


Winter 12-14-2018

Perceptions and Clinical Applications of Feedback Type if Dental Hygiene

Elmer Eleazar Gonzalez
University of New Mexico

Follow this and additional works at: https://digitalrepository.unm.edu/educ_ifce_etds

 Part of the [Dental Hygiene Commons](#), [Educational Methods Commons](#), [Educational Psychology Commons](#), and the [Higher Education Commons](#)

Recommended Citation

Gonzalez, Elmer Eleazar. "Perceptions and Clinical Applications of Feedback Type if Dental Hygiene." (2018).
https://digitalrepository.unm.edu/educ_ifce_etds/70

This Dissertation is brought to you for free and open access by the Education ETDs at UNM Digital Repository. It has been accepted for inclusion in Individual, Family, and Community Education ETDs by an authorized administrator of UNM Digital Repository. For more information, please contact disc@unm.edu.

Elmer Eleazar Gonzalez

Candidate

Individual, Family, & Community Education

Department

This dissertation is approved, and it is acceptable in quality and form for publication:

Approved by the Dissertation Committee:

Jay Parkes, Chairperson

Terri Flowerday

Jan Armstrong

Susan Wood

**PERCEPTIONS AND CLINICAL APPLICATIONS OF
FEEDBACK TYPE IN DENTAL HYGIENE**

by

ELMER ELEAZAR GONZALEZ

B.A., Spanish, The University of New Mexico, 2005
B.S., Dental Hygiene, The University of New Mexico, 2008
M.S., Dental Hygiene, The University of New Mexico, 2010
M.A., Educational Psychology, The University of New Mexico, 2014
M.B.A., Business Administration, The University of New Mexico, 2016

DISSERTATION

Submitted in Partial Fulfillment of the
Requirements for the Degree of

**Doctor of Philosophy
Educational Psychology**

The University of New Mexico
Albuquerque, New Mexico

December, 2018

DEDICATION

I would like to dedicate this achievement to my wife Lan for her unconditional love and encouragement, and to our children for the meaning, joy, and inspiration they bring to my life. Also dedicate this work to my parents for their guidance and advice throughout my life.

ACKNOWLEDGEMENTS

During this journey of learning and professional development, I have had the opportunity to work with many very special individuals whose support cannot go unnoticed. I would like to acknowledge the continuous support, guidance and advice from my dissertation chairperson, Dr. Jay Parkes and my committee members Dr. Terri Flowerday, Dr. Jan Armstrong, and Dr. Susan Wood. These individuals have not only been my professors, but have also been a great resource of knowledge and wisdom to guide me through my professional aspirations and most recently through my dissertation process.

Dr. Parkes has always been a great mentor and definitely a role model to look up to. His valuable expertise in feedback and assessment were key qualities for my development and desire to focus on those areas during my dissertation. Dr. Flowerday, has been a motivational icon and an amazing educator who was able to guide me from start to finish in my progression of Educational Psychology. Dr. Armstrong, with her nurturing voice and calm demeanor took me under her wing during my master's work and became my master's advisor. Her expertise in areas where I needed to grow were paramount for my success in Educational Psychology and other areas of my life. Dr. Wood, who became one of the greatest mentors I have had in my professional career during my transition from The University of New Mexico to New Mexico State University, has been a phenomenal support throughout my dissertation work and my work as a faculty member under her leadership. I am truly honored and blessed to have worked with these

four individuals and have received their guidance and expertise as I struggled to get through.

I would also like to acknowledge Rocio Alfaro Miller and Elena Mars for their support during my research study at Doña Ana Community College Dental Programs. Their assistance as the Dental Materials course instructors was amazing and greatly appreciated. My sincere appreciations to Ms. Frances Gutierrez-Olona and Ms. Kimberlynn Guzman for their assistance during the study is greatly appreciated. Many thanks to all the students who participated in the study. Any other professor, colleague, friend and family member, who have contributed to my formation and completion of this milestone, thank you.

**PERCEPTIONS AND CLINICAL APPLICATIONS OF
FEEDBACK TYPE IN DENTAL HYGIENE**

by

ELMER ELEAZAR GONZALEZ

B.A., Spanish, The University of New Mexico, 2005

B.S., Dental Hygiene, The University of New Mexico, 2008

M.S., Dental Hygiene, The University of New Mexico, 2010

M.A., Educational Psychology, The University of New Mexico, 2014

M.B.A., Business Administration, The University of New Mexico, 2016

Ph.D., Educational Psychology, The University of New Mexico, 2018

ABSTRACT

Purpose/Objectives: The study assesses whether or not feedback type and feedback delivery method play a significant role in students' learning and clinical performance. The study explores Ego Stroking Sandwich feedback and Non-Sandwich feedback as the feedback types and Instructors feedback vs. Scoring guide feedback as the feedback delivery method. Students' perceptions and clinical applications were considered as part of the study.

Methods: Eleven participants were included in the study. One group was the Ego Stroking Sandwich type feedback (n=5) and the other was the Non-Sandwich Type feedback (n=6). Each group performed two dental impressions (a maxillary and a mandibular) while receiving feedback type according to group assignment. A post impression questionnaire was administered to gather participants' perceptions on feedback type delivery based on the feedback they had just received.

Results: Ego Stroking Sandwich and Motivation ($M=3.511, SD=.488$) was slightly less effective compared to Non-Sandwich and Encouragement ($M=3.597, SD=.336$). The instructor Feedback subscale ($M = 3.28, SD = .443$) had a statistically significant higher mean for students in the Ego Stroking Sandwich condition than the Scoring Guide subscale did ($M= 2.67, SD = .242$). Similarly the instructor feedback subscale also had a statistically significant higher mean ($M= 3.70, SD = .253$) for students in the Non-Sandwich condition than the Scoring Guide subscale did ($M= 2.71, SD = .149$). An ANCOVA was conducted to assess the effects of Non-Sandwich versus Ego Stroking Sandwich feedback on student clinical performance using No Feedback as a covariate. No statistically significant differences noted between Non-Sandwich and Ego Stroking Sandwich feedback between groups, ($F(1, 8) = 2.852, MSe = 13.239, p = .130$).

Conclusion(s): A very important piece of clinical dental hygiene education is the use and delivery of feedback to students. Feedback in clinical education is

essential for learning. In allied dental education, feedback is the basis for clinical teaching and student skill development. In order to effectively deliver feedback, teachers must understand the different types of feedback available and the different ways of delivering feedback. Instructors must possess skills and proper feedback knowledge in order to deliver adequate and formative feedback to students.

Table of Contents

DEDICATION	iii
ACKNOWLEDGEMENTS	iv
ABSTRACT	vi
CHAPTER 1	1
INTRODUCTION AND LITERATURE REVIEW.....	1
Scientific Rationale:.....	1
Operational Definitions:	1
Introduction:.....	2
Literature Review:.....	6
Principles of Teaching and Learning	6
Motivation for Success.....	6
Feedback.....	9
Formative and Summative Feedback	10
Feedback vs Grades.....	11
The Feedback Sandwich.....	12
Levels of Feedback	14
What are the perils of feedback?	16
Diluting the Message with Praise (Questioning the value of the feedback sandwich)	12
Feedback in the Clinical Settings	19
The Study	20
Research Questions.....	23
CHAPTER 2	24
METHODOLOGY.....	24
Study Overview	24
Instruments	26
Procedures for Feedback Delivery.....	29
Inter-Rater Reliability.....	30
Internal Review Board Approval.....	32
Research Design	32
Baseline Impression	34

Group A.....	35
Group B.....	36
Ethical Considerations.....	39
CHAPTER 3	40
RESULTS	40
Analyses Overview:.....	40
Part One-Instrument Analyses.....	40
Questionnaires:.....	40
Reliability:.....	47
Clinical Skill Evaluations	47
Inter-Rater Reliability Study	47
Part Two-Analyses to Answer Research Questions	48
Research Question #1:	48
Research Question #2:	48
Research Question #3	50
Discussion on Participant’s Perceptions of Feedback.....	52
Research Question #1	52
Research Question #2	55
Clinical Skill Evaluation (CSE) Discussion:.....	57
Research Question #3	58
Limitations of the Study.....	60
Future Research.....	62
Practical Implications	63
APPENDICES.....	67
APPENDIX A - SCRIPT FOR FEEDBACK TYPE.....	68
APPENDIX B - GENERAL PERCEPTIONS OF FEEDBACK QUESTIONNAIRE	70
APPENDIX C - AFTER FEEDBACK DELIVERY QUESTIONNAIRE	75
APPENDIX D - IRB PROJECT INFORMATION.....	79
APPENDIX E - CLINICAL SKILL EVALUATION.....	83
APPENDIX F - RECRUITMENT E-MAIL.....	86
APPENDIX G - CONSENT FORM	88
APPENDIX H - UNM IRB APPROVAL.....	91
APPENDIX I - NMSU IRB APPROVAL	94

APPENDIX J - DACC APPROVAL MEMO.....	96
APPENDIX K - IMPRESSION PHOTOS.....	98
APPENDIX L – PHOTOGRAPHS OF MATERIALS USED	110
References	158

CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

Scientific Rationale: Giving and receiving feedback is important and significant when teaching and learning in dental hygiene. When feedback is directed at the task and within the appropriate learning level, it assists students to comprehend, to engage, and to develop effective strategies to process the information intended to be learned. Effective feedback needs to be clear, purposeful, meaningful, and compatible with students' prior knowledge and must provide logical connections (Akinbobola & Adeleke, 2012). Feedback is a tool that should be used in dental hygiene and other clinical fields for teaching to improve learning and enhance students' self-efficacy and clinical skill development. Feedback is one way to provide students with valuable information to assess their performance and improve their clinical skills. It is crucial to understand that feedback is the consequence of teaching/learning (Hattie & Timperley, 2007). In this study, feedback is framed utilizing concepts from Educational Psychology with an emphasis in clinical teaching and learning, specifically within the areas of allied dental education.

Operational Definitions:

Feedback: Verbal delivery of information to the student in order to fill the gap between instruction and learning, address faulty interpretations of performance and/or to improve performance and skills that are in the developmental novice stage.

Ego Stroking Sandwich Type Feedback: In this study it is defined as feedback type given to the student using a combination of praise at the beginning, substantive

feedback in the middle, and praise at the end. This type of feedback is many times confused with sandwich type feedback when delivering feedback.

Sandwich Feedback Type: The sandwich type feedback is considered good when it provides positive feedback at the beginning, more feedback in the middle and ends with more positive feedback. This should not be confused with Ego Stroking Sandwich Type feedback that uses ego stroking statements at the beginning and end.

Non-Sandwich Type Feedback: Feedback type given to the student using direct, task oriented, positive or negative feedback without praise at the beginning and end of the statement.

Introduction:

“I’m not there to make them feel better. I’m there to make them do better” (Bronson & Merryman, 2009, p. 21). Some educators might consider this statement harsh, but those who train novice healthcare professionals might view the statement with more sympathy. In dental hygiene, one often finds students with very distinct personalities, yet most of them share the same goal: to become a dental hygienist. Jessica and Joseph, are junior dental hygiene students, passionate about becoming dental hygienists. Jessica loves to work with people and wants to work in an underserved community helping those whose oral hygiene is often neglected. Joseph, on the other hand, would like to work in a more established environment, with state of the art equipment and a flexible schedule that would make his job easier. During their pre-clinic instruction, they have learned theories on proper instrumentation techniques and patient safety. Having mastered theoretical aspects

of instrumentation, they are now ready to move forward and begin to develop their clinical skills.

Using the teach-show-do approach, a clinical instructor demonstrates the skill with detailed steps on how to go about it while the student observes the instructor perform the skill on one of their classmates. After a twenty-minute demonstration, Jessica and Joseph practice the skill on their respective partners. Jessica calls the instructor over to check on her work and make sure she is doing it right. The instructor carefully observes her instrumentation technique and listens to the steps as she verbalizes them to the instructor. The instructor notes that Jessica is not rolling her instrument adequately as she approaches the mesial aspect of the tooth in question. Immediately, the instructor provides specific feedback directing her with proper steps on how to perform the task and correct the misunderstanding. "Jessica, the technique you are using is almost there; however, in order to not cause tissue trauma to your patient, it is important to start rolling the instrument as soon as you approach the mesio-buccal line angle. This will prevent you from causing trauma. This is how to roll..."

On the other side of the clinic is Joseph, who also calls his instructor over to check on his work. Coincidentally, he is having the same issue Jessica was having with the rolling technique of the instrument. Joseph's instructor observes him use the technique and responds, "You are a great student, make sure you roll your instrument a bit more so that you don't cause any tissue trauma. Overall you're a top notch student".

In dental hygiene education, it is common to encounter instructors who provide ego stroking sandwich type of feedback in order to encourage student

learning without tarnishing their relationship with the students. In this context, the ego stroking sandwich type feedback refers to providing the students with praise, the feedback to help the student improve or address faulty interpretations and finishing the feedback with an additional praise statement. This misconception of the feedback sandwich comes into play due to the lack of differentiating between praise and positive feedback. Research suggests that the use of the ego stroking feedback strategy may not be as useful or essential as many educators assume. It might even reduce students' learning. The key areas for instructors to remember lies in the fact that feedback and instruction go hand in hand and more often than not, instruction without feedback or feedback without instruction is not as effective.

Dental hygiene teaching and learning requires a clear understanding of how learning takes place and how that learning is then transposed into clinical skills to be developed to a proficiency level based on the students' progress through the curriculum and clinical setting. Several processes take place in order for learning to happen. Sensory input, which translates to all stimuli present in the environment. Stimuli is received in different ways (smell, taste, touch, vision, sound, or a combination of these). Think of the novice dental hygiene student, these students are exposed to many stimuli while learning instrumentation techniques or laboratory procedures. All of the stimuli they are exposed to are transferred from sensory memory to working memory. During that process, feedback and assessment are key components for the successful storage, retrieval and automation of clinical skills.

By providing effective feedback, an instructor can promote useful techniques for learning and improve the use of techniques such as chunking and schemata. This is of particular importance for the clinical setting because as new techniques are

taught and explained, the student must be encouraged to group them with previous learned skills. Instructors can help the student make those connections through feedback and assessment. This helps students in a couple of ways, feedback promotes learning and allows for correction of faulty interpretations and improvement of developing skills, while assessment, such as rubrics and scoring guides, are used to evaluate the clinical process of learning a skill and provide the instructor with valuable information to understand if instruction was effective and if the student is able to apply the learned skill into procedural knowledge (Johnson & Svingby, 2007). Another purpose of a rubric is for the student to have a procedural guide for performing a skill. These concepts are also utilized so that students expect feedback as part of training and that the feedback given promotes verification of the skill learned rather than enhancing student's sense of self-efficacy (Hattie & Jaeger, 1998).

The following review of the literature provides a brief overview of key concepts, models and selected empirical findings on the use of feedback interventions (FI's) in clinical settings. It also outlines the importance of teaching practices to enhance student motivation and feedback processing. This study seeks to expand current conceptions of what constitutes "good feedback" in dental hygiene education by reviewing relevant conceptual and empirical work from the area of educational psychology. There are no simple recipes for providing "ideal" feedback, however, educators who understand the basic concepts may be able to utilize techniques and methods to deliver feedback in a better way.

Clinical educators need to use their own judgment and examine the consequences of different ways of giving feedback to those they train. Educational

Psychologists have grappled with the question of how best to use feedback to foster student success. The next section presents basic concepts, then explores more complex conceptual models.

Literature Review:

Principles of Teaching and Learning

Effective teaching facilitates and attempts to optimize students' ability to allocate their working memory capacity to the things we want them to learn. It meets students at their zone of proximal development and engages students' knowledge productively for learning (Schonwetter, Lavine, Mazurat, & Nazarko, 2006). Effective teaching supports and enhances students' motivation for learning and facilitates patterns of productive student motivated self-regulation.

Motivation for Success

Motivation as described by Bandura (1977) is "primarily concerned with activation and persistence of behavior" (Bandura, 1977, p. 193). Motivation is put into context in different forms of self-efficacy (reinforcement, modeling, goal setting, choice, etc.) which is based on four main sources of information: "performance accomplishments, vicarious experience, verbal persuasion, and physiological states" (Bandura, 1977, p. 195). Performance accomplishments are motivationally influential because they are based on experiences that promote mastery of tasks (Bandura, 1977). Bestowing the benefits of these accomplishments, Bandura (1977) points out that depending on how early a person experiences success or failure; successes raise mastery expectations whereas failures lower them. In addition, the more success experienced the more self-efficacy increases. Once self-efficacy is fostered due to success, the negative outcome of occasional failure is quickly overcome by

determined effort and persistence which strengthens self-motivation (Bandura, 1993).

Vicarious experience also plays a crucial role in improving self-efficacy. In an educational context, vicarious experience is when a student observes a teacher or model perform a task of which they were afraid of, without any adverse consequence. The demonstration or modeling of such activity shows the observer that they can similarly perform the task and succeed if they put effort in it (Bandura, 1977). Likewise, verbal persuasion is another method of helping students cope with situations that might seem difficult to achieve and obtain a successful outcome through verbal prompts leading into the student's belief that they can do it (Bandura, 1977). Verbal persuasion is considered weak since it is not one that arises from the student's own accomplishments and it is mainly used to improve outcome expectations more so than to increase a sense of self-efficacy (Bandura, 1977). Physiological states in relation to clinical learning and self-efficacy could be related to stress for example. If a student is experiencing stress in the clinical setting; stress could lead to low performance and compromised self-efficacy. Physiological states such as stress could be transformed into positive experiences by providing adequate feedback that provides students with tools to master the task and achieve confidence (Bandura, 1977). These concepts play an important role not only in the way teachers provide instruction but equally important in how feedback is or should be delivered in order to motivate and improve students' self-efficacy at performing a clinical procedure successfully.

Effort , ability, and feedback are also common concepts that educators should understand in order to promote self-efficacy and motivation among their

students. Bandura (1993) speaks of motivation in the context of effort and ability and how people could have different perceptions of motivation. Bandura states that people who attribute their failure to lack of effort are said to have high self-efficacy whereas those who attribute their failure to ability are inefficacious. In other words, effort should be encouraged in classroom settings in order to promote motivation and support students' hard work while ability beliefs should be avoided by educators so that ability is not seen as the ultimate source of achievement (Dweck C. , 2008). The process of human motivation is a cognitive fabrication of thought, goal setting, and the self-belief of efficacy (Bandura, 1993). People motivate themselves by means of different cognitive processes like planning for the future, setting goals to achieve, and the belief on what they can accomplish (Bandura, 1993). Motivation has been rooted in different theories of motivation, attribution theory, expectancy-value theory, and goal theory (Bandura, 1993).

In addition, Self-Determination Theory gives rise to different types of motivational constructs, intrinsic and extrinsic motivation (Ryan & Deci, 2000). "Intrinsic motivation, refers to doing something because it is inherently interesting or enjoyable, and extrinsic motivation, refers to doing something because it leads to a separable outcome"(Ryan & Deci,2000, p 55). All these formulated hypotheses and theories of motivation operate under the principle of self-efficacy (Bandura, 1993).

Educators can foster intrinsic motivation by improving the way of giving performance feedback (Ryan & Deci, 2000). In the case of clinical instruction, intrinsic motivation is self-driven and fostered by providing positive feedback. Self-driven behaviors are those desirable for building self-efficacy because learners appear to be vested in the learning process (Ryan & Deci, 2000).

