-plus-two baccalaureate dental hygiene program. In 2008, twenty-six students were taught an infection control class via web-based modules. The group received the material in June before classes began in the fall. Students had from June to August to work on the modules. A question and answer session was given prior to classes in

August. A multiple-choice examination was administered on the first day of class, with subsequent clinical examinations given during week four of the class. The group of students had exposure to infection-control course materials for a total of three months prior to the beginning of the class.

A t-test analysis revealed little appreciable statistical difference in the two groups on the multiple-choice examination. Classroom instruction received an 86% pass rate, whereas the e-learning group scored 82%. The Fisher's exact test yielded a score of 24 on satisfactory performance in the classroom setting. The e-learning group scored a 22 on the same topic. The results displayed no real statistical difference between the groups. The e-learning group achieved satisfactory scores within the first and second attempts. The classroom group took up to three attempts for all to achieve satisfactory scores.

The researcher concluded the dental literature contained no study about infection control via e-learning. It also concluded the statistical differences in the t-test could be attributed to the extra exposure with the photograph learning exercise, video, and extra question/answer time after lectures. The study concluded that e-learning is comparable to classroom instruction. The e-learning also proved effective in providing students with knowledge prior to beginning their courses. Students and faculty can both benefit from this approach as access to distance learning increases for various student populations. As a result, the e-learning avenue can be appreciated and accepted for dental hygiene infection control education.

Effectiveness of Web-based Teaching Modules: Test-Enhanced Learning in Dental Education

Jackson, Hannum, Koroluk, and Proffit (2010) conducted a study to address the rising issue of faculty shortages and an ever-increasing curriculum. This study was based on pre-doctoral students in the University of North Carolina at Chapel Hill School of Dentistry. The students from the class of 2011 and 2012 took part in a Growth and Development curriculum. This curriculum allowed them to experience self-instruction and web-based technology teaching. The dental students were permitted access to the self-tests, small-group seminars with instructors, textbooks, and online teaching modules.

These self-tests are utilized only to generate learning; the score produced is not relative to the overall course grade, nor is it recorded. Self-tests provide the students initial feedback after each answer is chosen. The feedback uses text and graphics to provide an explanation for the student why the answer is correct or incorrect. Once the test is complete, a count of incorrect answers is given and additional instruction is suggested.

In today's society, students commonly accept the methods of self-instructed and web-based learning. The world is so technology driven and oriented that students are familiar with the modalities of web-incorporated learning. This study bases most of its data on the responses generated by the online self-tests.

The class of 2011 consisted of seventy-nine students who participated in the Level IV Growth and Development curriculum. The 2012 class had seventy-eight students who were able to participate in the Level I and Level II Growth and Development curriculum. Level I took place in the summer trimester of 2009; Level II, in the fall trimester of 2009. Students were first exposed to online teaching modules and later divided into smaller groups for more discussion about the material that was graded. The UNC Office of Computing and Information Systems observed the access students had to the teaching modules and online self-test. This monitoring recorded the dates and times of each student's access. The duration of the access was unable to be recorded.

Level I and II Growth and Development curriculum had no relational significance to the frequency of access in the modules or tests. Level IV Growth and Development, class of 2011, were enrolled for the fall trimester of 2009. Level IV also revealed no relational significance to module access, but the frequency of test access increased. The results also yield that students were more likely to access teaching modules in Level II over the rate in the Level I trimester period. The access to self-test decreased from Level II to Level I. There was no significant statistical difference in final-exam grade changes or course averages in the study results.

For this study, the research for cognitive psychology has shown how influential a repeated spaced presentation of material is for learning. The "testing effect" is defined as how the frequency of testing can enhance learning ability. Basically, it simply

concludes that taking tests on material in smaller increments is more beneficial than taking a larger final exam. The feedback provided to the students after each incorrect answer proves beneficial to learning. Some reports reveal that the student performance increase was produced by online self-assessment tools (Ibabe, 2010); however, the evidence is insufficient to mandate employing these ideas in computer-assisted learning within a dental school setting.

This study also concluded that Level IV Growth and Development curriculum utilized by students who had an extra full year of dental education over the other class. The added experience led to better study habits. The class of 2011 displayed more progressive study habits and patterns over the 2012 class, even with different study resources and course outlines.

The articles “Effectiveness of Web-Based Teaching Modules” (Jackson, 2010) and “E-Learning vs. Classroom Instruction in Infection Control in a Dental Hygiene Program” (Garland, 2010) go hand-in-hand with how technology has encroached into educational standards. Education has been forced to comply in order to keep up with changes in society. With legislation reducing the number of faculty available and no prospect of salary raises in sight, technology has been employed as a way to combat the pressures (Haden, 2002). Web-based classes and instruction have become the best way for students to learn. These studies show just how comparable web-based learning is to the traditional classroom. It dictates whether some people are able to achieve their goal of higher education.

Reflective Learning

The concept of reflective learning and its potential impact on dental hygiene will be addressed next. Writing in a journal, completing a community service project, and creating a practitioner's level of thinking lead to concise conclusions. The review focuses on the "real life" encounters dental hygienists will have at some point and how they should process their thinking, action, and feedback to achieve the best outcome.

Students' Reflective Learning within a Community Service-Learning Dental Module

A study conducted by Brondani (2010) examined a group a dental students at the University of British Columbia (UBC). For the academic calendar years 2008-2010, 121 students were divided into small groups. The study is based upon community service learning (CSL) and the role it plays in the lives of students. Students collectively utilized critical thinking, problem-solving skills, and their surrounding environmental factors. Community service learning involves the community as a whole and its members. The school places students in areas such as nursing homes, school systems, or community clinics. The students are to implement community projects at their assigned locations. Every group of dental students is observed by a tutor. A tutor holds one of the following positions: dentist, dental hygienist, or UBC graduate student.