Extrinsic motivation on the other hand, contrasts to the principles of intrinsic motivation. A student who performs a clinical procedure because he or she fears that poor performance will lead to dismissal from the program, is performing well, not because he or she enjoys the clinical procedure, but because improved performance will keep them from being dismissed from the program (Ryan & Deci, 2000). Another example to explain extrinsic motivation, is using the same students' performance. When the student improves performance in the clinical setting, it is because he or she considers it important and valuable for the success and completion of the program and ultimately to become a good clinician (Ryan & Deci, 2000).

Enhancing feedback delivery needs to be fostered in order to encourage effort, self-driven behaviors that promote student motivation and foster self-efficacy. Feedback needs to be given carefully and appropriately, to ensure that self-efficacy is cherished rather than destroyed (Bandura, 1993). Suitable feedback is the one that emphasizes progress, "enhances perceived self-efficacy, aspirations, and efficient analytic thinking, self-satisfaction, and performance accomplishments. Highlighting deficiencies undermines self-regulative influences with resulting deterioration performance" (Bandura, 1993, p 125).

Feedback

Feedback is a concept relating to one's performance; it is usually provided in several ways; by a teacher, by reading a book, the internet, by peers, by grades on exams or assignments, by parents, by electronic devices, etc. The use of feedback can be interpreted as a continuum of instruction and feedback. For feedback to be useful, it must provide clear and specific information about the task in question and

must fulfill the gap between what is understood and what is expected to be understood (Hattie , 2013). The gap can be closed by providing more instruction to the student in order to restructure understanding, and providing clear explanations of what is expected and where increased focus should be placed. Similarly, depending on the type of task, teachers should be pointing out to students whether or not they are correct or incorrect and providing other strategies for better understanding (Hattie & Timperley, 2007). It is important to note that in order for feedback to be powerful, there must be learning happening. (Hattie & Timperley, 2007, p 82).

Formative and Summative Feedback

Formative feedback communicates something to the learner in a way that helps improve and shape their performance and learning. Unlike summative feedback (grades, examination scores), the aim of formative feedback is to improve knowledge and support the development of a particular skill (Archer , 2010).

Formative feedback reduces cognitive load, while helping students reduce uncertainty about their performance (Parkes,et al, 2013). This provides learners with the tools to open new horizons and achieve learning goals. “Clear and specific feedback lights the way forward” (Parkes, et al, 2013, p 398). In contrast, hollow praise and compliments could decrease performance (Parkes,et al, 2013).

Formative feedback can be either facilitative or directive (Shute, 2008). Facilitative feedback provides suggestions, examples, guidance, and comments intended to help learners revise their own work (Shute, 2008). Directive feedback provides students with specific and detailed information needed to correct their performance rather than just pointing out whether something is right or wrong

(Shute, 2008). It provides students with feedback that tells them what needs to be fixed, directly addressing specific topics, responses and errors (Shute, 2008).

Feedback vs Grades

Grades are one of the most common forms of feedback offered to students, but grades are less useful than other types of feedback (Kluger & DeNisi, 1996). As a way to improve learning outcomes, providing written comments has been shown to be superior to providing grades alone (Kluger & DeNisi, 1998). Offering grades increases students' participation in the classroom, but typically does not improve students' performance (Hattie & Timperley, 2007). Many teachers offer students a combination of grades and written feedback in the form of written grade justification but lack the portion of providing meaningful feedback to improve performance. Unfortunately, the evidence suggests that combining grades, comments and praise does not lead to learning gains (Hattie & Timperley, 2007). This may be because students typically focus on their grade and ignore the feedback if they are given simultaneously (Shute, 2008).

Feedback versus Reinforcement

The idea that feedback is, or ought to be viewed as a reinforcer was popularized by E.L. Thorndike (1927), whose powerful "Law of Effect" transformed how psychologists viewed the relationship between behavior and learning. Educators today tend to think of feedback as a form of reward (reinforcement) or punishment. From this point of view, students who receive positive comments would be likely to repeat the desired behaviors and learn to perform at an even higher level. Conversely, students who hear negative comments might stop trying and learn less (Dweck, 2008). Research does not support the existence of a direct

relationship between reinforcements and learning. As discussed in more detail later, simple models of feedback intervention do not hold up to empirical scrutiny (Hattie & Timperley, 2007).

The Feedback Sandwich

The good “feedback sandwich” technique consists of responding to a student’s performance by making positive statements about the task performed at the beginning and the end, and providing criticism in between (Parkes, et al, 2013). Advocates claim that this way of giving feedback helps to build trust, decreases negative feelings about negative comments, and boosts comfort level of the receiver. The feedback sandwich is ineffective when it provides ego boosting praise, criticism in between and ends with praise because this feedback strategy does not necessarily improve learning outcomes (Parkes, et al, 2013).

Diluting the Message with Praise (Questioning the value of the feedback sandwich)

Formative feedback that is aimed at the student’s task or process is better compared to feedback that is aimed at the self, which most of the time only helps to dilute the real message. Feedback of the task is more effective by itself compared to feedback that mixes feedback of the self and task (Hattie & Timperley, 2007). However, feedback aimed to the process is better than feedback to the task. Feedback at the process level provides students with an enhanced learning environment. It is important to note that the feedback sandwich that provides positive substantive feedback at the beginning, criticism in the form of more feedback, and end with more positive feedback is a good sandwich because it provides students with an array of feedback throughout the process. This is not to be

confused with the ego stroking sandwich that provides praise, feedback and ends with praise.

Conceptualizing effective feedback

Effective feedback must answer three questions by either teachers or students; “where am I going? (what are the goals?), How am I going? (What progress is being made toward the goal?), and Where to next? (What activities need to be undertaken to make better progress?)” (Hattie & Timperley, 2007, p. 86). The questions correspond to the concepts of “feed up, feedback, and feed forward” (Hattie & Timperley, 2007, p. 86). An ideal learning environment develops when these questions are addressed and teachers and students seek the answers for them.

In order to answer the first question above, feedback must be effective. Students must have clear and specific goals in place (Hattie & Timperley, 2007). Through skillful feedback on performance, teachers can help students learn to clarify goals and to develop self-regulatory skills (Hattie & Timperley, 2007). Goals are most effective when students have a deep commitment to achieving them. When students see the link between learning and specific goals, they are more likely to benefit from feedback because they are better able to process this information (Hattie & Timperley, 2007).

The second question (“How am I going?”) concerns the need to provide specific information on students’ progress toward learning goals. Feedback delivery is most useful when it provides learners with guidance not only on how they are doing, but also on how to continue to develop their skills (Hattie & Timperley, 2007). Exams provide one way to obtain normative information on student progress, but

they may not afford the kind of developmental guidance both students and teachers require (Hattie, Fisher, & Frey, 2016). The third question (“where to next?”) provides students with information that directs their attention toward the future. Answering this question effectively provides the most important and influential impact on learning (Hattie & Timperley, 2007).

The power of feedback comes from the interaction of the three questions working synergistically (Hattie & Timperley, 2007). By providing thoughtful and comprehensive feedback, teachers can help students develop self-regulation skills, guide them toward more challenging tasks, and help them make effective use of previous knowledge (Hattie & Timperley, 2007).

Levels of Feedback

Another way to think about feedback is to view it with respect to four levels. The effectiveness of the feedback depends on the level at which the feedback is directed. The first level is aimed at the task or product (Hattie & Timperley, 2007). This type of feedback includes specific information about a task or product and helps students get a better understanding of what is needed. For example, “You need to roll your instruments more as you are approaching the mesial or distal aspect of a tooth, especially when you work on anterior teeth due to the fact that those areas are smaller compared to posterior teeth”. The second level focuses on the process people use to complete a product or task (i.e., “You need to utilize the knowledge you have about dental anatomy in order to effectively access the tooth concavities not seen clinically; this will allow you to remove calculus effectively on those areas difficult to clean otherwise”). The third level targets self-regulation, including the learner’s self-evaluation skills and confidence. Feedback that addresses this level

provides the student with skills required to continue engagement with a task. For example, “You already know how to roll the instruments and how to access tooth concavities. Get your explorer and make sure you removed all the calculus on those difficult to reach areas”. This kind of feedback allows students to check their own work. This may improve their self-efficacy and competence, and help them remain engaged with the task (Hattie & Timperley, 2007). The fourth level is directed toward the learner’s identity and emotional experience (the self). Research suggests that this type of feedback may actually interfere with learning. This is because messages aimed at altering the learner’s mood can activate the parts of the brain that are associated with self-focus. As discussed later, ego-boosting feedback (e.g., “you are such a smart student” “great job” “well done”) does not convey useful information about performance. In general, feedback aimed toward the self is the least effective type of feedback; whereas feedback aimed toward the task performance process and self-regulation is most effective (Hattie & Timperley, 2007). Effective, task-oriented feedback supports deep processing, engagement and task mastery. It can also help learners improve strategy use and self-regulation skills (Hattie & Timperley, 2007).

Feedback Intervention Theory

Kluger & DeNisi (1998) provide some insight on how feedback interacts with constructs based on the principles of control theory and feedback intervention theory (FIT). They identify three factors that are relevant to understanding whether and how feedback can support performance: 1) discrepancies from a standard, 2) locus of attention, and 3) task complexity. The authors point out that in order for feedback to enhance performance, it must be directed to the task in question rather

than to the self. When feedback is directed toward the self, cognitive load is increased and the spaces in working memory available for improved performance are taken up by emotion-laden content (Kluger & DeNisi, 1998). This interferes with successful performance.

Feedback that contains either praise or criticism directs attention to the self (increasing “self-focus”). This yields lower performance compared to feedback that does not increase self-focus (Dweck, 2008). These researchers argue that feedback should be combined with goal setting. This redirects attention from the self toward tasks necessary to achieve specific goals. When students have clear performance goals, teachers can offer feedback that keeps them focused on the goal. This, in turn should have a positive effect on their performance (Dweck, 2008).

What are the perils of feedback?

There are a number of hazards associated with providing feedback. Chief among these is that even though feedback has been widely studied and many of the findings suggest that it is instructionally powerful, it is not well understood (Shute, 2008). Instructors need to reflect upon and try out different feedback strategies, monitoring actual (rather than imagined) effects on learning and performance. As one reviewer of the literature noted, “Feedback that has negative effects on learning is not formative” (Shute, 2008, p. 156); It is also not effective.

Hattie and Timperley (2007) pointed out that people usually like to receive feedback even when this feedback has no effect on their performance. This puts pressure on instructors to respond to students in ways they have come to expect. Yet when instructors offer vague feedback and concern themselves with boosting the students’ egos, “The effects at the self-level are too diluted, too often

uninformative about performing the task, and too influenced by students' self-concept to be effective (Hattie & Timperley, 2007). The information has too little value to result in learning gains. Praise addressed to students is unlikely to be effective because it carries little information that provides answers to any of the three questions and too often deflects attention from the task" (Hattie and Timperley, 2007, p. 96).

As noted above, instructors sometimes try to soften the impact of critical feedback by offering positive comments at the beginning and/or end of their comments. Parkes, et al. (2013) investigated how students viewed feedback sandwiches, and whether this type of feedback improved learning. A three-week clinical note writing experience with 3rd year medical students was conducted, using a Calibrated Peer Review (CPR) web based program. This program allowed students from any discipline and any level in their career to practice writing and critical evaluation skills (Parkes, et al, 2013). The study consisted of two parts. Part one investigated learners' perceptions of feedback; part two examined how their performance was affected after they received messages that nested critical comments between positive ones. Results showed that students believed they had received useful feedback and that it had helped them learn. Interestingly, students who received more substantive feedback performed better overall and closer to their faculty members on note content (Parkes, et al, 2013).

Parkes, et al. (2013) concluded that even though students perceived feedback sandwiches to be valuable, they actually were not. Students' perceptions about feedback sandwiches were positive even though they did not have a positive effect on performance. In addition, "there is some indication that higher quality

feedback sandwiches, those with substantive positive comments, dilute critical feedback” (Parkes et al. 2013, p. 406).

Highlighting Ability instead of Effort

Recent research suggests that there are still other hazards associated with giving feedback. Dweck and others have shown that praise that highlights aptitudes and abilities (internal qualities) is problematic because the student will seek tasks that are easier to accomplish in order to perform better, rather than seeking tasks that will help him/her develop better skills (Dweck, 2008). Praise that emphasizes effort helps support the development of self-efficacy, which can have positive effects on task performance (Dweck, 2008). In short, praise used as a reinforcement or reward to enhance the self, is unlikely to produce gains in achievement. Praise accompanied with an explanation about the process or task performance is more desirable, because it provides the student with better information. However, as noted earlier, such feedback increases self-focus and may reduce the likelihood that students will actually benefit from it.

Feedback is ought to be most beneficial when it helps fill the gap between instruction and faulty interpretations of the task in question. Teachers can improve instruction and feedback delivery by having clear goals, which can increase performance and goal attainment. Having clear written goals is more effective than those that are vague (Dweck, 2008). Clear goals provide students with tools to become motivated and teachers are then able to provide more specific feedback directed to the task and goal in discussion.

Feedback is one way to provide students with valuable information to assess their performance and improve their skills based on the feedback they received. “If feedback is directed at the right level, it can assist students to comprehend, engage, or develop effective strategies to process the information intended to be learned. To be effective, feedback needs to be clear, purposeful, meaningful, and compatible with students’ prior knowledge and to provide logical connections. It also needs to prompt active information processing on the part of learners, have low task complexity, relate to specific and clear goals, and provide little threat to the person at the self-level” Hattie & Timperley (2007, p. 104). It is crucial to understand that feedback is the consequence of teaching/learning, instruction happens first and feedback second. Without prior instruction or learning, feedback has no use, however, feedback that happens after learning or teaching has a powerful influence on learning (Hattie & Timperley, 2007).

Feedback in the Clinical Settings

Several clinical studies (Cantillon & Sargeant, 2008; Fugill, 2005; Hauser & Bowen, 2009 and Ramani & Krackov, 2012) have suggested techniques to improve feedback delivery and methods to improve the use of feedback in the clinical setting during teaching and learning. Ramany & Krackov, (2012), present a summary of twelve tips for effective implementation of feedback techniques in the clinical setting. Some of the discussion on feedback here, involves the establishing of a respectful environment, goal setting and communicating goals in a clear and direct way so that objectives for feedback are set, focusing feedback on performance, and the use of neutral, specific language to focus on performance. In addition, setting professional development opportunities for faculty and staff and creating an

institutional atmosphere where feedback is valued, is crucial for the success of feedback orientation (Ramani & Krackov, 2012). There is a consensus in the literature in regards to the importance of feedback for clinical skill development (Schonwetter, et al., 2006). Teachers are seen as figures of authority and expertise by the novice learner, thus, feedback tends to be powerful in a positive or a negative way (Fugill, 2005). Most of the literature supports the claim that feedback is important in clinical teaching and learning, however, one study argues that feedback may actually cause student dependency and that too much feedback in the clinical setting, especially for the novice student may be counterproductive (Hauser & Bowen, 2009).

The use of feedback, concurrent and summative was explored in conjunction with computer-based video instruction when teaching knot-tying skills to first year medical students (Xeroulis, et al., 2006). Utilizing expert concurrent and summative feedback is beneficial for novice students in the clinical setting. When medical students were exposed to knot-tying, those students who were exposed to expert feedback and computer-based video instruction performed better than those who only received the computer-based video instruction alone. In addition, vicarious modeling plays an important role in successful skill development. Students are able to model their performance on that of the expert and compare the end product. Feedback provides students not only with information regarding their skill performance, but equally important, it provides the opportunity to detect mistakes and correct faulty interpretations (Xeroulis, et al., 2006).

The Study

Some research has pointed out that written feedback is more effective than

providing grades. In a review of educational research, Hattie and Timperly found that written feedback improved test performance of students in 74 classrooms. The argument rests in the belief that grades increase involvement but don't improve or have an effect on performance. In other instances, verbal versus written feedback has been investigated, demonstrating that it really depends on who is giving the feedback and what position they hold in regards to rank or level of expertise. Students usually take feedback best from a teacher than a peer or a parent. Verbal feedback is most effective when it is given immediately after an error or an opportunity for improvement is noted.

Dental hygiene clinical instruction is focused on both performance and learning. Performance should be the least important aspect to consider when teaching individuals to become effective, self-regulated, competent, and self-efficacious. However, in dental hygiene, as in most health professions, performance is normative. Faculty must take into consideration student's perceptions and attitudes on feedback and prepare students to take their clinical board examinations, which are based on performance (standardized, norm-referenced, high stakes examinations) (Cheng, Lin, & Su, 2011). Dental hygiene educators need to work with students in terms of skill building and self-efficacy development (Hauser & Bowen, 2009). Students' technical skills could be developed more effectively if the educator shifts focus from the performance of removing calculus alone, to helping a student build on the skills of removing calculus by means of formative feedback and modeling (vicarious learning). Educators should focus on teaching dental hygiene students to become better clinicians by not only providing

feedback but encouraging students to also provide feedback to peers and instructors (Archer , 2010). Dental hygiene educators can guide students toward better ways of achieving a career without compromising self-efficacy and cognitive capacities by promoting and delivering adequate feedback aimed at the task.

A very important piece of clinical dental hygiene education is the use and delivery of feedback to students. Clinical instructors in dental hygiene must possess skills and proper knowledge of feedback in order to deliver adequate and formative feedback to students. Feedback specificity is paramount to indicate how the student can improve a skill (Shute, 2008). The ego stroking sandwich type feedback makes students feel better and soothes the effects of the feedback. This approach is still used even though it has shown to be ineffective at improving performance and only effective at increasing students' perceptions of receiving good feedback (Parkes,et al, 2013).

In dental hygiene, just like other similar fields where students must acquire skills that will be employed to care for patients; feedback must be direct and address the issue as well as the process of how the student needs to do the task or skill properly. The use of ego stroking sandwich feedback in dental hygiene might be useful to make students feel better and perceive the feedback given more useful; however, by constantly adhering to the ego stroking sandwich feedback as the norm, faculty members may be doing a disservice to the students. Faculty members ought to put into practice different techniques of teaching and complement teaching with feedback aimed to the task and process rather than focus on feedback alone.

Research Questions

1. Which type of feedback, Non-Sandwich or Ego Stroking Sandwich do students perceive to be superior to improve their clinical skills and performance?
2. Is the use of a scoring guide, paired with instructor feedback better than instructor feedback alone for student's clinical performance?
3. Which type of feedback, (No Feedback, Non-Sandwich or Ego Stroking Sandwich type) shows to be superior on students' clinical performance?

CHAPTER 2 METHODOLOGY

Study Overview

The present study consists of assessing whether or not feedback type and the use of a rubric/scoring guide play a significant role in students' learning and clinical performance. The study will assess students' perceptions regarding feedback type and its effectiveness in learning and teaching. The study also looks into the role feedback plays in clinical performance regardless of feedback type. The literature has pointed out that feedback is essential for students' learning and motivation; however, there are many considerations to take when giving or receiving feedback. This study seeks to enhance the understanding of which feedback type is best suited for clinical teaching and learning.

Setting and Participants

Participants were undergraduate dental hygiene students seeking their associate degree in dental hygiene and dental assisting students working on their dental assisting certificate at New Mexico State University/Doña Ana Community College Dental Programs. Each cohort of dental hygiene students was composed of twelve students and there were two cohorts for a total of twenty-four students. Dental assisting students were in one cohort of thirteen students total. The majority of the students were female; however, equal opportunity to participate was given to both male and female participants. An e-mail was sent to the students in the first year of dental hygiene cohort to inform them of the study because the students in year two cohort had already taken the dental materials course and had been exposed to the teaching techniques that were utilized as part of this study. The e-

mail was also sent to the Dental Assisting program director and clinical coordinator to inform their students of the research study. In addition, the instructor for Dental Materials course made an announcement in class informing students of the study.

The study was conducted in the dental clinic where students performed the clinical procedure one group at a time. The room setting and environment were kept the same for all groups and all interventions. The investigator who provided the feedback was the same instructor for all interventions to avoid confounding variables from affecting the outcome. Two instructors who were not part of the research team scored the procedures; these instructors were the instructors who taught the Dental Materials course and were familiar using the scoring guide.

Eleven participants enrolled in the study, ten females and one male. Out of the eleven participants, nine were dental hygiene students and two were dental assisting students. Four of the dental hygiene students were prior assistants or had just graduated from dental assisting school before enrolling in dental hygiene; therefore, six out of eleven participants had prior experience taking alginate impressions. Participants were randomly assigned to a procedure, maxillary X1 or mandibular X2 impression for baseline purposes by selecting either a number one or two in sequence as 1, 2, 1, 2, 1, 2. After the procedures for obtaining baseline were completed, participants were randomly assigned to experimental Group A (Non-Sandwich type) or Group B (Ego Stroking Sandwich type) by choosing either a letter A or a letter B in sequential order as A, B, A, B, A, B.

Both groups, A and B, performed a maxillary and a mandibular impression within each group and received a type of feedback before and during the maxillary impression, and a type of feedback paired with a scoring guide before and during the

mandibular impression. The scoring guide used by the participants was the same as the scoring guide used by the instructors to evaluate the impressions. The scoring guide was made available to the participants before performing the mandibular impression for each group. Both groups received detailed pre-recorded instruction using the Dental Hygiene Procedures Videos- eCommerce Version, 1st edition to perform the clinical procedures during all interventions.

The participants and instructors were blinded as to which feedback group the participants had been assigned to. Only the investigator had information concerning group assignment for both groups.

Instruments

The instruments utilized for the study to answer the research questions 1-4 were scoring guides adopted and modified from Neil Gehrig, University of New Mexico, and (Wilkins, 2017). These scoring guides are utilized to teach dental hygiene students' clinical and instrumentation skills and have been adopted from Wilkins, 2011 and the University of New Mexico Dental Hygiene program's process evaluation rubrics. The scoring guides utilized were adopted, created, modified and piloted using Foliotek assessment plus and were used at the NMSU/DACC Program Spring 2017 both using Foliotek assessment plus for class of 2018 and printed version of Foliotek assessment plus for class of 2017. Modifications were made to the rubrics before the beginning of summer 2017 session based on the use and implementation Spring 2017.

The initial 20 item questionnaire (found in Appendix B) created, was adopted and modified from "The Instructional Feedback Orientation Scale: Conceptualizing and Validating a New Measure for Assessing Perceptions of Instructional Feedback"

(King, Schrodt, & Weisel, 2009). The questionnaire was used to measure student perceptions of feedback type in clinical performance.

The second questionnaire (found on Appendix C) utilized was also developed as a 20 Likert scale questionnaire. This questionnaire was developed by the investigator using a combination of vignettes and regular Likert scale questions. This questionnaire was used to look into participants' perceptions on the feedback they had just received as well as the feedback delivery method.

The Dental Hygiene Procedures Videos- eCommerce Version, 1st edition were used for initial instruction of the procedures to be performed. These videos were published and sold by Elsevier for teaching and learning proper steps to complete clinical procedures.

Each participant received a folder labeled with participant number. The folder contained a pre-labeled initial questionnaire, four after feedback questionnaires, and six scoring guides; three for maxillary and three for mandibular impressions. Two were labeled for baseline, two for Group A and two for Group B. After completing the baseline impression, participants were assigned to Group A or B and the scoring guides not pertaining to their group assigned were removed from the folder leaving only the scoring guides matching the group assignment.

Materials

DXTTR Dental Mannequin was utilized to carry on the clinical procedures in place of patients. DXTTR is a mannequin utilized to teach dental and dental hygiene students clinical instrumentation techniques and radiographic procedures before they practice those skills on actual patients. Using DXTTR for taking dental impressions has not been explored in other settings.

In order to reduce extraneous variables, all participants received the same type and amount of pre measured alginate and water for each impression according to manufacturer instructions. Spatulation time and speed were not measured for each participant as this was something they had to learn from the instructional video and type of feedback received, thus, spatulation time and speed were varied from one participant to the next.

Alginate material was used for the impressions. Alginate is an elastic, irreversible hydrocolloid used in dentistry and other fields for taking negative replicas of teeth or body parts. In this study, alginate was used to take an impression of the teeth on a mannequin.

Specimen cups were utilized to store pre-measured alginate material. Each participant received one cup with pre-measured alginate at baseline depending on the impression type they were assigned to. After baseline, each participant received two cups, one labeled maxillary and one labeled mandibular. The amount of alginate was measured and placed in the cups according to manufacturer instructions, 3 scoops for maxillary and 2 scoops for mandibular impressions. These measurements were tested on the impressions used for faculty calibration and were found to be sufficient when using the mannequins. Water was also pre-measured by the investigator and each participant received two cylinders with the same water measurement across participants. The water was measured on a 1:1 water to alginate ratio, one scoop of alginate material for one measure of water on the measuring cylinder.

Plastic disposable impression trays were utilized for the study and clinical procedures. These materials are manufactured and utilized in the dental setting for

loading the impression material in order to take impressions of the teeth and oral structures. The trays used were a medium tray for the mandibular arch and a large tray for the maxillary arch. All trays used were from the same manufacturer.

A plastic mixing bowl and metal spatula with wooden handle were used for mixing the alginate material. All bowls used were identical in color shape and size. All spatulas used were identical in size and shape.

Standard patient protective equipment was utilized by all the participants during the procedures. Nitrile gloves, protective lab coats, disposable masks, safety glasses, and closed toe shoes. Other than size, all gloves available were the same brand. All protective lab coats were the same texture and brand; masks were also all identical. Safety glasses varied depending on participants' preference of safety glasses.

The materials and result of the clinical procedure performed were photographed for comparison, further analyses, and publication after the study concluded. Photographs/videos were taken using an iPad pro camera. Photographs of the procedures will be kept by the investigator indefinitely for teaching purposes. These photographs are found in Appendix L. The impressions taken were photographed and grouped by participant after the study concluded. All photographs are found in Appendix K and L.

Procedures for Feedback Delivery

Feedback was delivered verbally to participants based on the group and intervention they were assigned to. In order to ensure fidelity that the feedback given corresponded to the feedback group as assigned, the investigator recorded some of the feedback that was given to each group using an iPad pro. The iPad pro

requires user authentication and only the investigator has access to it. The feedback recorded included the voice of the investigator and in some instances it also included the video of the clinical procedure for which feedback was given. The voice of the participants was not recorded unless the participants had additional questions while the investigator was giving feedback. The recordings were only used as a fidelity check to ensure that the feedback given to the participants corresponded to the actual feedback type as outlined in the script for feedback type found on Appendix A. The script was used by the investigator as another way to ensure fidelity and a reminder of the feedback type group, not as a prescriptive method to deliver a cookie cutter feedback since the procedures had many steps. The script aligned to the operational definitions of Ego Stroking Sandwich and Non-Sandwich feedback. The script corresponded to Ego Stroking Sandwich type feedback when praise was used at the beginning and end of the sandwich with a small amount of feedback in between. The script for non-sandwich feedback type included no praise on either end and focused on substantive feedback only.

Inter-Rater Reliability

Inter rater-reliability was assessed by having both instructors grade two sets of dental impressions (Appendix L) individually using the same scoring guide. The instructors came together and discussed areas where they were off for more than one point. Criteria was determined and set by the instructors to be followed during the study. It was determined that both instructors were going to begin scoring the procedure from item 5-12 "All anatomical detail is reproduced, sharp and defined" since steps 1-4 and 13-14 are related to patient care and the mixing process of alginate (See Appendix E). Both instructors agreed that starting at step five would

allow them to determine more accurately the quality of the impression taken by the participant. Both instructors also agreed that it would be most beneficial to utilize consensus to determine accuracy and discuss the quality of the product together (Johnson, et al., 2000). The scores obtained from items 5-12 were added to obtain the final score under the assumption that items 1-4 and 13-14 in the scoring guide had been followed properly at a novice level, thus, assigning 1 points for each item as needs improvement since the task was not observed by either one of the instructors. This operational score method (Score resolution) was utilized to determine the performance level of the participant (Johnson, et al., 2000). The performance levels were standardized as part of the Dental Hygiene program process of student evaluation. For each student clinical skill evaluation, the performance level is based on points. The points are then aligned to a performance category, which is aligned to the Commission on Dental Accreditation Standards for Dental Hygiene. A participant or student receiving 0-20 points is placed in the unacceptable category, 21-22 points=Novice, 23 points= Developing Level, and 24-28 points is the competent level. Since patients were not utilized for the study and mannequins took the place of patients, instructors opted to just focus on the outcome of the impression using items 5-12.

The investigator participated with the instructors during the inter-rater reliability exercise by providing feedback and guidance. The investigator did not participate during evaluation of the procedures performed to keep the investigator aside from bias on the outcome. The instructors did not have access to any research information other than scoring the scoring guide as they normally do in their classroom.

The study was conducted outside of the Dental Materials classroom time to prevent pressure on students' performance or thinking their grades may be affected on participation on the study. Participation in the study did not affect the students' performance in the course. All students received the appropriate training to perform procedures as part of their course 2 weeks after the study took place.

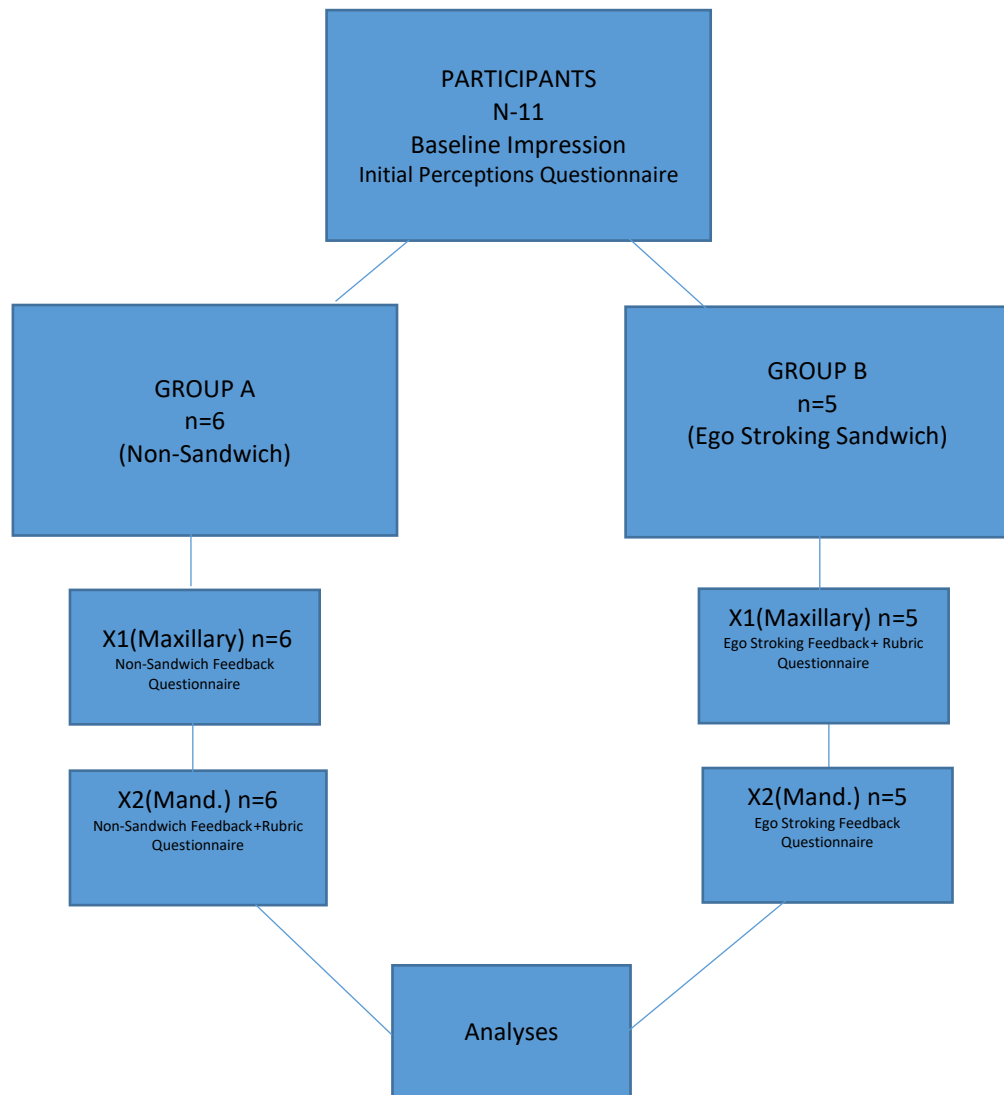
Internal Review Board Approval

The UNM IRB team, the DACC office of VPAA and the NMSU IRB team reviewed this study to ensure compliance and protection of human subjects. See Appendices D, F, G, H, J and I, for all IRB information and approvals. This study presented minimal risk to participants. The dental clinical procedures performed for the study were those performed as part of the curriculum in dental hygiene and dental assisting programs for student teaching and learning. As part of the clinical curriculum, the clinical procedures are performed in patients, however, for the research study, a dental mannequin was utilized which possess less risk than using patients.

Research Design

The study is a quasi-experimental repeated measures design. Figure 1, shows the study design used for this research project.

Figure 1. Study Design



Baseline Impression

All participants took a baseline impression, maxillary or mandibular prior to group assignment. Participants received no feedback and no rubric to perform the baseline impression. The baseline impression was used to control for impression type and any other variables that could arise as a complication of taking an impression. Another purpose was to obtain baseline with no feedback to see the effects of feedback on the impressions taken by the participants after Non-Sandwich or Ego Stroking Sandwich feedback had been delivered.

Participants also received an initial questionnaire to inquire about the general understanding of feedback and what type of feedback they perceived to be most effective for learning and success in clinical performance. The questionnaire consisted of 20, 4-point Likert type scale questions. Some questions were worded as vignettes where students were required to identify, if the type and or method of feedback given was of benefit to their learning and clinical performance.

The instructors evaluated the clinical skill using a scoring guide. Results were used as the baseline for the subsequent maxillary and mandibular impressions taken within each group. The questionnaire was also evaluated to compare type of feedback they consider most effective and to see if the type of feedback students perceive as most effective is the type of feedback that helps them develop better clinical skills.

At baseline, all participants watched the 3-minute video titled "Mixing Alginate" from start to finish. The video instructed participants on the technique to mix the alginate material used for maxillary and mandibular impressions. This video was not shown to participants at any other time during the study. Once participants

were ready to take a maxillary and mandibular impression, a second video was shown with instructions on performing the impression. Participants who landed on the maxillary baseline impression were shown the video titled “Making a Maxillary Preliminary Impression” that lasted 6.29 minutes and participants assigned to mandibular impression were shown the video titled “Making a Mandibular Preliminary Impression” that lasted 6.25 minutes. Video instruction was used at baseline to control for confounding variables and attempt to isolate the effects of feedback on performance rather than arguing that video instruction alone had an effect on performance.

Group A

Non-Sandwich Feedback

This group consisted of six participants, one male and five females receiving non-sandwich type of feedback. Participants were first shown the instructional video corresponding to “Making a Maxillary Preliminary Impression”. Three of the participants were either in the last semester of their Dental Assisting School or had already completed Dental Assisting school and were enrolled as Dental Hygiene students. The three students who had prior dental assisting experience, also had experience taking alginate impressions.

- This group took their first impression on the maxillary arch and received Non-Sandwich feedback. After the impression was completed, participants turned in the impression to the instructors for grading. Participants completed a questionnaire consisting of 20, 4-point scale Likert type questions regarding the type of feedback they just received during the procedure performed.

- After completion of the first post impression questionnaire, participants were shown the procedural video “Making a Mandibular Preliminary Impression” Participants were given a scoring guide to have handy and were instructed to proceed and complete their mandibular impression receiving feedback according to the group assigned. At the conclusion of the mandibular impression, participants turned in the product to the instructors for evaluation. Participants then completed the second post impression questionnaire.

Group B
Ego Stroking Sandwich Feedback

Group B consisted of (five participants, no males and five females) receiving ego stroking sandwich type of feedback. Participants were shown the instructional video corresponding “Making a Maxillary Preliminary Impression”. Three of the participants were either in the last semester of their Dental Assisting School or had already completed Dental Assisting school and were enrolled as Dental Hygiene students. The three students who had prior dental assisting experience, also had experience taking alginate impressions.

- This group performed the first impression on the maxillary arch and received ego boosting sandwich-type feedback prior and during the impression. After the impression was completed, participants turned in the impression to the instructors for grading. Participants completed a questionnaire consisting of 20, 4-point scale Likert type questions regarding the type of feedback they just received during the procedure performed.

- After completion of the first post impression questionnaire, participants were shown the procedural video “Making a Mandibular Preliminary Impression” and were instructed to proceed to take the impression on the mandibular arch. In this case, students received Ego Stroking Sandwich type feedback that consisted of praise, some feedback, and ended with praise. In addition, feedback type was paired with the same scoring guide used by instructors so that participants could have it handy if they wanted to review before or during performing the procedure. At the conclusion of the mandibular impression, participants turned in the product to the instructors for evaluation. Participants then completed the second post impression questionnaire to assess their perceptions on feedback delivery method.

Figure 2 shows the research model utilized.

Research Questions:

1. Which type of feedback, Non-Sandwich or Ego Stroking Sandwich do students perceive to be superior to improve their clinical skills and performance?
 - a. Measure: Control Condition, Feedback Type Perceptions
Questionnaire after Maxillary X1 and Mandibular X2 impressions.
2. Is the use of a scoring guide, paired with instructor feedback better than instructor feedback alone for student’s perceptions of their clinical performance?
 - a. Measure: Group A and Group B. Feedback Delivery Method
Questionnaire after Maxillary X1 and Mandibular Impression X2.

3. Which type of feedback, (Non-Sandwich or Ego Stroking Sandwich type) shows to be superior on students' clinical performance?
- a. Measure: Clinical Skill Evaluation Scores on Maxillary X1 and Mandibular X2 impressions across groups.

Figure 2. Research Model

	Maxillary Impression X1	Questionnaire	Mandibular Impression X2	Questionnaire
Baseline	No Feedback	Feedback Type Perceptions Questionnaire	No feedback	Feedback Type Perceptions Questionnaire
Group A	Non-Sandwich	Feedback Delivery Method Questionnaire	Non-Sandwich + rubric	Feedback Delivery Method Questionnaire
Group B	Ego Stroking Sandwich	Feedback Delivery Method Questionnaire	Ego Stroking Sandwich + rubric	Feedback Delivery Method Questionnaire

Ethical Considerations

An informed consent form was read to all participants. All participants were English speakers. Participants were not compensated for participation in the study; however, in gratitude for their participation, the investigator donated \$150.00 dollars to the Dental Hygiene student club and \$150.00 dollars to the Dental Assisting club.