The goal of the community service learning activity is that students employ a reflective process to generate greater knowledge in their related field of study. No particular standard is applied to the reflective process; the main focus in this study is to have the students maintain a journal. Journaling provides the students with an avenue

to express themselves and stimulate growth. This study defines reflection as “the intentional consideration of an experience in light of particular learning objectives.”

The journal entries were guided by a set of open-ended questions to stimulate critical thinking and self-exploration. The students first attended their respective sites before the project began and received the following questions to stimulate the learning activity: What did you observe? What surprised you the most and least during the site visit? The following questions were posed in the journals: What challenges are you facing? What is your perception so far about the project? What take-home message are you aiming for? (2010)

Questions for the journal for the conclusion were: What would you do differently next time? Where do you go from here? How do you see this project in the long run? (2010). This study compiled journal responses using N-VIVO 8 Software and Microsoft Power Point.

Awareness of the type of reflective learning is imperative in health professions education. The students are practicing clinical skills and simultaneously increasing their thinking skills. The study had a total of 203 reflections submitted that were divided into “before” and “after” entries. Many emotions and key words were exhibited in the journals.

An example of a journal entry from a second-year dental student going to a long-term care facility follows:

> A question came up in our presentation: how to brush teeth in elderly (residents) who refuse to open their mouths? . . . I felt a bit frustrated as I did not cover this topic during the presentation. We should have covered that topic since it is a common occurrence. My immediate response was 'That is a very important question and we will be pleased to give you some answers next time. (Brondani, 2010, p. 631)

The study provided insights into the personal thoughts and feelings dental students' exhibit during clinical experiences. It provides a way to explain and mediate the best possible outcomes for various scenarios. Reflective journaling allows the student to avoid stereotypes that may exist within the community. It generated reflective learning and stimulated personal growth. Community service learning provides an environment for reflective learning through journaling. These are thoughts and decisions students can take with them throughout their learning careers.

Developing Reflective Health Care Practitioners: Learning from Experience in Dental Hygiene Education

The goal of a study conducted by Asadoorian (2010) was to evaluate the self-assessment of dental hygiene students through reflective journaling. This study involved dental hygiene students in the pre-clinical and clinical first-year terms of the program. The ability of dental hygiene practitioners to assess their critical-thinking and learning processes is crucial to generate knowledge. Recognizing the value of self-assessment is how one uses reflection from their practices. A dental hygiene practitioner who looks

back, critically examines experiences, and learns is deemed reflective. This reflective practitioner is able to decipher the difficult encounters of a daily life in the clinical setting.

Reflective practitioners also keep up-to-date on new knowledge and apply it in the practice setting. Studies have shown there is an apparent gap between existing practice and current knowledge. This gap is termed the “theory-practice gap.”Recognizing this gap has led the healthcare profession to require continuing education. This requirement ensures that an effort is made to close the existing knowledge gap. The goal of continuing education is to ensure the public has access to high-quality and safe healthcare via a minimum level of practitioner competence. It also ensures that health professionals’ performance will improve over time.

The act of reflection is a skill worth teaching to practitioners through continuing education. Reflection connects new theoretical knowledge to existing practice; it uses nearly limitless practice experiences, generates a deeper and complex form of thinking, and can create “transformative knowledge” that leads to behavior alterations in clinicians.

The reflection model contains seven hierarchies: trigger, description, awareness, analysis, relating, new perspective, and validation. This model is useful in guiding students to detail their clinical experiences, connect theoretical knowledge, and learn from their own experiences. The study was designed to elicit responses to levels of

reflection students could achieve, types of triggers for reflected experiences, and the types of reflected subject material.

First-year dental hygiene students involved in preclinical and clinical experiences were selected over two consecutive semesters. The students were requested to reflect on clinical experiences according to the reflective model and journal their responses weekly. The students were to choose and submit two journal entries each week for evaluation by the course coordinator. Higher grades were received by the students who achieved a more reflective level of thinking. The students were also provided a one-hour PowerPoint presentation to explain the rationale and structure of the reflective journal. A study coordinator invited the students to participate in hopes of eliminating bias. The students' weekly submissions were given anonymous status once the journals were received each week. A standard of confidentiality was mandated for the students. Copies of the journals were made, while the originals were returned to the students. Part of the study coordinator's job was to eliminate identifying markers in the journals prior to sorting reflective responses. Qualitative analysis was transcribed and completed on the reflective journals. Reliability and validity were also employed on the assessment of the journals.

Only eleven of the twenty-six students turned in reflective journals for the study. Those eleven journals were divided into sixty-four entries. The results yielded 67% of the responses reported in the central level of reflecting; 31% were non-reflective. A total of less than 5% of the journal entries obtained a critical reflective level. Many of

the journal entries provided a trigger, description, and awareness detail; half did not achieve analysis or better. In retrospect, the students did not obtain a reflective critical level during the process. Despite instructions to the students on how to move through the reflective model, several proceeded to skip levels. The most common negative response was “technique difficulty,” followed by instrumentation, patient positioning, and instructor. The most common generated positive response was confidence with comfort, good feeling, at ease, and excited to follow.

This study was small in size, and it lacked statistical significance; however, it generated some knowledge about dental hygiene students. It was able to provide insight into how important the reflective process can be to healthcare professionals. There was obvious need to complete further and more in-depth studies about reflective learning for dental students. The transformative-knowledge and continuing education areas are of interest to gain understanding in reflective learning. General acceptance and implementation into the curriculum would be necessary to gain wide usage.