Exclusion criteria for the study included participants not affiliated and enrolled as students in the NMSU/DACC Dental Programs.

CHAPTER 3

RESULTS

Analyses Overview:

Information in this chapter is presented in two sections, section one presents results on instrument analyses and section two provides results that address the research questions. The assumptions were tested and upheld for all analyses. For all statistical analyses an alpha level of $\alpha=0.05$ was established.

Part One-Instrument Analyses

Questionnaires:

An exploratory factor analysis (Costello & Osborne, 2005 and Yong & Pearce, 2013), was attempted on both questionnaires to provide internal structure evidence of validity (Messick, 1993). Likely, due to the small sample size, and thus the low participant to item ratio, factor extraction methods failed to work. Principal Components Analyses (PCA) were substituted for the exploratory factor analyses. The extracted components were rotated using varimax rotation. The decision to define the two components was based on the post-rotation eigenvalues and a visual examination of the scree plot. Both, the initial and after feedback questionnaires yield two components each. The component scales were determined as follows: Initial questionnaire: Ego Stroking Sandwich Feedback and Motivation and Non-Sandwich Feedback and Encouragement. The scales for the after feedback questionnaire are Instructor Feedback and Scoring Guide Feedback.

Ego Stroking Sandwich Feedback and Motivation. Results of the PCA Analyses returned two components, one grouped items 5,8,9,15a,16a,16b,17,18 and 19

together (see table 1). These items had in common Ego Stroking Sandwich type feedback and motivation to learn and or improve the task, therefore, a scale titled Ego Stroking Sandwich and motivation was created. An example of one of the items is “Great job, When mixing alginate material, remember to utilize an adequate powder to water ratio; good job overall.” (All items are shown in table 1.) This scale represents participants’ perceptions on Ego Stroking Sandwich type feedback and the role it plays in learning and performance. In addition, motivation was grouped with Ego Stroking Sandwich type feedback not because they go hand in hand, but because the questions were worded in such a way to tease out if participants felt that Ego Stroking Sandwich type feedback was also a way to motivate their learning and or performance. In this case, Ego Stroking Sandwich type and motivation were tied together as if they work in synergy.

Motivation and encouragement were paired with each type of feedback, however, most of the items once grouped together weighted more heavily on Ego Stroking Sandwich and motivation as well as non-sandwich and encouragement based on PCA factors.

Non-Sandwich Feedback and Encouragement. This was the result of the PCA Analyses grouping items 1, 2, 4, 7, 10 and 15b as a factor. Upon Analysis of the items, the general commonalities between them were Non-Sandwich type feedback and Encouragement. An example of one of the items is “Your instrumentation skills can improve by rolling your instrument from the mesial to the distal in an exploratory motion and small strokes. In order to prevent tissue trauma, it is important to adapt the instrument to the tooth at all times. Start at the distobuccal line angle engaging

the blade on the side towards you and keeping your instrument touching the tooth at all times, then, overlap at the distobuccal line angle and engage the opposite blade on the same side of the instrument and keeping the instrument adapted to the tooth, proceed mesially, following the exploratory strokes we talked about earlier.”

Participants’ perceptions on this type of feedback and encouragement showed to be relatively equal to sandwich and motivation. Questionnaire items 3, 6,12,13,14, 15c, 15d, 16c, 16d, and 20 loaded overlapped with two or three factors, therefore these items were dropped to avoid issues with the Analyses. Table 1 shows the initial questionnaire and the items grouped by EFA for each variable.

Table 2. Initial Perceptions Questionnaire

Questions	Non-Sandwich and Encouragement	Ego Stroking Sandwich and Morivation	Dropped Items
Q1: I pay close attention to feedback	X		
Q2: I think feedback is important in the clinical setting	X		
Q3: I think feedback is important in improving my performance			X
Q4: I usually reflect on the feedback I receive	X		
Q5: I am encouraged when I receive positive feedback		X	
Q6: I am encouraged when I receive negative feedback			X
Q7: Jessica, you are doing a fantastic job, however, you need to work on rolling your instrument from mesial to distal a little bit more, but overall great job on your instrumentation skills. The type of feedback Jessica received makes me feel motivated to improve my instrumentation skills.	X		
Q8: Jessica, you are doing a fantastic job on your instrumentation skills, keep going. The type of feedback Jessica received makes me feel motivated to improve my instrumentation skills.		X	
Q9: Jessica, your instrumentation skills can improve by rolling your instrument from the mesial to the distal in an exploratory motion and small strokes. In order to prevent tissue trauma, it is important to adapt the instrument to the tooth at all times. Start at the distobuccal line angle engaging the blade on the side towards you and keeping your instrument touching the tooth at all times, then, overlap at the distobuccal line angle and engage the opposite blade on the same side of the instrument and keeping the instrument adapted to the tooth, proceed mesially following the exploratory strokes we talked about earlier. The type of feedback Jessica received makes me feel motivated to improve my instrumentation skills.		X	
Q10: Your instrumentation skills can improve by rolling your instrument from the mesial to the distal in an exploratory motion and small strokes. In order to prevent tissue trauma, it is important to adapt the instrument to the tooth at all times. Start at the distobuccal line angle engaging the blade on the side towards you and keeping your instrument touching the tooth at all times, then, overlap at the distobuccal line angle and engage the opposite blade on the same side of the instrument and keeping the instrument adapted to the tooth, proceed mesially following the exploratory strokes we talked about earlier. This type of feedback makes me feel encouraged to improve my clinical performance	X		

Table 2. Initial Perceptions Questionnaire Continued

Questions	Non-Sandwich and Encouragement	Ego Stroking Sandwich and Morivation	Dropped Items
Q11: Your instrumentation skills can improve by rolling your instrument from the mesial to the distal in an exploratory motion and small strokes. In order to prevent tissue trauma, it is important to adapt the instrument to the tooth at all times. Start at the distobuccal line angle engaging the blade on the side towards you and keeping your instrument touching the tooth at all times, then, overlap at the distobuccal line angle and engage the opposite blade on the same side of the instrument and keeping the instrument adapted to the tooth, proceed mesially following the exploratory strokes we talked about earlier. This type of feedback does not motivate me to improve my clinical skills			X
Q12: When I receive feedback, I am most interested in positive feedback			X
Q13: I am most satisfied when a classmate gives me feedback to improve my clinical performance.			X
Q14: I am most satisfied when a teacher gives me feedback to improve my clinical performance.			X
Q15a: When you begin to mix the alginate material, it is better if you utilize the adequate powder to water ratios we discussed in class, in order to obtain a more stable impression of the teeth. Remember that spatulation speed also contributes to how fast your alginate sets. Go ahead and mix it again following the ratios and a slower spatulation speed rate. This feedback makes me feel Motivated to Learn		X	
Q15b: This feedback makes me feel Encouraged to Improve	X		
Q15c: This feedback makes me feel Uncomfortable to Learn			X
Q15d: This feedback makes me feel Threatened to Improve			X
Q16a: Great job, When mixing alginate material, remember to utilize an adequate powder to water ratio; good job overall. This feedback makes me feel Motivated to Learn		X	
Q16b: This feedback makes me feel Encouraged to Improve			X
Q16c: This feedback makes me feel Uncomfortable to Learn			X
Q16d: This feedback makes me feel Threatened to Improve			X
Q17: When teachers provide feedback, I learn best when it is direct and addresses my mistakes so that I can improve.		X	
Q18: When teachers provide feedback, I learn best when it is positive and provides praise so that I can improve.		X	
Q19: When teachers provide positive feedback, it is encouraging and helps me learn.		X	
Q20: When teachers provide direct feedback without praise, I feel hurt.			X

Instructor Feedback. Participants' perceptions of feedback received after performing each impression was measured with a questionnaire. PCA Analyses yield two components, one grouped items 1,2,3,5,7,8,12,13,14, and 18 together (see table 2). The similarities between these items were instructor feedback and improvement in performance and or learning. An example of the items is "The feedback I just received from the instructor was useful to improve my understanding of the technique I was Performing"

Scoring Guide Feedback. The second component grouped items 4,6,10,11,15,16,17,19 and 20 (see table 2). Scoring guide feedback and improvement in performance and or learning were the common constructs found in each of the items. Some examples of the items here are "Using a rubric helps me to perform a clinical skill in more detail" and "Using a scoring guide in addition to feedback helps me improve the outcome of my clinical performance"

Since improvement in performance of learning were common on all of the items, only instructor feedback and scoring guide feedback were used as scales to tease out any differences between participants' perceptions of the feedback method they received after each impression regardless of feedback type. Items 9 and 11 were removed to improve reliability. Table 2 shows after feedback questionnaire items and how PCA Analyses grouped them into two components.

Table 2. After Feedback Type Questionnaire Items

Questions	Instructor Feedback	Scoring Guide Feedback	Item Dropped
Q1: The feedback I just received from the instructor was useful to improve my understanding of the technique I was performing	X		
Q2: I think the type of feedback I just received is important in the clinical setting	X		
Q3: I think the feedback I received is important in improving my performance	X		
Q4: I reflected on the feedback I just received		X	
Q5: The feedback I just received was positive to learning	X		
Q6: Using a rubric helps me to perform a clinical skill in more detail		X	
Q7: The type of feedback I just received makes me feel motivated to improve my instrumentation skills.	X		
Q8: This type of feedback makes me feel encouraged to improve my clinical performance	X		
Q9: This type of feedback, makes learning difficult and confusing.			X
Q10: When I receive feedback, I am most interested in positive feedback		X	
Q11: I am most satisfied when a classmate gives me feedback to improve my clinical performance.		X	
Q12: I am most satisfied when a teacher gives me feedback to improve my clinical performance.	X		
Q13: The type of feedback I just received was direct and addressed my mistakes in a way that motivated me to improve my performance.	X		
Q14: The type of feedback I just received was positive and provided praise, which motivated me to improve my performance.	X		
Q15: The feedback I just received made me feel demotivated		X	
Q16: Using a scoring guide is not that useful to improve the outcome of my clinical performance.		X	
Q17: Using a scoring guide in addition to feedback helps me improve the outcome of my clinical performance		X	
Q18: The feedback I just received was sufficient to enhance my skills			X
Q19: The use of a scoring guide in addition to feedback is a superior way to improve the outcome of my clinical performance		X	
Q20: The use of rubrics and feedback together is not necessary to improve my understanding of a clinical skill		X	

Reliability:

A reliability analysis was conducted on the scores obtained from each of the variables produced by the PCA analyses. Table 3 below shows reliability estimates for each variable.

Table 3. Reliability Estimates for Questionnaire Variables

Variable	Cronbach's Alpha	N of Items
Instructor Feedback	.93	10
Scoring Guide Feedback	.85	9
Ego Stroking Sandwich and Motivation	.87	9
Non-Sandwich and Encouragement	.82	6

Clinical Skill Evaluations

A clinical skill evaluation, in this study also referred to as the scoring guide, was used to assess the outcome of the impression taken by the participants. Instructors used the same scoring guide to grade all impressions regardless of group or impression type. An inter-rater reliability study was conducted before the main study took place.

Inter-Rater Reliability Study

Prior to the study, both instructors were calibrated by the investigator using 4 impressions, 2 maxillary and two mandibular taken by two different individuals. Criteria were determined by the instructors and investigator on what areas of the impression were going to be graded. Inter-Rater Reliability analyses were conducted

on the four scores received by the instructors. For all participant's impressions, the instructors used the scoring guide and pre-determined criteria. Instructors also used a consensus method and photographs to determine a final score on each impression . The inter-rater reliability was based on ratings obtained from training session prior to study and was calculated as Cronbach's Alpha (.94).

Part Two-Analyses to Answer Research Questions

Research Question #1:

Which type of feedback, Non-Sandwich or Ego Stroking Sandwich do students perceive to be superior to improve their clinical skills and performance?

Descriptive statistics on the mean differences for Ego Stroking Sandwich Feedback, Motivation, Non-Sandwich Feedback, and Encouragement are shown in table 5. Ego Stroking Sandwich and Motivation ($M=3.511$, $SD=.488$) was perceived to be slightly less effective compared to Non-Sandwich and Encouragement ($M=3.597$, $SD=.336$) on the initial questionnaire by the 11 participants. This difference, however, was not statistically significant when tested with a one-way repeated measures ANOVA ($F(1,10) .209$, $MSe=0.40$, $p=.657$).

Research Question #2:

Is the use of a scoring guide, paired with instructor feedback better than instructor feedback alone for student's perceptions of their clinical performance?

This research question was addressed by examining participants' responses to the two subscales of the questionnaire and comparing those responses across the two treatment conditions. Table 5 shows descriptive statistics for the subscales Ego Stroking Sandwich and Non-Sandwich feedback. This research question was analyzed

using a mixed two-factor analysis of variance where subscale was the within subjects factor and feedback delivery method was the between subjects factor.

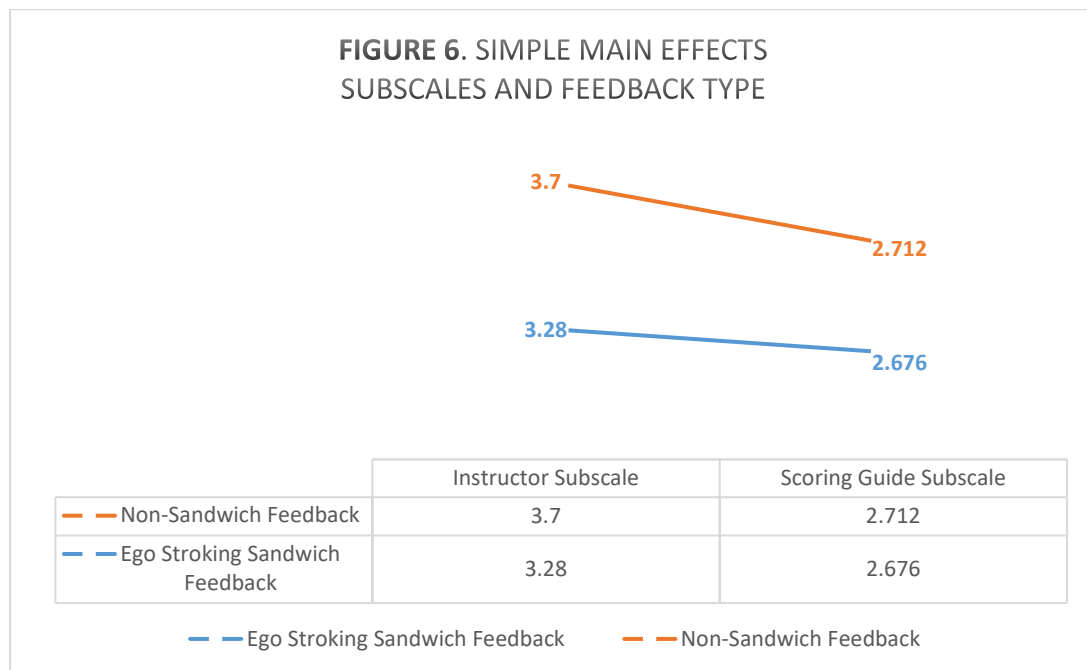
The interaction between feedback delivery method and subscale was statistically significant (Wilks' Lambda= 0.568, $F(1,9) = 6.859$, $p = .028$.) The interaction was followed up with simple main effects tests. Subscale differences were not statistically significant for Instructor feedback subscale ($F(1,9) = 3.908$, $MSe = .481$, $p = 0.79$) or Scoring Guide subscale ($F(1,9) = 0.90$, $MSe = .003$, $p = .771$). In Table 5, this refers to the columns.

The two subscales were statistically significantly different within each feedback type condition. The instructor Feedback subscale ($M = 3.28$, $SD = .443$) had a statistically significant higher mean for students in the Ego Stroking Sandwich condition than the Scoring Guide subscale did ($M = 2.67$, $SD = .242$) (Wilks' Lambda= .225, $F(1,9) = 31.057$, $p = .000$). Subscale and feedback simple main effects are shown in figure 6. Similarly the instructor feedback subscale also had a statistically significant higher mean ($M = 3.70$, $SD = .253$) for students in the Non-Sandwich condition than the Scoring Guide subscale did ($M = 2.71$, $SD = .149$) (Wilks' Lambda= .083, $F(1,9) = 99.786$, $p = .000$).

Table 5. Descriptive Statistics for Effects of Feedback Delivery Method

Feedback Type	Instructor Subscale <i>M,SD</i>	Scoring Guide Subscale <i>M,SD</i>
Ego Stroking Sandwich Feedback	3.280(.443)	2.676(.242)
Non-Sandwich Feedback	3.700(.253)	2.712(.149)

Figure 6. Simple main effects of subscales and feedback type.



Research Question #3:

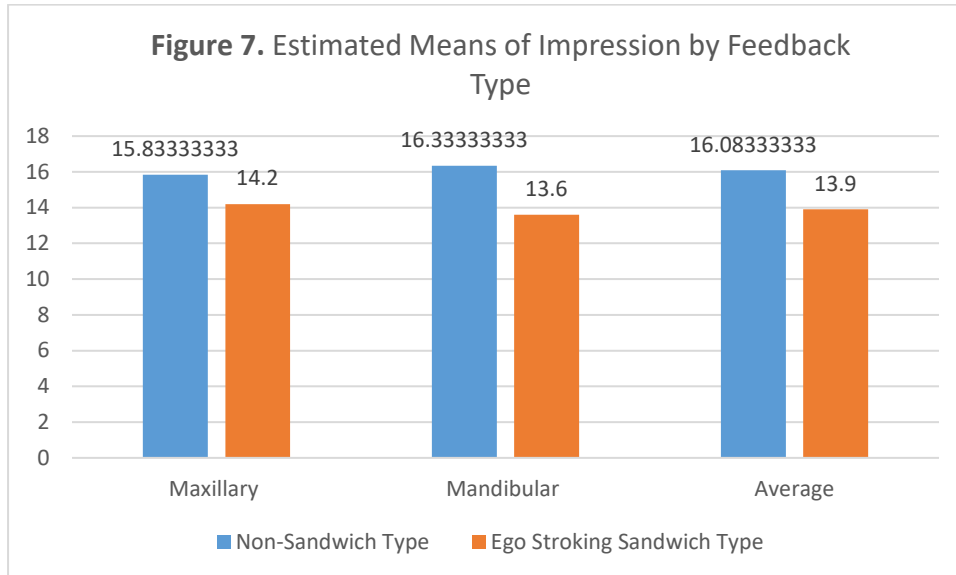
Which type of feedback, (No Feedback, Non-Sandwich or Ego Stroking Sandwich type) shows to be superior on students’ clinical performance?

An ANCOVA was conducted to assess the effects of Non-Sandwich versus Ego Stroking Sandwich feedback on student clinical performance using No Feedback as a covariate. The analyses showed no statistically significant differences between Non-Sandwich and Ego Stroking Sandwich feedback between groups, ($F(1, 8) = 2.852, MSe = 13.239, p = .130$).

Although there are no statistical significant results on feedback type effectiveness between Non-Sandwich and Ego Stroking Sandwich feedback on student performance, based on mean differences, we can observe that Non-

Sandwich Feedback condition is better ($M=16.083$, $SD=2.222$) in comparison to Ego Stroking Sandwich Feedback ($M= 13.900$, $SD=1.781$).

Figure 7 shows a breakdown of marginal means of impression depending on the feedback type received.



CHAPTER 4 DISCUSSION

This chapter provides interpretation of the results as presented in chapter 3. First, a discussion of the research findings on participants' general perceptions of feedback type to address research question #1 and feedback delivery method to address research question #2. Then, the clinical skill evaluation results are discussed in relation to feedback type delivered and its effects in clinical performance as presented in support of research question #3. Limitations of the study are also discussed followed by future research and concluding with implications of the study for clinical dental hygiene and dental assisting.

Discussion on Participant's Perceptions of Feedback

Research Question #1

The initial questionnaire was administered to gain a general sense of how students perceived feedback and which type of feedback (ego stroking sandwich or non-sandwich) they perceived to be most effective for learning and performance in the clinical setting.

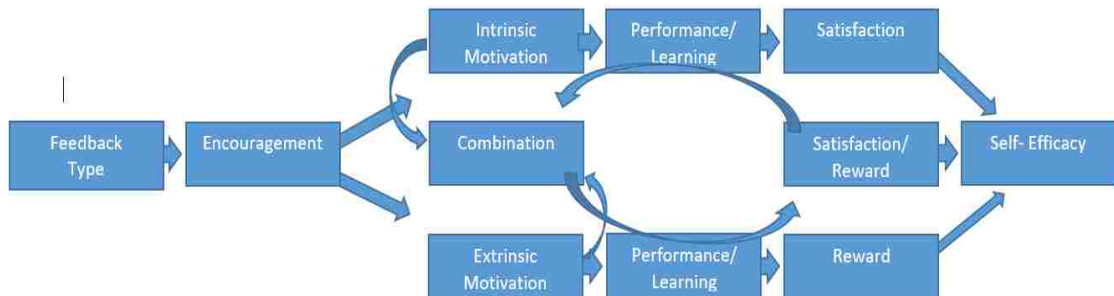
Based on students' perceptions we can ascertain that there is no difference on feedback type and students' perceptions of its effectiveness in learning and performance. We can see a very small mean difference between the two where Non-Sandwich type feedback was perceived slightly better but because the mean difference is so small, we conclude that participants did not perceive Ego Stroking Sandwich feedback to be different than Non-Sandwich feedback or vice versa.

The scales were also paired with motivation and encouragement based on the PCA components. Although motivation and encouragement were not tested as part of the analyses to address the research questions, it is worth mentioning how they played a role in the questionnaire and the construction of the questions. Focusing on theories of motivation discussed in this paper (Ryan & Deci, 2000), there is intrinsic and extrinsic motivation. The main difference between the two is that in intrinsic motivation one performs a task for the internal satisfaction of performing the task without expecting anything in return, whereas extrinsic motivation is more often thought of as the motivation that leads to performance when there is a reward at the end. In technical careers like dental hygiene, dentistry, nursing and similar careers that require students to develop specific skills to perform a task, motivation plays a significant role. Motivation more likely than not is cultivated and, or reinforced by the instructor. Feedback plays the most important role in cultivating motivation for student learning and task performance. Feedback that addresses the task and process and provides detailed instruction to correct or improve the task, process or skill is most desirable. After feedback is given, if effective, feedback should promote encouragement which in my opinion, encouragement incites motivation. In technical careers, alike sports, motivation needs not to be intrinsic alone but it could be either intrinsic, extrinsic or a combination of both.

The results on this questionnaire provide insight on perceptions of feedback and although motivation and encouragement were not tested individually to make inferences, they were fused to feedback type within the questionnaires. Just like there is no difference on the type of feedback participants perceived to be most effective, there is also no difference on how they perceived encouragement and

motivation. A different study needs to be performed to tease out differences between feedback type and motivation type if there are any. In my opinion, the interpretation of the results of this study (as shown in Figure 8) show that feedback, regardless of type, leads to student encouragement. Student encouragement leads to motivation (intrinsic, extrinsic or a combination of both), motivation leads to performance and learning, and performance and learning lead to task completion, which then, turns into student self-efficacy to perform a task effectively. As pointed out by Hattie and Timperley, 2007, feedback should promote learning, which can then, lead to self-efficacy and be utilized by the student to provide feedback to instructors, peers, and others.

Figure 8. Feedback and Motivation Flowchart



Feedback is crucial for student learning and skill development. Instructors of dental assisting and dental hygiene clinical courses ought to be familiar with feedback delivery methods and what strategies have shown to be most effective. Although the results of the study show no significant difference on students' perceptions of feedback type, the bulk of the literature (Bandura, 1993; Boehler, et al., 2006; Busser, 2012; Cantillon & Sargeant, 2008; Dwec , 2016; Hattie & Timperley, 2007; Hauser & Bowen, 2009; Parkes,et al., 2013 and Xeroulis, et al., 2006) shows

that feedback specificity is important for student outcomes and performance. In order to look into feedback type and task performance; it is important to recognize what perceptions students bring into the teaching and learning environment so that our approach to deliver feedback is based on the idea of improving student learning and performance. Instructors ought to provide students with tools that improve their ability to focus on the task and either improve what they are doing or address areas that are in need of additional instruction.

Research Question #2

A second questionnaire was given to participants after they were assigned to a feedback type group and performed a maxillary and a mandibular impression. In both cases, after each impression the questionnaire was the same and was used to assess participants' perceptions on feedback delivery method.

Two scales were produced as a result of the PCA analysis. The scales created based on the content of the items were instructor feedback and scoring guide feedback. The two factor ANOVA with simple main effects yield result indicating that participants perceived instructor feedback more valuable than scoring guide feedback paired with instructor feedback within groups and across groups. Another observation was that participants perceived instructor feedback to be most effective while receiving Non-Sandwich type feedback. The video recordings were used as a fidelity check only to ensure that each group received feedback pertaining to the group they were in. Example, the Non-Sandwich group received Non-Sandwich "Based on the feedback I gave you before you had to load the tray very fast, now on this one, instead of loading a big chunk you want to split the tray in half. You want to load this half first, then this other half of the tray and then smooth it, okay..."

Similarly, the Ego Stroking group received Ego Stroking feedback “Do you have any questions. I think you guys are fabulous; you did a fantastic job with maxillary impressions. When placing the mandibular tray, you want to make sure that you retract the lips of DEXTTR with force because the lips are tight, then you place the tray as instructed in the video.” The investigator kept the scrip for feedback handy to be reminded of the feedback type group just to prevent any accidents of giving the wrong type of feedback to the participants. Due to the extent of the study and the many steps of taking an impression, the script was not followed word by word but was used to remind the investigator of feedback type.

During the mandibular impression, participants were able to have the scoring guide used by the instructors handy. One of the assumptions in this situation was that the scoring guide served more as a distractor than a useful tool for students to improve clinical performance. Because participants lacked experience taking impressions on a DEXTTR and using the fast set alginate, adding additional factors such as the scoring guide, could have caused some cognitive overload, thus, their perception of using a rubric did not seem to be optimal.

Other studies have discussed the general effects of feedback delivery methods and its effectiveness. Researchers (Hattie & Timperley, 2007) provide evidence not only on the power feedback plays in teaching and learning but also on the power instructors have when delivering feedback to learners. Since most students perceive feedback from an instructor more valuable than feedback from a classmate or in the case of this study, feedback obtained from reading the scoring guide, it would be important to look into a study that isolates instructor feedback

and scoring guide feedback and its effects on clinical performance instead of only looking at perceptions.

Clinical Skill Evaluation (CSE) Discussion:

The results of the CSEs show that there are no statistical differences between feedback type on clinical performance. However, these results are based on a small sample size of only five and six participants per group. When looking at the descriptive statistics, there is mean difference between feedback type and clinical performance point in a positive direction, thus, a possible bigger sample size may yield results that are more powerful. Figure 7 shows the estimated means of impression by feedback type. Looking at the average means for feedback type, Non-Sandwich feedback ($M= 16.08, SD 2.222$) is greater than Ego Stroking Sandwich feedback ($M= 13.9, SD=1.781$) indicating that those who received Non-Sandwich feedback performed better in the clinical procedure of taking impressions.

At least half of the participants were either dental assisting students or dental hygiene students who had prior dental assisting experience. This is important because it was expected that some participants were going to perform at a higher level during the baseline impression since they had prior experience with the alginate material and taking maxillary and mandibular impressions. A visual inspection of table 6 shows that those participants who had no experience performed lower compared to those with experience, however, after feedback type was delivered; the participants who performed lower at baseline were able to catch up and scored similarly to those who had prior experience. No inferential analyses are reported here because participants' experience was not a variable of interest for this study.

Table 6. Participant Performance Based on Experience

Participant ID	Prior DA Experience	Baseline CSE Score	Maxillary CSE Score	Mandibular CSE Score
1171912 P3		7	17	13
1171912 P5		6	16	17
1171912 P8	X	13	18	17
1171912 P10		8	16	16
1171912 P11	X	10	17	21
1171912 P13	X	7	11	14
1171912 P1	X	8	13	13
1171912 P2	X	14	13	14
1171912 P4	X	11	16	9
1171912 P6		6	16	18
1171912 P7		6	13	14

Baseline CSE:

The baseline CSE was administered to participants to obtain baseline data in order to compare any changes seen after feedback was delivered. As shown in table 6, Participants who had prior experience as dental assistants or were in the dental assisting program obtained better scores than those who had no prior experience at the time of the study.

No assumptions were made as to whether or not prior experience would play a role due to the logical explanation that prior experience usually does have an effect on performance. What is important to note is the fact that even those with prior experience at taking impressions showed improvements after feedback type was provided compared to baseline scores.

Research Question #3

The simple main effects Analysis of covariance performed on the clinical skill evaluations using baseline scores as a covariate shed some light on the effects of feedback type between groups.

First, no statistical differences were found on the mean differences between Non-Sandwich and Ego Stroking Sandwich type feedback. Although no statistical significance was found on the ANCOVA, the mean differences on the descriptive statistics show that those individuals who received Non-Sandwich feedback performed better impressions compared to those who received Ego Stroking Sandwich type feedback regardless of prior experience and impression type. All impressions were photographed and all the photographs are found in Appendix L for review as necessary.

Furthermore, mean differences also show a trend that indicates that Non-Sandwich feedback was most effective during the maxillary impression for both groups compared to the mandibular impression. It is important to note, that during the mandibular impression, participants had access to the scoring guide used to evaluate the overall quality of the impressions. When students are in the novice stages, their focus is devoted to the one task they are performing. In this case, the participants' cognitive and psychomotor skills were all being utilized by taking an impression. Their cognitive capacity at the time was fully loaded allowing little to no space for a rubric to be read while performing the procedure and trying to attend to feedback. This observation aligns with other research findings (Bandura, 1977).

These findings are also similar to those reported by Xelious and colleagues, 2006 where medical students were exposed to knot-tying. In that study, those students who were exposed to expert feedback and computer-based video instruction performed better than those who only received the computer-based video instruction alone (Xeroulis, et al., 2006) which is similar to the results seen on this study. Students at baseline were only exposed to video instruction and no

expert feedback, thus, their scores were lower compared on their clinical skill evaluations compared to the scores obtained after video instruction and receiving feedback type. This study did not analyze the differences between expert feedback and video instruction but went beyond and looked into the differences of feedback type on students' performance keeping video instruction as a controlled variable that everyone received.

It is important to carry further research with a bigger number of participants to observe results that are more powerful. However, based on the observations of this study and the statistical analyses; the study shows promising paths to better understand the effects of feedback type in clinical performance as well as the ability for instructors to recognize that utilizing too many methods for feedback delivery at once could be counterproductive for novice students. It is best to focus on one method of delivering feedback and the feedback ought to be aimed at the task such as the one delivered by the instructor, non-Sandwich type, in this study.

Limitations of the Study

The study was conducted with a small sample of participants, which presents a limitation. Overall participation consisted of five and six participants per group with eleven subjects. The sample was conveniently selected since the students from the dental hygiene and dental assisting program at Dona Ana Community College were easily accessible. It is important to note that a clinical study of this nature more often than not, tends to have small sample sizes. In laboratory and clinical teaching, most accrediting agencies place a limit on the faculty to student ratio. In the case of allied dental programs, most often the ratio is 1:5, having one instructor per every five students, thus, this study mimics the actual day to day teaching and learning

environment of a dental materials course. These ratios are also problematic, the observation on this study, was that if an instructor is supervising five students at once, it is very difficult to provide effective and individualized feedback to all five students as they are performing the procedures. Schools usually have limited funds to hire more faculty members but in those cases, other options should be looked into in order to ensure students are receiving the proper teaching and feedback to help them master a process and become good clinicians. Some dental schools are working with computerized systems where students practice a procedure and receive immediate feedback on their performance after cutting a tooth preparation, however, in allied dental education this is not possible at the moment due to limitations in funding and not having a computerized system to provide immediate feedback to novice students on clinical procedures such as periodontal probing, hard tissue charting, or even alginate impression taking technique.

In order to improve external validity, samples from other schools may be needed in order to improve the sample size of participants taking the impressions while receiving some type of feedback. Another method to improve external validity would be to replicate the study in multiple semester with different cohorts.

Another limitation of the study was time and cost. The study was conducted over a 4-hour period and some fatigue of the participants and instructors was observed. Since this is a clinical condition, if more participants were available, the study would have to take part during a long period of time, which may create a lot of burden for the school and participants as well as the investigator. Dental materials are costly and the procedures are time consuming, therefore, a bigger sample size may not be possible under circumstances like the ones on this study due to

limitations in class sizes in allied dental programs. A clinical study also takes clinical time away and orchestrating clinical utilization in programs with limited resources may not be possible.

Future Research

Clinical research in dental hygiene and other allied dental professions is needed in order to gain a better understanding of best practices and areas that can be explored both in teaching and learning as well as clinical practice. A future study will include replication in different areas of dentistry to obtain more robust external and internal validity across settings. Exclusion criteria should include participants who have had prior experience, taking alginate impressions, and focus only on those who have not had any experience to obtain more homogenous results focused only on participants without experience and see results that are more accurate based on significant mean differences. This study explored results with both participants with no experience and with some experience. Since obtaining a big sample is difficult for a clinical study in dental hygiene, it may be necessary to recruit subjects from pre-dental hygiene or pre-dental areas in order to improve sample size.

From this study, we can conclude that student learning in the clinical setting is best nurtured by ensuring faculty members are well trained in delivering effective feedback addressed to the task and process as well as providing feedback that provides detailed guidance to improve a task or correct faulty interpretations of the task at hand. It is also crucial to avoid ego stroking feedback because it is not as effective as direct formative feedback, even though students' perceptions show no differences.

Practical Implications

A very important piece of clinical dental hygiene education is the use and delivery of feedback to students. Clinical dental hygiene instructors must possess skills and proper feedback knowledge in order to deliver adequate and formative feedback to students. As reported by some experts, feedback specificity is paramount to indicate how the student can improve a skill (Shute, 2008). The two dental hygiene instructors portrayed at the beginning of this paper are a clear example of the mix of feedback delivery one experiences in a clinical setting. One provided clear, specific and direct feedback while the other provided ego stroking feedback in a sandwich type, aimed to the self, more so than to the task or the process, and with little or no explanation on how to improve.

Jessica and Joseph, two students at the same level in their dental hygiene education with similar aptitudes and goals to develop a skill that would transform them in good dental hygienist might however take very different turns based on the type of feedback and instruction received by their clinical instructors. Jessica's instructor provided specific feedback that is aimed at the task and process. "The technique you are using is almost where it should be in skill development, however, in order to not cause tissue trauma to your patient it is important to start rolling the instrument as soon as you approach the mesial buccal line angles. This will prevent you from inadvertently cutting the gingival tissue and causing trauma. This is how to roll...(vicarious modeling)" The feedback given is what is desirable in dental hygiene clinical instruction. It is important for clinical educators to remember that students are there to learn a skill that will later be used to treat patients. Students value their instructors' feedback because students see the instructor as an expert in the field.

When instructors provide effective and formative feedback that addresses the task and process; the instructor is doing a good service to the student, the patients whom the student will be treating in the future and overall to the profession of dental hygiene.

On the other hand, Joseph also received feedback for the same skill and the same misconception while instrumenting the mesial aspect of a tooth. His instructor provided feedback that some educators perceive as the norm and gold standard of feedback “the sandwich” to which in this paper is better known as the ego stroking sandwich type. “You are a fantastic student Joseph, make sure you roll your instrument a bit more when you come to the mesial aspect of the tooth; but overall you’re a great student, keep working on it”. The ego stroking sandwich technique provided the student with feedback aimed at the self. The first portion of the feedback “ego stroking sandwich” been offered as praise, (“you are fantastic, Joseph...”) has also been shown to undermine motivation and jeopardize learning (Dweck, 2008). The second portion of the feedback given to Joseph was the actual feedback desired that could have been useful if it had not been diluted by the first portion (“make sure you roll your instrument a bit more when you come to the mesial aspect of the tooth”). Since the overall aim of the feedback was originally intended to be aimed at the task, it might be perceived by both the instructor and student as effective, however, because it was directed to the self it is less effective than non-sandwich formative feedback. The last part of the feedback given concluded with another ego stroking comment (“but overall you’re a great student”) intended to be aimed at the overall performance of the student, however, when the student hears the ego stroking comment of the sandwich first, he/she already is

attending in working memory that he/she is good, thus there is limited space to process the rest of the feedback since the praise already diverted the overall message in a different direction. Ending with praise confirms the first assumption of the student that he or she is good.

It is also important for clinical instructors to understand that regardless of feedback type, students learn and improve clinical performance. However, as shown in this study, the descriptive statistics show a clear trend indicating that the non-sandwich feedback delivery method was more effective on students' clinical performance, even though students did not perceive feedback type as crucial for learning and performance. In addition, there must be a clear understanding that this is one of very few studies that has looked into dental clinical applications using feedback as a variable to determine performance level based on feedback type. It is also wise not to forget about the array of research that points out to feedback specificity as a crucial method for students' learning, and feedback that uses praise diminishes the substantive intended effects of the feedback given. This study also shows that trend, the students who received praise, performed lower on impression taken compared to those who received direct feedback with no praise.

The results of this study should be used as an exploratory approach to understand feedback type in clinical applications with novice students as well as a method to determine the feedback type each clinical instructor wants to use while teaching clinical procedures. It is also crucial to understand that allied and dental students are performance oriented, thus, providing feedback that improves performance and self-efficacy is essential for student success. Furthermore, It is possible that the question is not only in relation to the type of feedback offered but

how the feedback is offered. Immediate feedback may be more useful than delayed feedback in the clinical setting as well as feedback from the instructor is more effective than feedback from a scoring guide (Hattie & Timperley, 2007).

Conclusion

This study explored student perceptions of feedback type as well as clinical applications in dental hygiene and dental assisting while using feedback type as an independent variable to assess the outcome of the impressions taken. This study has not only looked at perceptions of feedback but also included clinical applications while measuring the outcome after feedback type had been provided.

The results on this study have shown that although students learn with feedback regardless of feedback type; the non-sandwich type shows trends to be better to improve clinical performance based on the descriptive statistics. Feedback delivery method also showed to be important in this study.

Participants were more satisfied and preferred feedback delivered by the instructor in comparison to feedback paired with instructor and scoring guide across interventions. In addition, the best quality impressions resulted from participants who received the Non-Sandwich type feedback even though the inferential statistics showed no statistical differences between feedback type and clinical performance.