The Influence of Technology on Reflective Learning in Dental Hygiene Education

Hanson and Alexander (2010) conducted a study of the importance of reflective learning and the way it can advance a student’s progress in thinking. The study focused on the ability to fine-tune critical thinking about motor skills and cognitive thinking. Reflective learning allows for the understanding of new ideas and scenarios by integrating new knowledge. A “learning circle” is what stems from reflective learning, including the importance of placing students in real-world situations to decipher their

critical-thinking abilities. Some of the questions posed for the “learning circle” are: How can communication and respect be increased? How can a patient be treated better, faster, or more efficiently? How could instrumentation have been more effective? These questions cue the student to reflect on daily encounters and practices to achieve a better outcome.

Technology has changed the way education is delivered and how educators must involve students to maintain learning. The internet has produced profound improvements within education and society, so implementing online journaling is a way to coincide with technological change. Reflective learning, traditionally produced on handwritten paper, now can be accomplished in the form of blogs on the web. A purpose of this study (Hanson & Alexander, 2010) was to discover the relationship of reflective practice among dental hygiene students while deciphering which method is more conducive to producing learning results. The questions that were posed for this study to answer were: Hard copy journaling will reveal what levels of reflective learning? What reflective learning will be observed in electronic journaling? Does hard copy or electronic journaling produce a greater reflective learning experience?

This study was compiled with existing data from a non-experimental historical evaluation. Dental hygiene students with junior and senior status at various universities were grouped in hard copy and electronic-journaling groups. The dental hygiene students were assigned to submit at least one entry per week consisting of reflection about clinical experiences. The journaling data stretched over a two-year period.

Journaling was also an incorporated part of the students' academic practices. The students were requested to sign consent forms stipulating that nonparticipation would not impact the nature of their grade.

The participants in each group were graded by the level of reflection achieved: habitual, understanding, reflective, and critical action. The results of the hard copy journal group were 27% habitual, 39% understanding, 33% reflective, and none in the critical category for seniors (2010). The junior hard copy journal group yielded 31% habitual, 48% understanding, 20% reflective, and none in critical (2010). The electronic journaling group of seniors had 10% habitual, 44% understanding, 30% reflective, and 17% in critical (2010). The junior group of electronic journaling yielded 22% habitual, 48% understanding, 22% reflective, and 8% critical (2010).

The study results showed how electronic journaling facilitated critical reflective learning and hard copy did not yield critical-level learning. Electronic journaling also resulted in lower levels of long-term learning throughout the study. Electronic journaling stimulates more awareness about their content over hard copy. Many students thought no one would read the hard copy journal as much as the electronic. The students who made entries electronically were utilizing self-awareness about their content and who would respond or read. With this small study group, it has been observed how great an impact reflective learning and technology can have on dental hygiene students in either classroom or clinic settings.

Oral Health Students as Reflective Practitioners: Changing Patterns of Student Clinical Reflections over Twelve Months

Tsang (2012) focused a study on the level of reflective learning that undergraduate oral health students apply to clinical and professional practices. Self-awareness and critical thinking can be achieved through self-examination. The definition of reflective can be divided into types, models, levels, frames, and contexts, to name a few. For practitioners to reflect upon what they have learned creates a higher, abstract level of thinking. These have been perceived as difficult to achieve in dental programs and as a result are often avoided in the curriculum. It has been assumed that the learning process itself yields reflective learning. By assuming that reflective learning skills have typically been underdeveloped, modalities can be improved for students. These types of learning processes create a more reflective practitioner of the student.

This study took place at the University of Queensland with bachelor of oral health program students participating. This program qualifies students as dental therapists and dental hygienists in Australia and New Zealand. The reflective learning mechanism was implemented for the oral health curriculum for the dental hygiene students' final twelve months. It placed reflective journal writing in the clinical and assessment requirements for students. There were seventeen female students enrolled for the final year of the program. At the beginning of the semester, two seminars were given explaining the nature of reflective learning and writing with examples. The basis for guiding the structure of reflective learning and writing was Boud's 4 R's of reflection.

The four R's stand for *revisit*, *react*, *relate*, and *respond*. *Revisit* has the person return to the event, incident, or experience. *React* has the person consider in detail the experience. *Relate* involves the person reevaluating the experience and seeking to understand its meaning. *Respond* is a plan for what might change through the reflection process.

The fourth-year students had two clinic sessions a week of three hours' duration each session. Reflective journaling was assigned after each clinic session with guidelines to direct thought processes. The journals were submitted for assessment at the conclusion of each semester. The journals were assigned a pass/fail grading outcome. The journals that contained critical reflection received a passing grade, while journals that did not contain critical reflection received a failing grade.

The results of the students' journal entries revealed a critical reflective learning gain over the span of the twelve-month period. The initial results from the journals contained apparently superficial responses, but over the course of the school year, the rate of critical reflection in the responses increased. The submitted reflections from the students in the first week showed 61% at the descriptive level. At the conclusion of week 12, 58% of the students had achieved the critical reflection level. The highest level of reflection, according to Boud, is *respond*. This level was attained only infrequently, but it developed over the course of the study. In the beginning of the study the rate of *respond* was at 8%, by the conclusion of the study it had increased to 26%. The aspects

of *react*, *relate*, and *respond* increased the most over the course of the study, while *revisit* decreased toward the conclusion.

This study demonstrated the importance of incorporating reflective learning practices into the oral health profession. The depth of critical thinking can evolve with learning experience over the course of a program. Reflective learning and critical thinking can foster a high level of professional and clinical skill for a dental hygienist.

Summary

Chapter II, Review of Literature, contains research on the nature of dental hygienists and their profession. It provides insight and reflection on where education has been and where it is headed. Each article reviewed was different in approach, study group, or rationale. Each studied how to incorporate technology and education into the dental field. Educators are being held to higher standards than ever before and are mandated to include more course material with little assistance, even while more people are choosing to return to college for higher education.