APPENDICES

APPENDIX A - SCRIPT FOR FEEDBACK TYPE

Perceptions and Clinical Applications: Feedback Type in Dental Hygiene

Group A (Non-Sandwich type feedback)

Feedback Script

The (Task being performed) can be improved by (provide method of how it can be improved). It is also important to take into consideration (Provide feedback on two additional areas where the participant can improve the task, if appropriate). Let me know if you have any further questions. Try the techniques we discussed and see how that works. Thanks.

Group B (Ego Stroking Sandwich type feedback using praise)

Wow, great job. In order to improve (provide method of how it can be improved). You are a great student. Let me know if you have any other questions. Thanks.

APPENDIX B - GENERAL PERCEPTIONS OF FEEDBACK QUESTIONNAIRE

EDPY Clinical Feedback Questionnaire

Q1: I pay close attention to feedback:

- Strongly Disagree Disagree Agree Strongly Agree

Q2: I think feedback is important in the clinical setting

- Strongly Disagree Disagree Agree Strongly Agree

Q3: I think feedback is important in improving my performance

- Strongly Disagree Disagree Agree Strongly Agree

Q4: I usually reflect on the feedback I receive

- Strongly Disagree Disagree Agree Strongly Agree

Q5: I am encouraged when I receive positive feedback:

- Strongly Disagree Disagree Agree Strongly Agree

Q6: I am encouraged when I receive negative feedback:

- Strongly Disagree Disagree Agree Strongly Agree

Q7: Jessica, you are doing a fantastic job, however, you need to work on rolling your instrument from mesial to distal a little bit more, but overall great job on your instrumentation skills.

The type of feedback Jessica received makes me feel motivated to improve my instrumentation skills.

- Strongly Disagree Disagree Agree Strongly Agree

Q8: Jessica, you are doing a fantastic job on your instrumentation skills, keep going.

The type of feedback Jessica received makes me feel motivated to improve my instrumentation skills.

- Strongly Disagree Disagree Agree Strongly Agree

Q9: Jessica, your instrumentation skills can improve by rolling your instrument from the mesial to the distal in an exploratory motion and small strokes. In order to prevent tissue trauma, it is important to adapt the instrument to the tooth at all times. Start at the distobuccal line angle engaging the blade on the side towards you and keeping your instrument touching the tooth at all times, then, overlap at the distobuccal line angle and engage the opposite blade on the same side of the instrument and keeping the instrument adapted to the tooth, proceed mesially following the exploratory strokes we talked about earlier.

The type of feedback Jessica received makes me feel motivated to improve my instrumentation skills.

- Strongly Disagree Disagree Agree Strongly Agree

Q10: Your instrumentation skills can improve by rolling your instrument from the mesial to the distal in an exploratory motion and small strokes. In order to prevent tissue trauma, it is important to adapt the instrument to the tooth at all times. Start at the distobuccal line angle engaging the blade on the side towards you and keeping your instrument touching the tooth at all times, then, overlap at the distobuccal line angle and engage the opposite blade on the same side of the instrument and keeping the instrument adapted to the tooth, proceed mesially following the exploratory strokes we talked about earlier.

This type of feedback makes me feel encouraged to improve my clinical performance.

- Strongly Disagree Disagree Agree Strongly Agree

Q11: Your instrumentation skills can improve by rolling your instrument from the mesial to the distal in an exploratory motion and small strokes. In order to prevent tissue trauma, it is important to adapt the instrument to the tooth at all times. Start at the distobuccal line angle engaging the blade on the side towards you and keeping your instrument touching the tooth at all times, then, overlap at the distobuccal line angle and engage the opposite blade on the same side of the instrument and keeping the instrument adapted to the tooth, proceed mesially following the exploratory strokes we talked about earlier.

This type of feedback does not motivate me to improve my clinical skills.

- Strongly Disagree Disagree Agree Strongly Agree

Q12: When I receive feedback, I am most interested in positive feedback.

- Strongly Disagree Disagree Agree Strongly Agree

Q13: I am most satisfied when a classmate gives me feedback to improve my clinical performance.

- Strongly Disagree Disagree Agree Strongly Agree

Q14: I am most satisfied when a teacher gives me feedback to improve my clinical performance.

Strongly Disagree Disagree Agree Strongly Agree

Q15: When you begin to mix the alginate material, it is better if you utilize the adequate powder to water ratio we discussed in class, in order to obtain a more stable impression of the teeth. Remember that spatulation speed also contributes to how fast your alginate sets. Go ahead and mix it again following the ratio; and a slower spatulation speed rate.

This feedback makes me feel

	Strongly Agree	Agree	Disagree	Strongly Disagree
Motivated to Learn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Encouraged to Improve	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Uncomfortable to Learn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Threatened to Improve	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q16: Great job, When mixing alginate material, remember to utilize an adequate powder to water ratio; good job overall.

This feedback makes me feel

	Strongly Agree	Agree	Disagree	Strongly Disagree
Motivated to Learn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Encouraged to Improve	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Uncomfortable to Learn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Threatened to Improve	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q17: When teachers provide feedback, I learn best when it is direct and addresses my mistakes so that I can improve.

Strongly Disagree Disagree Agree Strongly Agree

Q18: When teachers provide feedback, I learn best when it is positive and provides praise so that I can improve.

- Strongly Disagree Disagree Agree Strongly Agree

Q19: When teachers provide positive feedback, it is encouraging and helps me learn.

- Strongly Disagree Disagree Agree Strongly Agree

Q20: When teachers provide direct feedback without praise, I feel hurt.

- Strongly Disagree Disagree Agree Strongly Agree

APPENDIX C - AFTER FEEDBACK DELIVERY QUESTIONNAIRE

EDPY Clinical Feedback Questionnaire after interventions

Q1: The feedback I just received from the instructor was useful to improve my understanding of the technique I was performing

- Strongly Disagree Disagree Agree Strongly Agree

Q2: I think the type of feedback I just received is important in the clinical setting

- Strongly Disagree Disagree Agree Strongly Agree

Q3: I think the feedback I received is important in improving my performance

- Strongly Disagree Disagree Agree Strongly Agree

Q4: I reflected on the feedback I just received

- Strongly Disagree Disagree Agree Strongly Agree

Q5: The feedback I just received was positive to learning

- Strongly Disagree Disagree Agree Strongly Agree

Q6: Using a rubric helps me to perform a clinical skill in more detail

- Strongly Disagree Disagree Agree Strongly Agree

Q7:

The type of feedback I just received, makes me feel motivated to improve my instrumentation skills.

- Strongly Disagree Disagree Agree Strongly Agree

Q8:

This type of feedback makes me feel encouraged to improve my clinical performance

- Strongly Disagree Disagree Agree Strongly Agree

Q9:

This type of feedback, makes learning difficult and confusing.

- Strongly Disagree Disagree Agree Strongly Agree

Q10: When I receive feedback, I am most interested in positive feedback.

- Strongly Disagree Disagree Agree Strongly Agree

Q11: I am most satisfied when a classmate gives me feedback to improve my clinical performance.

- Strongly Disagree Disagree Agree Strongly Agree

Q12: I am most satisfied when a teacher gives me feedback to improve my clinical performance.

- Strongly Disagree Disagree Agree Strongly Agree

Q13: The type of feedback I just received was direct and addressed my mistakes in a way that motivated me to improve my performance.

- Strongly Disagree Disagree Agree Strongly Agree

Q14: The type of feedback I just received was positive and provided praise which motivated me to improve my performance.

- Strongly Disagree Disagree Agree Strongly Agree

Q15: The feedback I just received made me feel demotivated.

- Strongly Disagree Disagree Agree Strongly Agree

Q16: Using a scoring guide is not that useful to improve the outcome of my clinical performance.

- Strongly Disagree Disagree Agree Strongly Agree

Q17: Using a scoring guide in addition to feedback helps me improve the outcome of my clinical performance

- Strongly Disagree Disagree Agree Strongly Agree

Q18: The feedback I just received was sufficient to enhance my skills

- Strongly Disagree Disagree Agree Strongly Agree

Q19: The use of a scoring guide in addition to feedback is a superior way to improve the outcome of my clinical performance

- Strongly Disagree Disagree Agree Strongly Agree

Q20: The use of rubrics and feedback together is not necessary to improve my understanding of a clinical skill

- Strongly Disagree Disagree Agree Strongly Agree

APPENDIX D - IRB PROJECT INFORMATION

IRB Project Information

The purpose of this form is to provide information about a project for IRB review.

Instructions: Complete the required sections.

Sections marked with an asterisk (*) are required.

Sections marked with a double asterisk (**) are required if applicable.



1005 Sigma Chi NE

Tel: (505) 277-2644

Fax: (505) 277-2697

Email: IRB@unm.edu

Project Identification	
* Title of the project:	Perceptions and Clinical Applications: Feedback Type in Dental Hygiene

Principal Investigator of Record			
* The Principal investigator of record is: (select one) <input checked="" type="checkbox"/> Principal Investigator <input checked="" type="checkbox"/> Responsible Faculty			
* Name:	Dr. Jay Parkes	* Phone:	505-277-3320
		* Email:	parkes@unm.edu
* Department:	Individual Family and Community Education	* University Status (e.g. tenure track or visiting faculty, instructor, staff, etc.):	Professor
Campus Affiliation:	<input checked="" type="checkbox"/> Main Campus <input type="checkbox"/> Gallup <input type="checkbox"/> Los Alamos <input type="checkbox"/> Taos <input type="checkbox"/> UNM West: <input type="checkbox"/> Valencia		

Additional Contact Person			
** The contact person for this project is: (select one) <input checked="" type="checkbox"/> Student Investigator <input type="checkbox"/> Project Coordinator			
** Name:	Elmer Gonzalez	** Phone:	575-528-7216
		** Email:	elmer6@unm.edu
** Department:	Individual Family and Community Education	** University Status (e.g. undergraduate, master's or PhD student, staff, etc.):	Ph.D. student

Certification	
* As Principal Investigator, I certify the following:	
<input checked="" type="checkbox"/>	I will personally conduct or supervise this research in accordance with state law, institutional policies and procedures, and federal regulations as applicable.
<input checked="" type="checkbox"/>	I agree to conduct the research in accordance with the three basic principles of the Belmont Report (Respect for Persons, Beneficence, and Justice).
<input checked="" type="checkbox"/>	I agree to seek and obtain prior written approval from the University of New Mexico Institutional Review Board (UNM IRB) for any amendments to this research including changes in procedures, project risks, study aims, project team, etc.
<input checked="" type="checkbox"/>	I will maintain records of this research according to federal and state regulations and guidelines, including keeping a copy of this form for the investigator's records. If the project is approved, I agree to maintain copies of all IRB correspondence and documents for at least 5 years after completion of the project, or longer if required.
<input checked="" type="checkbox"/>	I agree to promptly report any adverse events or unanticipated problems involving risks to participants or others in the course of this project in accordance with the UNM Office of the IRB (OIRB) policy.
<input checked="" type="checkbox"/>	I understand that this research, once approved, is subject to continuing review and approval by the UNM IRB unless written documentation is provided that the research is exempt. I agree to maintain active project approval. I will not conduct any research activities if there is a lapse in approval. In order to maintain active approval, I agree to submit to the OIRB complete requests for continuation at least thirty (30) days prior to the project expiration date.
I certify that the statements herein are true, complete, and accurate to the best of my knowledge, and accept the obligation to comply with all applicable federal regulation and state laws, institutional policies and procedures, and the requirements and determinations of the UNM IRB with respect to this research.	

Principal Investigator/Responsible Faculty		Student Investigator	
* Signature	Date	** Signature	Date

Summary of the Protocol	
<p>* Provide a brief, lay, protocol summary that includes project goals, background, and methods used for this research.</p> <p>Limit: 1500 characters</p>	<p>Dental hygiene teaching and learning requires a clear understanding of how learning takes place and how that learning is then transposed into clinical skills to be developed to a proficiency level based on the students' progress through the curriculum and clinical setting. Feedback provides students not only with information regarding their skill performance, but equally important, it provides the opportunity to detect mistakes and correct faulty interpretations (Xeroulis, et al., 2006).</p> <p>The study follows an repeated measures experimental design where the control intervention (Time 1) serves as the baseline data. Participants will be randomly assigned to one of two procedures, X1 or X2. After participants complete the procedure for baseline, they will be randomly assigned to experimental Group A (non-sandwich type) or Group B (sandwich type). Each group will perform X1 and X2 clinical procedures, however, the intervention will consist of different type of feedback for each group and the addition of a rubric for X2 procedure. All groups will be evaluated on the clinical skill been performed using the same rubric by the instructor. All groups will receive detailed pre-recorded instruction using the Dental Hygiene Procedures Videos- eCommerce Version, 1st edition to perform the clinical procedures during all interventions. All groups will also receive feedback through the procedure. The type of feedback will be given based on the intervention and group assignment.</p>

Project Logistics																					
<p>* Is the project funded?</p> <p>** Title of funded project (i.e. Grant title):</p> <p>** PI for funded project (i.e. PI of Grant):</p> <p>** Funding awarded to:</p> <p>** Name of Funding Source:</p>	<p><input checked="" type="checkbox"/> No <input type="checkbox"/> Yes. Provide the following information:</p> <p><input type="checkbox"/> UNM <input type="checkbox"/> Other. Describe:</p> <p>** Cayuse Project Number:</p>																				
<p>IMPORTANT! If applicable, provide a copy of the complete grant application.</p>																					
<p>* Will the project be submitted for federal funding?</p> <p>* Are there external sites at which the researcher will conduct or oversee the project?</p> <p>** Site Name:</p> <p>** Site Location:</p> <p>** Contact Name:</p> <p>** Contact E-mail:</p>	<p><input checked="" type="checkbox"/> No <input type="checkbox"/> Yes.</p> <p><input type="checkbox"/> No <input checked="" type="checkbox"/> Yes. Provide the following information for each site:</p> <table border="1"> <thead> <tr> <th></th> <th>Site 1</th> <th>Site 2</th> <th>Site 3</th> </tr> </thead> <tbody> <tr> <td>** Site Name:</td> <td>Dona Ana Community Collage</td> <td></td> <td></td> </tr> <tr> <td>** Site Location:</td> <td>New Mexico State University</td> <td></td> <td></td> </tr> <tr> <td>** Contact Name:</td> <td>Elmer Gonzalez</td> <td></td> <td></td> </tr> <tr> <td>** Contact E-mail:</td> <td>elmerg@nmsu.edu</td> <td></td> <td></td> </tr> </tbody> </table>		Site 1	Site 2	Site 3	** Site Name:	Dona Ana Community Collage			** Site Location:	New Mexico State University			** Contact Name:	Elmer Gonzalez			** Contact E-mail:	elmerg@nmsu.edu		
	Site 1	Site 2	Site 3																		
** Site Name:	Dona Ana Community Collage																				
** Site Location:	New Mexico State University																				
** Contact Name:	Elmer Gonzalez																				
** Contact E-mail:	elmerg@nmsu.edu																				
<p>** Is UNM the lead site for this project?</p>	<p><input type="checkbox"/> No <input checked="" type="checkbox"/> Yes.</p>																				
<p>IMPORTANT! If external sites are involved, provide a copy of the site's IRB Approval, IRB Authorization Agreement, or Letter of Support.</p>																					
<p>* Identify the project type: (check all that apply)</p> <p>* This project is: (select one)</p>	<p><input checked="" type="checkbox"/> Social/Behavioral <input type="checkbox"/> International Research <input type="checkbox"/> Community-Based Participatory Research</p> <p><input type="checkbox"/> Chart/Record Review <input type="checkbox"/> Biomedical <input type="checkbox"/> Other. Describe:</p> <p><input type="checkbox"/> Faculty Research <input checked="" type="checkbox"/> Doctoral Dissertation <input type="checkbox"/> Master's Thesis</p> <p><input type="checkbox"/> Staff Research <input type="checkbox"/> Undergraduate Project <input type="checkbox"/> Other. Describe:</p>																				
<p>Did this project receive an OIRB consult prior to submission?</p>	<p><input type="checkbox"/> No <input checked="" type="checkbox"/> Yes</p>																				

Project Data Information	
<p>* The project data that will be collected/used include: (check all that apply)</p> <p>Note: This applies for screening/recruitment purposes and data collection/analysis purposes.</p>	<p><input type="checkbox"/> Personal Identifiers (e.g. names, social security numbers, address, job titles, etc.)</p> <p><input type="checkbox"/> Protected Health Information (PHI)</p> <p><input type="checkbox"/> Education Information (e.g. grades, student records, etc.)</p> <p><input checked="" type="checkbox"/> None of the above will be collected/used</p>
<p>* Data collection/analysis methods: (check all that apply)</p>	<p><input type="checkbox"/> Records Reviews <input type="checkbox"/> Web-based/Online Data <input type="checkbox"/> Secondary Data Sets</p> <p><input checked="" type="checkbox"/> Audio/Video Recordings <input type="checkbox"/> Interviews/Focus Groups <input checked="" type="checkbox"/> Surveys/Questionnaires</p> <p><input type="checkbox"/> Drugs/Supplements <input type="checkbox"/> Medical Devices <input type="checkbox"/> Laboratory Devices</p>

	<input checked="" type="checkbox"/> Other Describe: Outcome of clinical procedure (Alginata impressions) taken.
<p>* Provide information about data linkage & the process for de-identifying data:</p> <p>a. * Describe how data will be linked to individual participants.</p> <p>b. * Describe the process that will be used to de-identify data and/or destroy the link to identifiers.</p> <p>d. * If data will remain identifiable, justify retention of identifiable data and describe procedures that will be put in place to protect the confidentiality of any identifiable data (including storage and security for electronic and hard copies).</p> <p>Limit: 2000 characters.</p>	<p>Data Processing: Data will be collected using the rubrics adopted and developed by the program. Data will be analyzed using statistical software SPSS. Data will be stored in a locked cabinet in the investigator's office for one year after the study is concluded. After one year, data will be destroyed. No personal identifiers will be collected for the study. ID numbers will be assigned to participants. No links are made between data collected and participants. The consent form will be kept separate from other forms containing only the participant's ID numbers.</p>

Participant Enrollment Information	
* What is the total maximum expected enrollment? e.g. participants, charts, records, etc.	50
* Vulnerable populations to be enrolled: (check all that apply)	<input type="checkbox"/> Children (age less than 18 years) <input type="checkbox"/> 0 – 6 years <input type="checkbox"/> 7 – 11 years <input type="checkbox"/> 12 – 17 years <input type="checkbox"/> Pregnant Women/Fetuses <input type="checkbox"/> Prisoners <input type="checkbox"/> Individuals with Impaired Decision Capacity <input checked="" type="checkbox"/> None of the above will be enrolled into this project
* Will this study include non-English speakers?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes. Language(s):
* During the consent process, will a Legally Authorized Representative be used? (A LAR is used when adult participants are unable to consent and require someone to consent on their behalf.)	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes
* Will you apply for a Certificate of Confidentiality? (A CoC is used to protect data when collecting identifiable illegal risk behaviors or other sensitive information. More info.)	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes
* Are you requesting a waiver/alteration of the consent process or documentation of the consent process? (Waiver of documentation applies when no signatures are collected, e.g. internet research; please see the protocol template for detailed information.)	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes
* Will you compensate your participants?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes

APPENDIX E - CLINICAL SKILL EVALUATION

Preview	CSE X1C P25				
<p>Alginate Impressions (Max 8Mand) CSE</p> <p>Alginate Impressions (Max 8Mand) CSE</p> <p>FACULTY:</p> <p>A grade of 0 or 1 requires faculty comment.</p> <p>Please leave your initials in the comments box below.</p>					
RUBRIC(S)					
Unit Expectations Scoring	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Incomplete At This Time</th> <th style="width: 25%;">Acceptable (2 pts)</th> <th style="width: 25%;">Improvable (1 pt)</th> <th style="width: 25%;">Unacceptable (0 pts)</th> </tr> </thead> </table>	Incomplete At This Time	Acceptable (2 pts)	Improvable (1 pt)	Unacceptable (0 pts)
Incomplete At This Time	Acceptable (2 pts)	Improvable (1 pt)	Unacceptable (0 pts)		
<ol style="list-style-type: none"> 1. Explains procedure to the patient. 2. Mix the impression material according to the manufacturer's instructions. 3. Loads impression tray correctly. 4. Infection control is maintained throughout the procedure. 5. All anatomical detail is reproduced, sharp and defined. 6. Impression is free of voids in critical areas. 7. Impression is free of rips and tears. 8. There are no areas where the material has pulled away from the tray. 					