The responses to the subject matter of this research demonstrate that it is an important topic. Understanding how much electronic learning is being incorporated in dental hygiene education is just as important as how much it can be utilized as part of the students' learning provided by their faculty. Reflective learning is another consideration in how dental hygiene education can improve with greater understanding on the part of future professionals. Studying how dental hygiene students learn and keeping them on the cutting edge of technology will enable them to become better-

rounded professionals ready to serve society. All the articles conclude that reflective learning is important to the progress of the dental hygiene practitioner's career.

In Chapter III, the methods and procedures for this study will be explained. Within this chapter the population, instrument design, methods of data collection, and statistical analysis will be detailed.

CHAPTER III

METHODS AND PROCEDURES

This chapter describes the methods and procedures implemented through this study to examine electronic course delivery and reflective learning in dental hygiene students' curriculum. The methods and procedures for this study include defining the population, detailing the instrument design, describing the methods of data collection, and detailing the statistical analysis methods used to process the data.

Population

The purpose of this study was to examine whether electronic course delivery used reflective learning in educating dental hygiene students. The population involved in this study is the dental hygiene faculty currently teaching these particular curricula within the state of Virginia. Dental hygiene faculties are typically female dominated. The sample for this study will also be solely contained within the state of Virginia. Three dental hygiene programs within a community college setting and two within a university setting will contribute to the study group. At least five faculty educators who teach the first- and second-year dental hygiene students will participate in this study.

These educators were asked to participate in a non-proportional purposive sampling interview. The researcher will produce a list of educators from the director of the dental hygiene program at each postsecondary institution. The selection process for this group was based upon the demographics of community college and university

settings. Community college faculties have characteristics different from those enrolled in a four-year institution. No compensation will be provided for participation in the study for faculty.

Instrument Design

The instrument used for this study is an interview guided by a survey format for participant responses. Its structure is based on the Likert scale type of response selections. The research questions will be evaluated through a series of structured, closed-ended interview questions administered to the dental hygiene faculty educators. The dental hygiene curriculum will be evaluated based on the answers from the faculty about how they utilized electronic and reflective learning techniques throughout the program along with their attitudes and strategies. Based upon their experience and participation, faculty will answer the questionnaire accordingly.

The questions were based upon the following concepts:

- Impact of electronic learning on student educational and professional growth
- Impact of reflective learning on student educational and professional growth
- Attitudes of educators concerning reflective learning and electronic teaching
- Satisfaction of educators with level of reflective learning and electronic teaching
- Adequate training for educators to deliver electronic courses
- Success from reflective learning and electronic teaching

These results will be analyzed using descriptive statistics. Using a standard mean method, the total scores from the faculty will be converted into a visual table for easy comprehension. The instrument contains nine closed-ended questions and one open-ended question. An example of a closed-ended question is: *I am familiar with electronic learning methods*. This was followed by the Likert scale type of answers to choose. The Likert scale is still a popular choice for researchers. A blueprint for the research questions that need to be addressed within the research topic was used in the design.

This method of research concerning electronic and reflective learning in dental hygiene education will provide insight into the collegiate curriculum system. Obtaining this type of education program knowledge will provide data for necessary upgrades to ensure that a dental hygienist in Virginia prepared through distance delivery courses will have the same exposure and skill development as a dental hygiene student prepared elsewhere. See Appendix A for a copy of the interview protocol.

Methods of Data Collection

The researcher emailed the selected five faculty educators a cover letter inviting their participation in the study. The cover letter explained the nature of the study, the interview purpose, human subjects' protection measures, and notice of agency. The interviews with faculty were dealt with by individual correspondence. Faculty educators were asked to respond with an interview time within a week. At the conclusion of the week, all five faculty educators corresponded and completed the interview. See Appendix B for the cover letter to the study.

Statistical Analysis

Responses to interview questions were tabulated and analyzed to determine how electronic teaching and reflective learning impacts their respective dental hygiene program. The percentages, number of respondents, and mean were calculated for each interview question. These statistical techniques are commonly utilized as a standard method of scoring and interpreting data results. The answers that will be converted and calculated into numerical data will be short answer and close-ended in nature. The open-ended responses will be summarized. These sample scores will be effectively represented in a common scoring that includes a mean score with a table for easy visual interpretation. Answers were reported in the findings section of the study.

Summary

Chapter III discussed the methods and procedures for this interview study. It contained the population, instrument design, methods of data collection, and statistical analysis of the interview survey responses. The sample consisted of five faculty educators from dental hygiene programs within the Commonwealth of Virginia. The instrument design was based upon closed-ended and open-ended-style questions that will be used to answer the research questions posed. The methods of data collection consisted of an email and interview using a structured protocol to guide question correspondence with the chosen faculty educators. Statistical analysis of the response data were analyzed by descriptive statistical methods after being organized, converted, summarized, and tabulated.

Chapter IV, Findings, contains the interview results that have been analyzed and computed. This chapter will also discuss response rates and findings in research question order.

CHAPTER IV

FINDINGS

The purpose of this section is to present the data-collection results obtained from dental hygiene faculty at the colleges in the Commonwealth of Virginia. The goal of this study was to gain a greater insight from dental hygiene faculty concerning electronic course delivery and reflective learning strategies contained within these courses. The survey's findings report how dental hygiene faculties perceive and implement electronic course delivery along with reflective learning strategies. The findings yield responses from an array of faculty within two- and four-year institutions across the Commonwealth of Virginia.