	Incomplete At This Time	Acceptable (2 pts)	Improvable (1 pt)	Unacceptable (0 pts)
9. The signabi thoroughly covers the tray.				
10. Impression is free of bubbles and bulges.				
11. The signabi is smooth, not sponge-like.				
12. Teeth are centered in the tray and tongue is properly placed.				
ETHICS, PROFESSIONALISM & CRITICAL THINKING				
13. Infection control, patient comfort, health and safety				
14. Punctuality, time management, appearance, demeanor, attitude, composure, honesty, team work, cooperation, and communication.				
Unit Scoring				
Competent (24-28 pts)	Developing Level (23 pts)	Novice (21-22 pts)	Unacceptable (0-20 pts)	
Score: Sum of Expectation Scores				
OVERALL COMMENTS				
Comments				
Attachments				

APPENDIX F - RECRUITMENT E-MAIL

Dear Students:

You are cordially invited to participate in a research study conducted by Elmer E. Gonzalez, Ph.D. Candidate in Educational Psychology under the supervision of Dr. Jay Parkes, professor of Educational Psychology from the University of New Mexico, Department of Individual, Family and Community Education. The research project is to assess students' perceptions of feedback and clinical skill performance in dental hygiene following instruction and feedback.

You are cordially invited to participate in this study. Your participation is voluntary. The time commitment to participate is approximately 3 hours. In appreciation for your participation, Prof. Gonzalez will be donating \$150.00 dollars to your student club account.

If you have any questions or would like to participate, please contact Prof. Gonzalez at elmer6@unm.edu or phone (575)528-7216.

For questions concerning research practices or any type of research misconduct, please feel free to contact Dr. Jay Parkes at Parkes@unm.edu (505) 277-3320 or the UNM Office of the Institutional Review Board (IRB) at IRBMainCampus@unm.edu (505) 2772644.

Regards,

Elmer E. Gonzalez, Ph.D. Candidate

APPENDIX G - CONSENT FORM



**Perceptions and Clinical Applications: Feedback Type in Dental Hygiene
Consent to Participate in Research**

113017

Purpose of the study: You are being asked to participate in a research study that is being done by Dr. Jay Parkes the Principal Investigator, and Elmer E. Gonzalez, from the Educational Psychology Department of Individual, Family and Community Education. The present study consists of assessing whether or not feedback type and the use of a rubric play a significant role in student's clinical performance. In addition, the study will assess student's perceptions regarding feedback type and its effectiveness in learning and teaching. You are being asked to take part in this study because you are a student in the Dental Programs at Dona Ana Community College.

This form will explain what to expect when joining the research, as well as the possible risks and benefits of participation. If you have any questions, please ask one of the study researchers.

What you will do in the study: The study will consist of 3 interventions. The study will consist of a control intervention where the participants will receive no feedback, and no rubrics, instructions will be given using the instructional videos from Elsevier. The Course instructor will evaluate performance using a rubric. The experimental interventions will consist of randomly assigning participants to two experimental groups, Group A and Group B. Each group will receive a type of feedback and/or a rubric and will perform 2 clinical procedures using a dental mannequin DXTTR and alginate impression materials. The Dental Materials instructor will evaluate all interventions using the same rubric regardless of intervention and group. The research investigator will video record some of the procedures performed and the feedback given to the student. The recordings will be transcribed and voice will be removed from the video recording leaving only the video of the procedure performed. Photographs of the procedure performed may be obtained from the video or may be taken in addition to the video. If you are uncomfortable answering any of the questions on the survey, you can skip them at any time or you can stop participation on the study at any time. Participation in this study will take a minimum of 3 hours and no more than 5 hours over a two-day period. It is expected that you will take 30 minutes to complete the first survey and approximately 1.5 hours to complete the rest of the study.

Risks: This study presents minimal risk to participants. The dental clinical procedures performed for the study are those performed as part of the curriculum in dental hygiene and dental assisting programs for student teaching and learning. No risks other than those experienced in a typical classroom/laboratory in Dental Materials is expected.

Benefits: There will be no benefit to you from participating in this study. However, it is hoped that information gained from this study will help improve teaching practices in dental hygiene.

Confidentiality of your information: Data will be accessed by Elmer Gonzalez and Dr. Jay Parkes. No PHI will be collected and your name will not be used in any research documents. The consent forms will be kept in a separate folder and will not be matched with any of the information collected from you. We will take measures to protect the security of all your personal information, but we cannot guarantee confidentiality of all study data. The University of New Mexico Institutional Review Board (IRB) that oversees human subject research and/or the NMSU Research Board may be permitted to access your records. Your name will not be used in any published reports about this study.



You should understand that the researcher is not prevented from taking steps, including reporting to authorities, to prevent serious harm of yourself or others.

Payment: You will not be paid for participating in this study. In return for your time and the inconvenience of participating in this study, your study club will receive a \$150 dollar donation at the end of the study.

Right to withdraw from the study: Your participation in this study is voluntary. You have the right to choose not to participate or to withdraw your participation at any point in this study without penalty.

If you have any questions, concerns, or complaints about the research study, please contact:

Eimer Gonzalez at emerc@unm.edu or phone (505)528-7216.

Dr. Jay Parkes at Parkes@unm.edu (505) 277-3320

If you would like to speak with someone other than the research team to obtain information or offer input or if you have questions regarding your rights as a research participant, please contact the IRB. The IRB is a group of people from UNM and the community who provide independent oversight of safety and ethical issues related to research involving people.

UNM Office of the IRB: (505) 277-2644, irbmaincampus@unm.edu. Website: <http://irb.unm.edu/>

CONSENT

You are making a decision whether to participate in this study. Your signature below indicates that you have read this form (or the form was read to you) and that all questions have been answered to your satisfaction. By signing this consent form, you are not waiving any of your legal rights as a research participant. A copy of this consent form will be provided to you.

I agree to participate in this study.

Name of Adult Participant Signature of Adult Participant Date

Researcher Signature (to be completed at time of informed consent)

I have explained the research to the participant and answered all of his/her questions. I believe that he/she understands the information described in this consent form and freely consents to participate.

Name of Research Team Member Signature of Research Team Member Date



APPENDIX H - UNM IRB APPROVAL



OFFICE OF
THE INSTITUTIONAL
REVIEW BOARD

DATE: January 10, 2018

REFERENCE #: 24717

PROJECT ID & TITLE: [1171912-1] Perceptions and Clinical Applications: Feedback Type in Dental Hygiene

PI OF RECORD: Jay Parkes, Ph.D

SUBMISSION TYPE: New Project

BOARD DECISION: DETERMINATION OF EXEMPT

EFFECTIVE DATE: January 10, 2018

REVIEW CATEGORY: Exempt category #1, 2

DOCUMENTS:

- Advertisement - Recruitment e-mail (UPDATED: 12/14/2017)
- Application Form - Project Info (UPDATED: 12/19/2017)
- Conflict of Interest - Management Plan - 2017-2018 FCOI MP: Gonzalez (UPDATED: 12/14/2017)
- Consent Form - Consent form (UPDATED: 12/14/2017)
- CV/Resume - CV Gonzalez (UPDATED: 12/14/2017)
- CV/Resume - CV Parkes (UPDATED: 12/14/2017)
- Letter - LOS Dona Ana Community College (UPDATED: 12/19/2017)
- Other - Feedback Script (UPDATED: 12/18/2017)
- Other - Scientific Review Form (UPDATED: 12/18/2017)
- Other - Project Team (UPDATED: 12/14/2017)
- Proposal - Perceptions and Clinical Applications-Feedback Type in Dental Hygiene (UPDATED: 12/19/2017)
- Protocol - Protocol (UPDATED: 12/14/2017)
- Questionnaire/Survey - EDPY Clinical Feedback Questionnaire post interventions (UPDATED: 12/14/2017)
- Questionnaire/Survey - EDPY Clinical Feedback Questionnaire (UPDATED: 12/14/2017)
- Training/Certification - CITI Gonzalez (UPDATED: 12/18/2017)
- Training/Certification - CITI Parkes (UPDATED: 12/14/2017)
- Training/Certification - CITI Gonzalez RCR (UPDATED: 12/14/2017)

Thank you for your New Project submission. The UNM IRB has determined that this project is EXEMPT from IRB oversight according to federal regulations. Because it has been granted exemption, this research project is not subject to continuing review. It is the responsibility of the researcher(s) to conduct this project in an ethical manner.

If informed Consent is being obtained, use only approved consent document(s).

This determination applies only to the activities described in the submission and does not apply should any changes be made to this project. If changes are being considered, it is the responsibility of the Principal Investigator to submit an amendment to this project for IRB review and receive IRB approval prior to implementing the changes. A change in the research may disqualify this research from the current review category.

The Office of the IRB can be contacted through: mail at MSC02 1665, 1 University of New Mexico, Albuquerque, NM 87131-0001; phone at 505.277.2844; email at irbmain@unm.edu or in-person at 1805 Sigma Chi Rd. NE, Albuquerque, NM 87106. You can also visit the OIRB website at irb.unm.edu.

APPENDIX I - NMSU IRB APPROVAL



Office of the Vice President for Research

INSTITUTIONAL REVIEW BOARD (IRB)

Dr. Rolston St. Hilaire, Chair

MSC 3 RES

New Mexico State University

P.O. Box 3001

Las Cruces, NM 88003-8001

Phone: 575-646-7177 Fax: 575-646-2480

Email: ovpr@nmsu.edu

DATE: February 27th, 2018
FROM: The Office of Research Compliance
TO: Elmer Gonzalez
Co PI: Elmer Gonzalez
Co PI & Faculty Advisor: Jay Parkes
Department Head: Monica Torres
SUBJECT: **Decision Memo for Application #16097**

Project Title: Perceptions and Clinical Applications: Feedback Type in Dental Hygiene
Application Type: New
Review Type: Expedited
Approval Period: 2018-02-27 - 2019-02-26
Parent Application:
Review Category: 6,7

The NMSU Institutional Review Board Chair, Dr. Rolston St. Hilaire, has reviewed and approved the above application for the conduct of research involving human subjects.

The application was reviewed in accordance with the review process outlined in 45 CFR 46.110(b)(2) - Category 6,7.

The research must be conducted according to the proposal/protocol that was approved by the IRB. Any changes in the research, instruments, or the consent document(s) must be submitted to the IRB prior to implementation. Additionally, any unexpected hazards or adverse events involving risk to the subjects or others must be reported immediately to the IRB, using the appropriate form, within the time frame specified in the NMSU Principles and Procedures for the Conduct of Research Involving Human Subjects.

Please note that the IRB approval is valid for only one (1) year. Pursuant to federal regulations, the IRB must review and approve all research protocols involving human subjects at intervals appropriate to the degree of risk, but no less than once per year. Therefore, in order to continue your project after the above approved period, you must submit a request for continuation 45 days prior to the above referenced expiration date.

Note: Data collected during a period of lapsed approval is unapproved research and can never be reported or published as research data.

If you should have any questions, please do not hesitate to contact the Office of Research Compliance at 646-7177 or via e-mail at ovpr@nmsu.edu.

APPENDIX J - DACC APPROVAL MEMO



NMSU Doña Ana Community College

MSC-3DA, P.O. Box 30001, Las Cruces, NM 88003-8001

(575) 528-7000 | (800) 903-7503 Fax: (575) 527-7515 | www.dacc.nmsu.edu
East Mesa Central Workforce Gadsden Sunland Park Chaparral Hatch

To: Elmer Gonzalez
From: Monica F. Torres, Vice President for Academic Affairs *MT*
Subject: Request to Conduct Research at Doña Ana Community College
Date: January 24, 2018

Thank you for your interest in conducting research at Doña Ana Community College. The process to gain approval involves two steps: provisional approval and final approval.

Step One: Provisional Approval

After reviewing your request to conduct research at Doña Ana Community College, you have been granted provisional approval.

Step Two: Final Approval

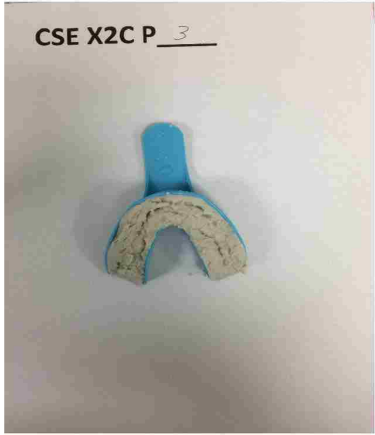
Final approval of the request to conduct research at DACC will be granted once proof of IRB approval has been provided to the VPAA. Please note that if you are based at a college or university other than New Mexico State University, you will also need to obtain approval through the Institutional Review Board at NMSU. More information is available by emailing OVPR@nmsu.edu.

Thank you again for your interest. If you need additional clarifications, I can be reached at mtorres@dacc.nmsu.edu or at 575.527.7520.