This study will ascertain answers to the research questions posed. It will be determined if dental hygiene faculty educators agree that electronic learning has an impact on the educational and professional growth of dental hygiene students. It will also be found if there is an impact on the professional and educational growth of students through reflective learning. The attitudes of educators concerning electronically delivered courses can be varied in nature, as with reflective learning. A portion of the educators will find satisfaction with the amount of electronic and reflective learning implemented within their programs. Some dental hygiene educators will feel that they receive adequate training from employers to deliver electronic courses and find delivery successful.

Response Rate

The number of dental hygiene faculty in the Commonwealth of Virginia contacted for participation was five, which provided one faculty educator from each of the dental hygiene programs. Of the five faculty, all provided responses to the interview. This amount of response yields 100% participation. All five participants gave responses to Questions 1-9. All five participants answered the open-ended response of Question 10.

The interview questions were based upon a 5-point Likert scale responses to rate Questions 1-9. An open-ended discussion statement was provided for Question 10. The Likert scale rates the responses from 1 being “strongly disagree,” to 5, which is “strongly agree.”

Report of Survey Findings

Questions 1 and 2 of the interview were structured to answer Research Question 4: Are the faculty educators satisfied with the amount of electronic learning being implemented into their course material? Of the five faculty members who participated in the survey, two disagreed and three agreed. Question 1 asked are you satisfied with how much electronic learning has been implemented into the course material. The mean score was 3.2. See Table 1.

Table 1

Are you satisfied with how much electronic learning has been implemented into the course material? (Q1)

Response	Number	Percent (%)	Mean
Agree	**3**	**60.0**	**3.2**
Disagree	**2**	**40.0**	

Question 2 asked faculty educators whether electronic learning methods were in place for the students in their dental hygiene programs. None of the participants skipped this question. Of the five participants that answered, three agreed (60.0%) and two strongly agreed (40.0%). The 100% response in agreement showed that electronic learning methods were in place for their program. The mean score was 4.4. See Table 2.

Table 2

Our dental hygiene program has current electronic learning methods in place for students. (Q2)

Response	Number	Percent (%)	Mean
Strongly Agree	**2**	**40.0**	**4.4**
Agree	**3**	**60.0**	

Question 3 was derived from Research Question 1: What impact have electronic learning and reflective learning made on the professional and educational growth of their dental hygiene students? Interview Question 3: Electronic learning and reflective learning have an impact on the professional and educational growth in dental hygiene students. None of the participants skipped this question. With the five faculty educators who responded, three agreed (60.0%) and two strongly agreed (40.0%). The educators

were in 100% agreement that electronic and reflective learning makes an impact on student professional and educational growth. The mean was 4.4. See Table 3.

Table 3

Electronic learning and reflective learning have an impact on the professional and educational growth in dental hygiene students. (Q3)

Response	Number	Percent (%)	Mean
Strongly Agree	**2**	**40.0**	**4.4**
Agree	**3**	**60.0**	

Interview Question 4 was designed from Research Question 6: Did dental hygiene faculty educators feel they have received an appropriate amount of training from their employers to deliver electronic distance learning effectively? None of the participants skipped this question. Two participants strongly agreed (40.0%) and three agreed (60.0%). The responses show faculty agreeing they have received adequate training for electronic course delivery. The mean was 4.4. See Table 4.

Table 4

I have received adequate training from my employer to deliver electronic distance learning effectively. (Q4)

Response	Number	Percent (%)	Mean
Strongly Agree	**2**	**40.0**	**4.4**
Agree	**3**	**60.0**	

Question 5 asked the faculty educators about journals in their classroom or clinic curriculum and if they are used for reflective learning purposes. None of the participants skipped this question. One participant was undecided (20.0%) on this question. One

agreed (20.0%) and two strongly agreed (40.0%) in response, while another participant disagreed (20.0%). This question yielded a diverse percentage in responses. The mean was 3.8. See Table 5.

Table 5

Journals are utilized for reflective learning in the classroom or clinic setting. (Q5)

Response	Number	Percent (%)	Mean
Strongly Agree	**2**	**40.00**	**3.8**
Agree	**1**	**20.00**	
Undecided	**1**	**20.00**	
Disagree	**1**	**20.00**	

Question 6 had the faculty educators examine self-exploration and critical thinking as it applies to the reflective learning aspect of their curricula. None of the participants skipped this question. Two of the participants agreed (40.0%), while three strongly agreed (60.0%). The mean was 4.4. See Table 6.

Table 6

Self-exploration and critical thinking is achieved by the reflective learning practices in my curriculum. (Q6)

Response	Number	Percent (%)	Mean
Strongly Agree	**3**	**60.0**	**4.4**
Agree	**2**	**40.0**	

Question 7 was designed from Research Question 5: Were faculty educators personally satisfied with amount of reflective learning within their curriculum? Question 7 asked if you were satisfied with the amount of reflective learning in the curriculum.

None of the participants skipped this question. Two of the participants strongly agreed (40.0%) and three agreed (60.0%). The mean was 4.4. See Table 7.

Table 7

I am satisfied with the amount of reflective learning in the curriculum. (Q7)

Response	Number	Percent (%)	Mean
Strongly Agree	**2**	**40.0**	**4.4**
Agree	**3**	**60.0**	

Question 8 was based upon Research Question 7: Did dental hygiene educators find success with electronic delivery methods? Question 8 inquired as a dental hygiene educator, I find success with electronic delivery methods. None of the participants skipped this question. One participant was undecided (20.0%), two agreed (40.0%), and two strongly agreed (40.0%). The mean was 4.2. See Table 8.

Table 8

As a dental hygiene educator, I find success with electronic delivery methods. (Q8)

Response	Number	Percent (%)	Mean
Strongly Agree	**2**	**40.0**	**4.2**
Agree	**2**	**40.0**	
Undecided	**1**	**20.0**	

Question 9 addressed whether faculty believe electronic course instruction is as effective in learning as the traditional classroom. None of the participants skipped this question. Two participants strongly agreed (40.0%), two was agreed (20.0%), and one undecided (40.0%). The mean was 4.2. See Table 9.

Table 9

Electronic course instruction is as effective in learning as traditional classroom instruction. (Q9)

Response	Number	Percent (%)	Mean
Strongly Agree	**2**	**40.0**	**4.2**
Agree	**2**	**40.0**	
Undecided	**1**	**20.0**	

Question 10 was an open-ended type of discussion statement that allowed participants to express their thoughts about the influence that electronic and reflective learning has had on their dental hygiene teaching. Question 10 was derived from Research Question 7: Did dental hygiene educators find success with electronic course delivery and reflective learning? None of the participants skipped this comment area. Each of their responses are quoted separately in the following paragraphs.

> "Electronic learning is a method of teaching, but I feel [a] traditional classroom is still the most effective for dental hygiene and our students."
>
> "It has engaged students to assume a more proactive role in their learning and helps me to better assess their critical thinking and judgment."
>
> "Journals are used for clinical practice. It allows the student to set goals for learning and requirements, plan for achieving the goals, and reflecting back. It is extra work for faculty, but the outcomes have proven to help the students stay on track."
>
> "Reflection in courses I direct takes the form of a specific reflection document for content, experience, and peer evaluation (in group activities). It is also used in a blog for the course activity on the class BlackBoard or WordPress site. I see over the progression of the semester/curriculum at how much more introspective the student has become after reflecting on how this experience has changed their perception, decision-making, and ethical behaviors. I use this method with first, second, and third year students. Portfolio use has the reflective component as well. Students must provide evidence of the program competency statements, by reflection as well as graded activities. Electronic and hybrid delivery of course materials/activities has been useful with my senior dental hygiene students-who are out on community service/off-campus rotations when "formal" in-class sessions are held. Students, who receive the

information in person, as well as those on rotation, can review the formal seminar presentation via ECHO 360 lecture capture. So no one misses out on the content provided. Group functions within the online course allow students to create group projects/presentations electronically, then submit completed work to the course director for evaluation. Student assignments force application, evaluation, and synthesis of the content of the in-class presentations. MOOCs, online modules and access to virtual libraries enhance traditional curriculum in the students and faculty alike have instant access to evidence on which to base decisions. Developing models in clinical teaching that use PICO format to answer clinical questions on evidence-based care would not be feasible without the information super highway. Providing justification for care decisions to our patients is another benefit to EBDM and the internet in our curriculum and continuing professional education."

"Electronic learning allows the students to have peer-to-peer interaction, learn from a variety of electronic media, and also gives the student flexibility of their learning environment. For example, within my courses I prerecord all lectures and utilize class time for active learning strategies. This would not be possible without an electronic learning environment. Additionally, offering this type of interaction gives students time to reflect on the material and come to class with a higher order of thinking. Reflective learning has been critical within our program. The students are given topics and must answer questions based upon their own experiences."

SUMMARY

Chapter IV provided the interview findings for this study. The purpose of this study was to analyze the effect electronic teaching and reflective learning had on students enrolled in a dental hygiene program by faculty. The focus of the study was to gather responses from dental hygiene faculty educators in the Commonwealth of Virginia concerning electronic teaching and reflective learning in their program curricula. An electronically emailed cover letter and corresponding interview were conducted to gather data for the responses. The interview population consisted of a dental hygiene faculty educators from each of the five dental hygiene programs in the Commonwealth of Virginia.

The report of interview findings related the nine closed-ended questions to the seven research questions posed within the study. Question 1 asked participants if they were satisfied with the amount of electronic learning that has been implemented in their curriculum. Three of the five participants agree (60.0 percent) and two disagree (40.0 percent). Interview Question 2 stated: “Our dental hygiene program has current electronic learning methods in place for students.” Two participants strongly agree (40.0 percent) and three agree (60.0 percent). Question 3 stated “Electronic and reflective learning has an impact on the professional and educational growth in dental hygiene students.” Two participants strongly agree (40.0 percent) and three agree (60.0 percent). Question 4 was “I have received adequate training from my employer to deliver electronic distance learning effectively.” Two participants strongly agree (40.0 percent) and three agree (60.0 percent). Question 5 asked if “Journals are utilized for reflective learning in the classroom or clinic setting.” Two participants strongly agree (40.0 percent), one agrees (20.0 percent), one is undecided (20.0 percent), and one disagrees (20.0 percent).

Question 6 sought to determine if “Self-exploration and critical thinking are achieved by the reflective learning practices in my curriculum.” Three participants strongly agree (60.0 percent) and two participants agree (40.0 percent). Question 7 stated “I am satisfied with the amount of the reflective learning in the curriculum.” Two participants strongly agree (40.0 percent) and three participants agree (60.0 percent). Question 8 asked “As a dental hygiene educator, I find success with electronic delivery methods.” Two participants strongly agree (40.0 percent), two agree (40.0 percent), and

one was undecided (20.0 percent). Question 9 stated “Electronic course instruction is as equally effective in learning as the traditional classroom instruction.” Two participants strongly agree (40.0 percent), two agree (40.0 percent), and one is undecided (20.0 percent). Participants responded to the open-ended statement, Question 10 asked to describe the influence electronic and reflective learning has made on your dental hygiene teaching, in a variety of conclusions. Each offered a view into their program and curriculum offering modalities that work and are effective for their students.

In Chapter V, the Summary, Conclusions, and Recommendations are given for the research study. This chapter also provides conclusions and recommendations that are based upon results from the interview survey responses.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Chapter V provides a summary of the research study. The conclusions are based upon answers to the research questions from the study's findings. The researcher makes recommendations based upon the findings of the research and need for additional studies in the future.

SUMMARY

This study examines how electronic and reflective learning is being utilized in dental hygiene programs within the Commonwealth of Virginia. It also provides insight into how dental hygiene faculties perceive and interpret these avenues of learning. Electronic learning has evolved through the decades and has made education attainable at various stages of life. Many college degree programs across the country implement electronic distance learning into their curricula. The question arises about just how much electronic distance learning is implemented into dental hygiene programs within the Commonwealth of Virginia. Some areas of a dental hygiene program curriculum can include electronic and reflective learning practices, but how familiar and effective these learning practices are to college faculty drives this study. The goals of this study were to determine: What were the impacts of electronic learning on dental hygiene students' educational and professional growth? What were the impacts of reflective learning on dental hygiene students' educational and professional growth? What were educators' attitudes toward electronic course delivery and reflective learning? Were dental hygiene

educators satisfied with how much electronic learning is being implemented in programs? Were dental hygiene educators satisfied with the level of reflective learning being implemented in programs? Did dental hygiene educators feel they have adequate training from their employers to deliver electronic course instruction effectively? Did dental hygiene educators find success with electronic course delivery and reflective learning?

The participants chosen for this study were faculty educators from the five dental hygiene colleges in the Commonwealth of Virginia during the 2013 school year. The participants' email was obtained from each dental hygiene program's website listing. The faculty educators could be from a two- or a four-year college dental hygiene program. The faculty educators could also have part-time or full-time teaching status. The limitations of this interview were using only one faculty educator per dental hygiene program within the Commonwealth of Virginia. Five dental hygiene faculty educators among the five dental hygiene programs were emailed cover letters and corresponded by interview. The criteria for the interview were based upon the literature review and research questions. The participation rate of this interview was 100 percent. The data results were used to determine the effect electronic learning and reflective learning have on dental hygiene students by their educators.

The interview was designed to answer the research questions. The questions were developed to measure the responses of dental hygiene faculty educators concerning electronic distance and reflective learning. A Likert-scale type of interview

template was used to gather information from faculty educators. The scale used a 5-point rating that ranged from 1 to 5, with 1 as “strongly disagree” and 5 as “strongly agree.” The interview contained open-ended and closed-ended questions. The analysis of each research goal is described in the conclusions.

The research data collection began with a letter of participation. The letter of participation included the interview purpose, addressee response encouragement, human subjects’ protection measures, and notice of agency. An interview followed upon acceptance of each faculty educator. The interview proceeded with instructions. Participants were asked to complete the interview in one week. Aggregated responses were provided to the researcher. All five faculty educators responded, providing a 100 percent response rate.

The interview data received by the researcher were organized and analyzed by research and associated survey questions. The forced-response answers were converted into interval data. Open-ended responses were summarized and clustered. The data were calculated to indicate the frequency of responses. The responses were analyzed using descriptive statistical methods to generate attitudes concerning electronic distance and reflective learning.

Conclusions

The conclusion section of this study analyzed each of the seven research questions that were developed to guide and answer to the research problem.

Research Question 1

What were the impacts of electronic learning on the dental hygiene students' educational and professional growth? Results from this study showed 40.0 percent of the participants disagree and 60.0 percent agree with this question. The mean score was 3.2. The results shown the educators were uncertain regarding the impact electronic learning can have on dental hygiene students' education and professional growth.

Research Question 2

What were the impacts of reflective learning on the dental hygiene students' educational and professional growth? Results from this study showed 40.0 percent of participants strongly agree and 60.0 percent agree. The mean score was 4.4. In conclusion, all the educators agreed reflective learning impacts their students' educational and professional growth.

Research Question 3

What are educators' attitudes toward electronic course delivery and reflective learning? All participants agreed to an extent concerning electronic course and reflective learning, based upon responses from the interview. There are dental hygiene program faculty educators, based upon the responses, who do not to some degree implement electronic or reflective learning in their curricula. These viewpoints and attitudes were expressed through the open-ended responses to Question 10.

Research Question 4

Are dental hygiene educators satisfied with how much electronic learning is being implemented into programs? Results from this study showed 40.0 percent disagree and 60.0 agree. The mean score was 3.2 for this question. The second question concerning electronic learning methods being in place for students had results of 60.0 percent agree and 40.0 percent strongly agree. The mean score was 4.4 for this question. In conclusion, the faculty educators feel there is enough electronic learning within their programs.

Research Question 5

Are dental hygiene educators satisfied with the level of reflective learning being implemented into programs? Results from this study found 60 percent agreed and 40 percent strongly agreed. The mean score was 4.4. A portion of the participants were unsure of the level of reflective learning in their programs. The largest portion of participants agrees they are satisfied with the extent of reflective learning in their program.

Research Question 6

Do dental hygiene educators feel they have adequate training from their employers to deliver electronic course instruction effectively? Results from this study found that 60.0 percent of participants strongly agree and 40.0 percent agree. The mean

score was 4.4. These percentages reflect a portion of educators who feel their training has not prepared them to instruct effectively.

Research Question 7

Do dental hygiene educators find success with electronic course delivery and reflective learning? Results from this study found 20 percent were undecided, 40 percent agree, and 40 percent strongly agree. The mean score was 4.2. The largest portions of participants agree that electronic course delivery and reflective learning practices are effective.

In conclusion, the study results showed that these dental hygiene faculty educators utilized electronic course delivery along with reflective learning practices. The area of greatest importance concerns the amount of training educators receive from their employers to deliver electronic course instruction. This is a serious level of competency, considering the amount of electronic course delivery that takes place within programs each year. The open-ended responses from participants describing how electronic learning and reflective learning have influenced their dental hygiene teaching revealed a more personal viewpoint. Two participants responded in length about the necessity of psychomotor skill learning, methods of electronic and reflective learning within their curriculum, and learning activities that utilized those aspects. Both of those participants are faculty educators in four-year universities. The other three participants of two-year colleges also discussed the usefulness of electronic course delivery for their

students. Electronic course delivery and reflective learning are necessary components to education, but proper training and usage still have room for improvement.

Recommendations

The following recommendations include suggestions for utilizing the study's findings and conducting additional research studies in light of the findings.

Implementation of Findings

Although the study's findings were limited to five participating dental hygiene faculty educators, the following recommendations are based upon those responses:

- The Commonwealth of Virginia dental hygiene faculty should update dental hygiene program curricula, in both four- or two-year colleges, to include active electronic learning methods. The entire faculty agreed there is a degree of electronic learning in place (Q2) (Q3).
- The Commonwealth of Virginia college systems should provide faculty educators in dental hygiene programs with adequate training techniques and education for electronic learning and reflective learning. This is based upon the 44.44 percent of participants responding with agreeing answers (Q5).
- The Commonwealth of Virginia dental hygiene programs should require that dental hygiene faculty educators understand the effectiveness of electronic learning and find ways to implement it in their curricula via methods consistent with traditional classroom instruction (Q8)(Q9).

Future Research

The following recommendations are made for conducting additional research studies in light of this study's finding and limitations:

- A similar study with an expanded population beyond the Commonwealth of Virginia. There are only five dental hygiene programs within the Commonwealth of Virginia, but many more across the United States. This would also yield an expansion of participants for greater response rates.
- Research to compare the specific types of electronic and reflective learning practices that are utilized in dental hygiene programs. This would generate a broader knowledge base concerning methods and activities for more standardized learning.
- The design that has the potential to yield greater results with more inclusive input would examine several dental hygiene programs across the United States. This would foster a greater understanding of the technological advancements that have or have not taken place in the academic setting. Implementing a study on a local scale provides a small insight into a large-scale concept.

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Appendix A

Faculty Educator Interview Template

The dynamics of dental hygiene are being shaped both by the content of course delivery and by the methods and understanding by students. The use of electronic instruction is becoming more popular each year. Along with electronic instruction comes reflective learning, which allows students to gain insight on the material they have attained and evaluate how effective their decision-making outcome was to their learning experience. Reflective learning provides a passive way of achieving exploration and analysis from the student. An example to measure reflective learning is a journal. Placing a reflective learning aspect into electronic course delivery can produce another level of learning for the dental hygiene students. This interview is designed to gain a greater understanding of how much electronic instruction and reflective learning is taking place within the dental hygiene programs in the Commonwealth of Virginia.

Instructions: Please choose the most accurate response told to you for the following statements.

1. Are you satisfied with how much electronic learning has been implemented into the course material?

5	4	3	2	1
Strongly agree	Agree	Undecided	Disagree	Strongly disagree

2. Our dental hygiene program has up-to-date electronic learning methods in place for students.

5	4	3	2	1
Strongly agree	Agree	Undecided	Disagree	Strongly disagree

3. Electronic and reflective learning has an impact on the professional and educational growth in dental hygiene students

5	4	3	2	1
Strongly agree	Agree	Undecided	Disagree	Strongly disagree

4. I have received adequate training by my employer to deliver electronic distance learning effectively.

5	4	3	2	1
Strongly agree	Agree	Undecided	Disagree	Strongly disagree

5. Journals are utilized for reflective learning in the classroom or clinic setting.

5	4	3	2	1
Strongly agree	Agree	Undecided	Disagree	Strongly disagree

6. Self-exploration and critical thinking is achieved by the reflective learning practices in my curriculum.

5	4	3	2	1
Strongly agree	Agree	Undecided	Disagree	Strongly disagree

7. I am satisfied with the amount of reflective learning in the curriculum.

5	4	3	2	1
Strongly agree	Agree	Undecided	Disagree	Strongly disagree

8. As a dental hygiene educator, I find success with electronic with electronic delivery methods.

5	4	3	2	1
Strongly agree	Agree	Undecided	Disagree	Strongly disagree

9. Electronic course instruction is as equally effective in learning as the traditional classroom instruction.

5	4	3	2	1
Strongly agree	Agree	Undecided	Disagree	Strongly disagree

10. Describe the influence electronic and reflective learning has made on your dental hygiene teaching.

Appendix B

Invitation to Participate

<<Date>>

<<Email Address>>

Dear Interview Participant,

The following interview is an instrumental part of a research project conducted by a graduate student at Old Dominion University. The purpose of this student research is to gather your thoughts concerning the use of electronic course delivery and reflective learning strategies being built into dental hygiene curriculums in the Commonwealth of Virginia.

Participants in this interview should be dental hygiene faculty educators in a community college or university setting. Full time and adjunct faculty educators are all qualified to participate in the interview if you are teaching a distance learning dental hygiene course. The participation and response to this interview is voluntary but essential to the completion of this research project. Please be assured that the responses to this interview will remain completely confidential throughout the project if you choose to participate. Please answer the items as accurately as possible, for there is no true right or wrong answer in the interview. Your opinions and responses will be of importance and value to gain a greater insight in the preparation to graduate future of dental hygienists.

The completion of the interview should take only 5-10 minutes. Thank you in advance for your cooperation and contribution to this research project.

Thank you,

Cassandra L. Huffman, RDH, BSHS

Graduate Student

Old Dominion University