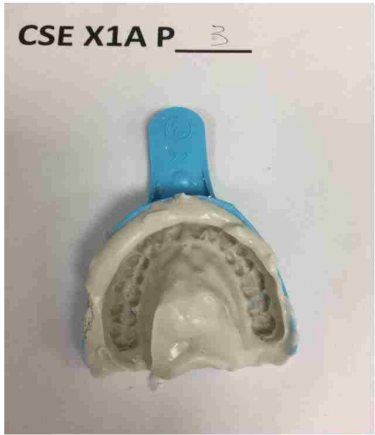
*Approved.
M.F.T.
2/27/2018*

APPENDIX K - IMPRESSION PHOTOS

CSE X2C P 3



CSE X1A P 3



CSE X2A P 2







CSE X1C P 6



CSE X1B P 6



CSE X2B P 6



CSE X2C P 7



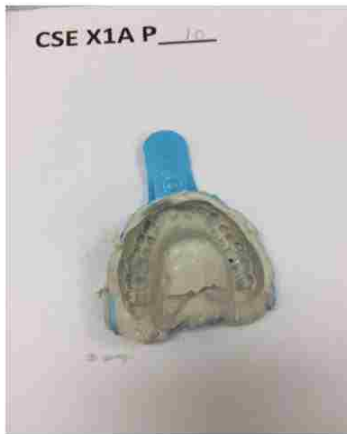
CSE X1B P _____



CSE X2B P 7







CSE X2C P 11



CSE X1A P 11



CSE X2A P 11



CSE X2C P 13



CSE X1A P 13



CSE X2A P 13





CSE X1C P 4



CSE X1B P 4

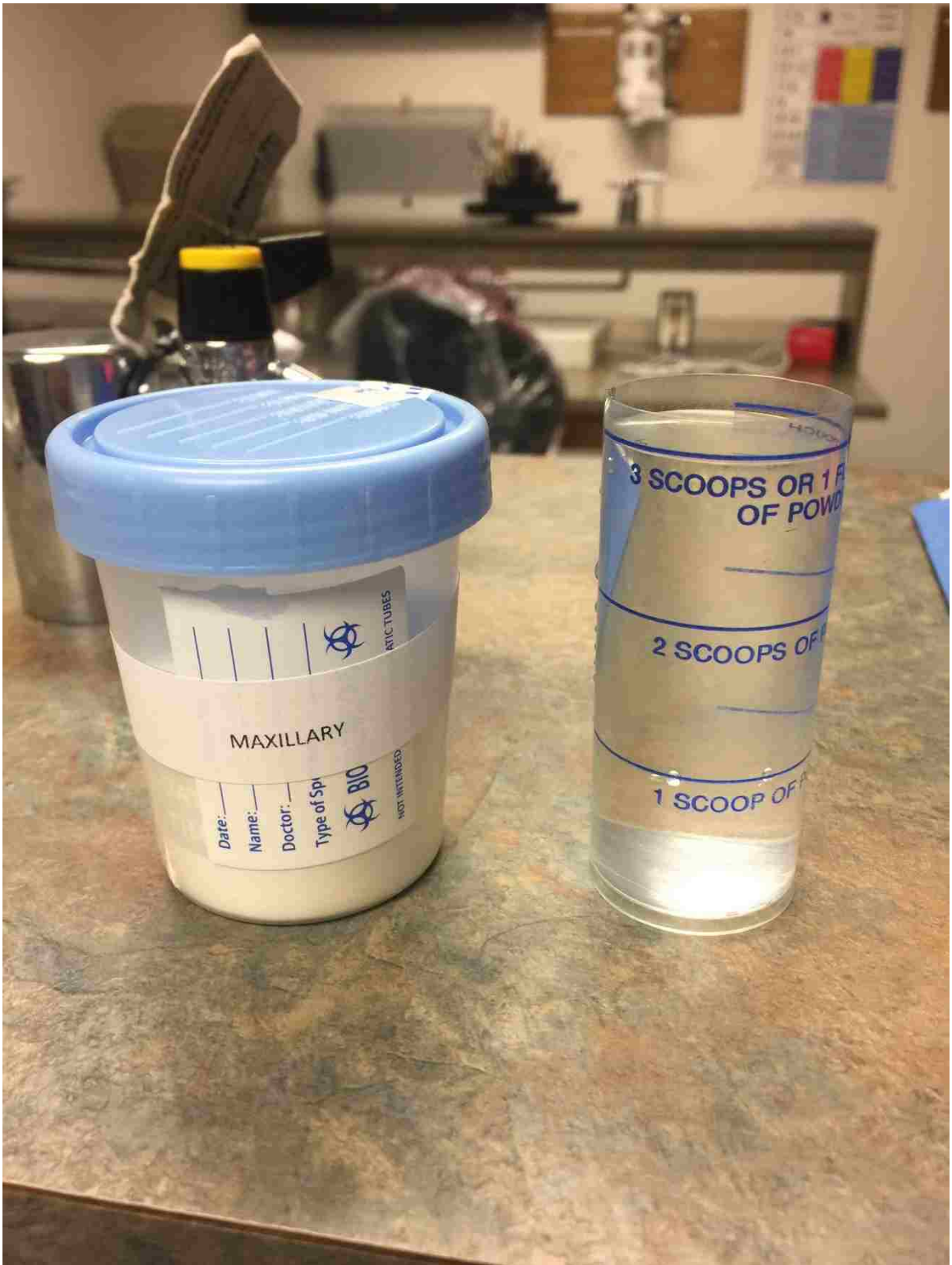


CSE X2B P 4

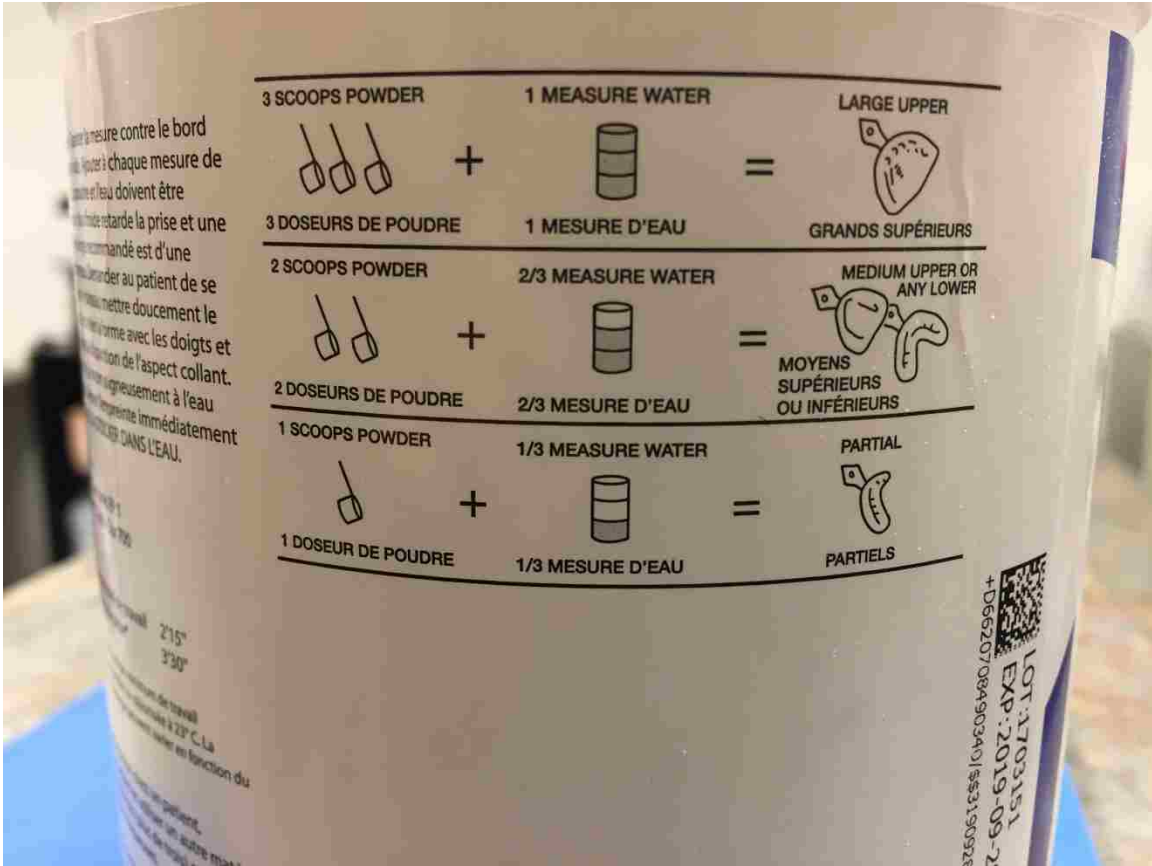


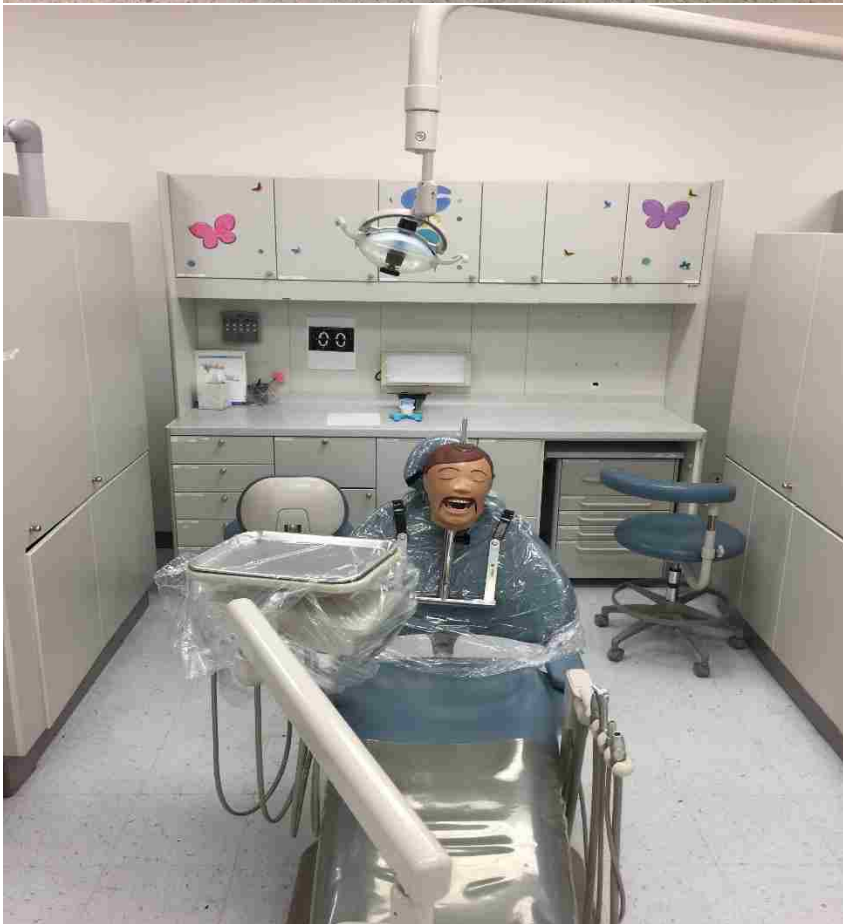
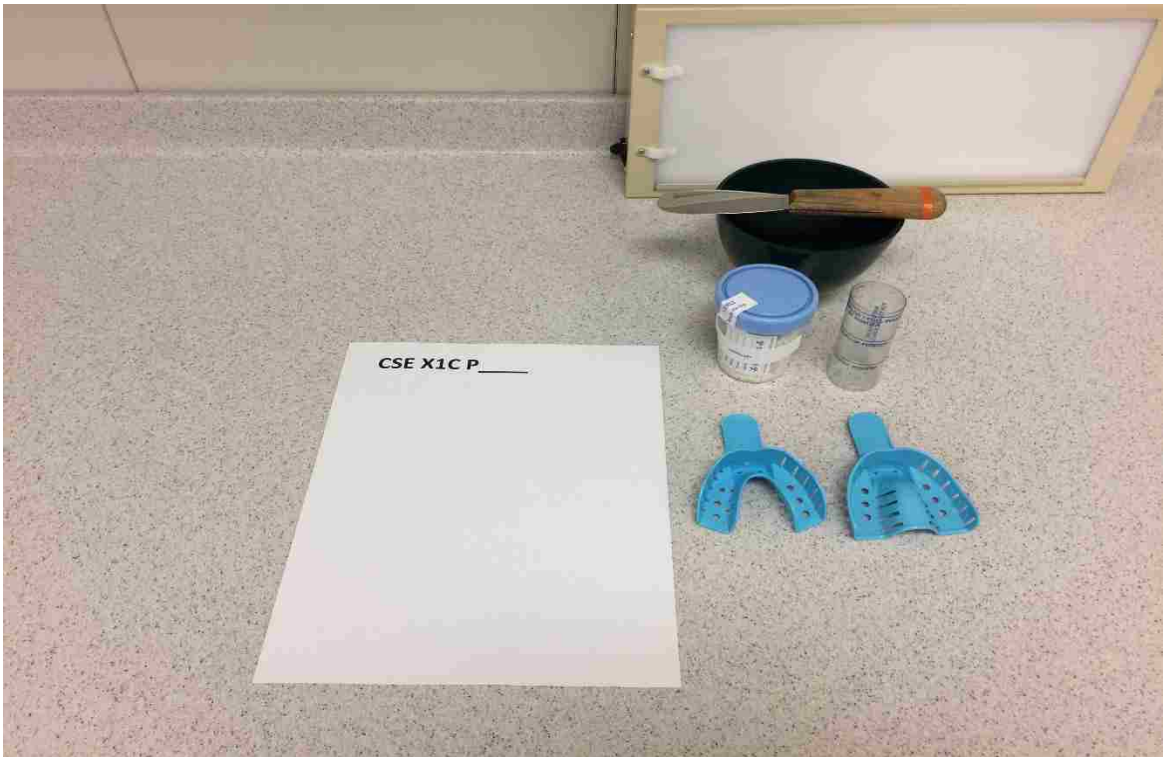
APPENDIX L – PHOTOGRAPHS OF MATERIALS USED



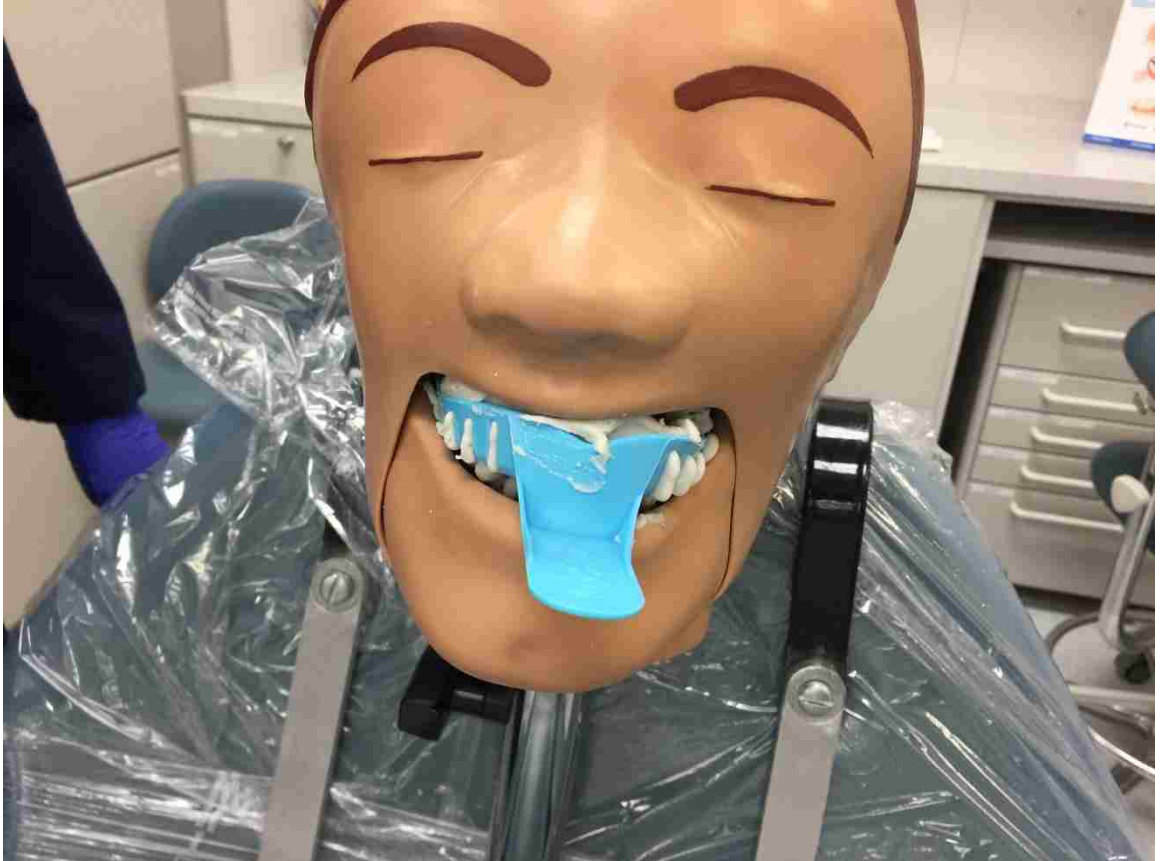


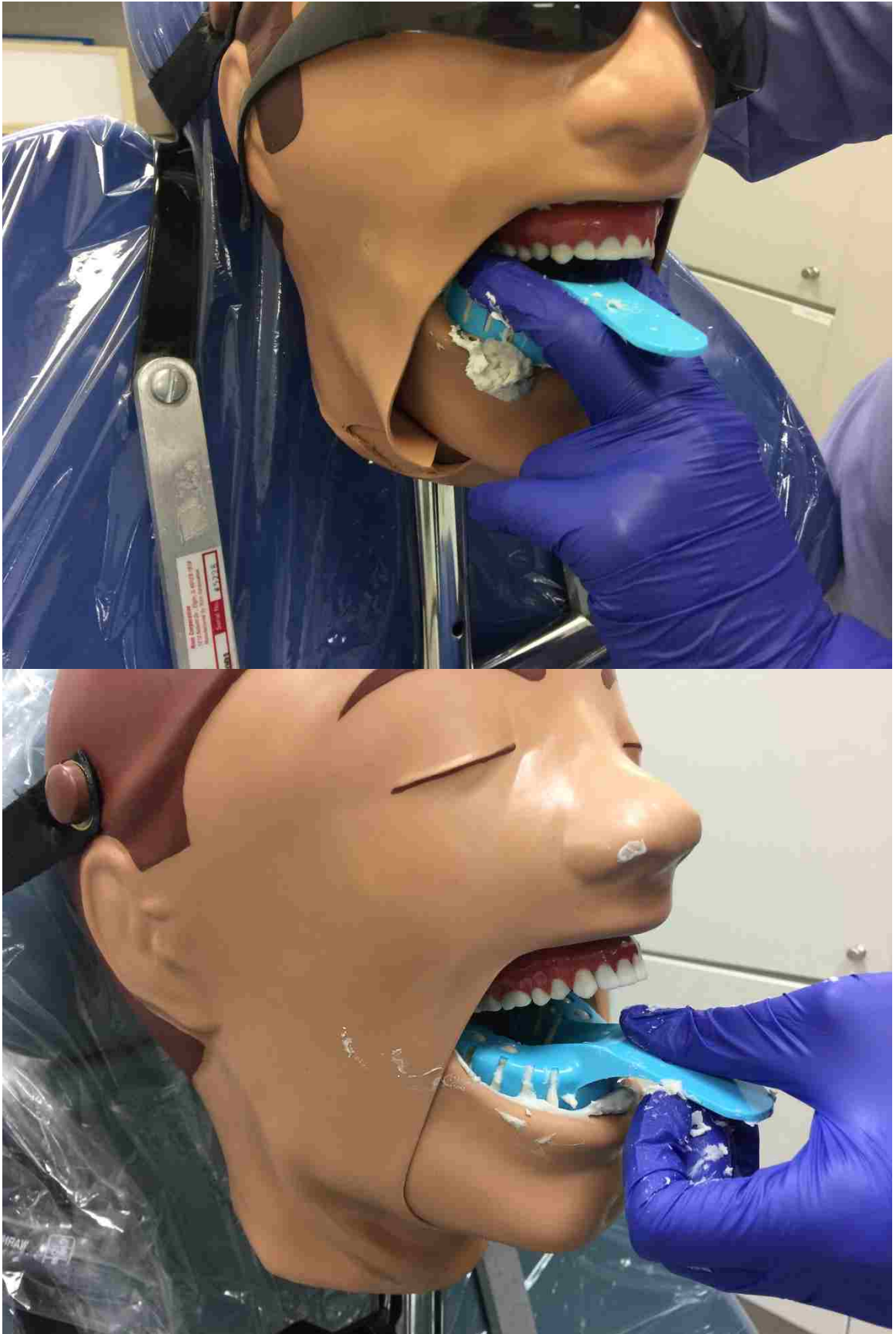












CSE X2A P 5



CSE X2A P 13



CSE X2A P cb



CSE X2A P 3



CSE X2A P 11



CSE X2A P 10



CSE X2B P 6



CSE X2B P 1



CSE X2B P 7



CSE X2B P 4



CSE X2B P 2



TEST 2

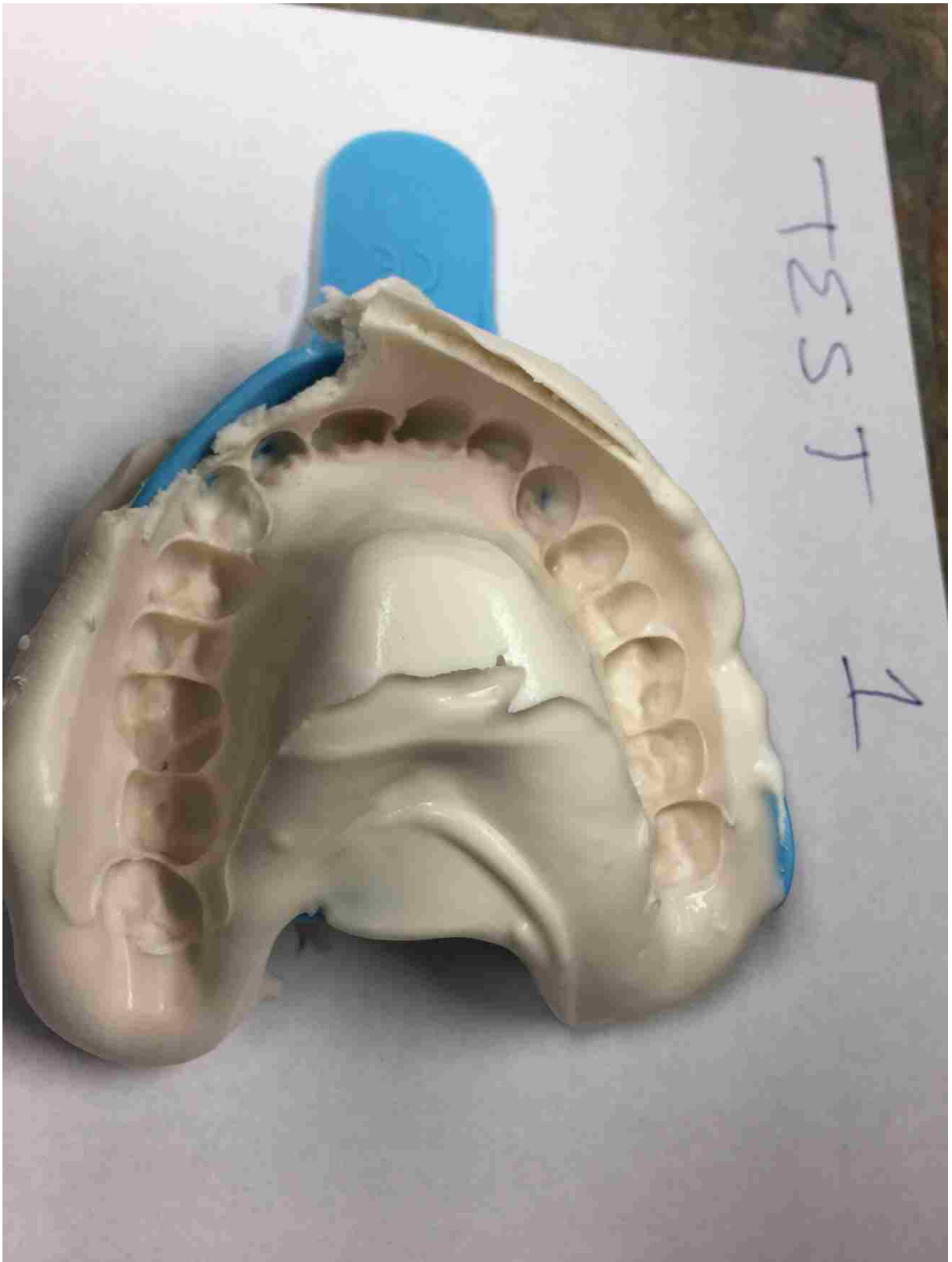


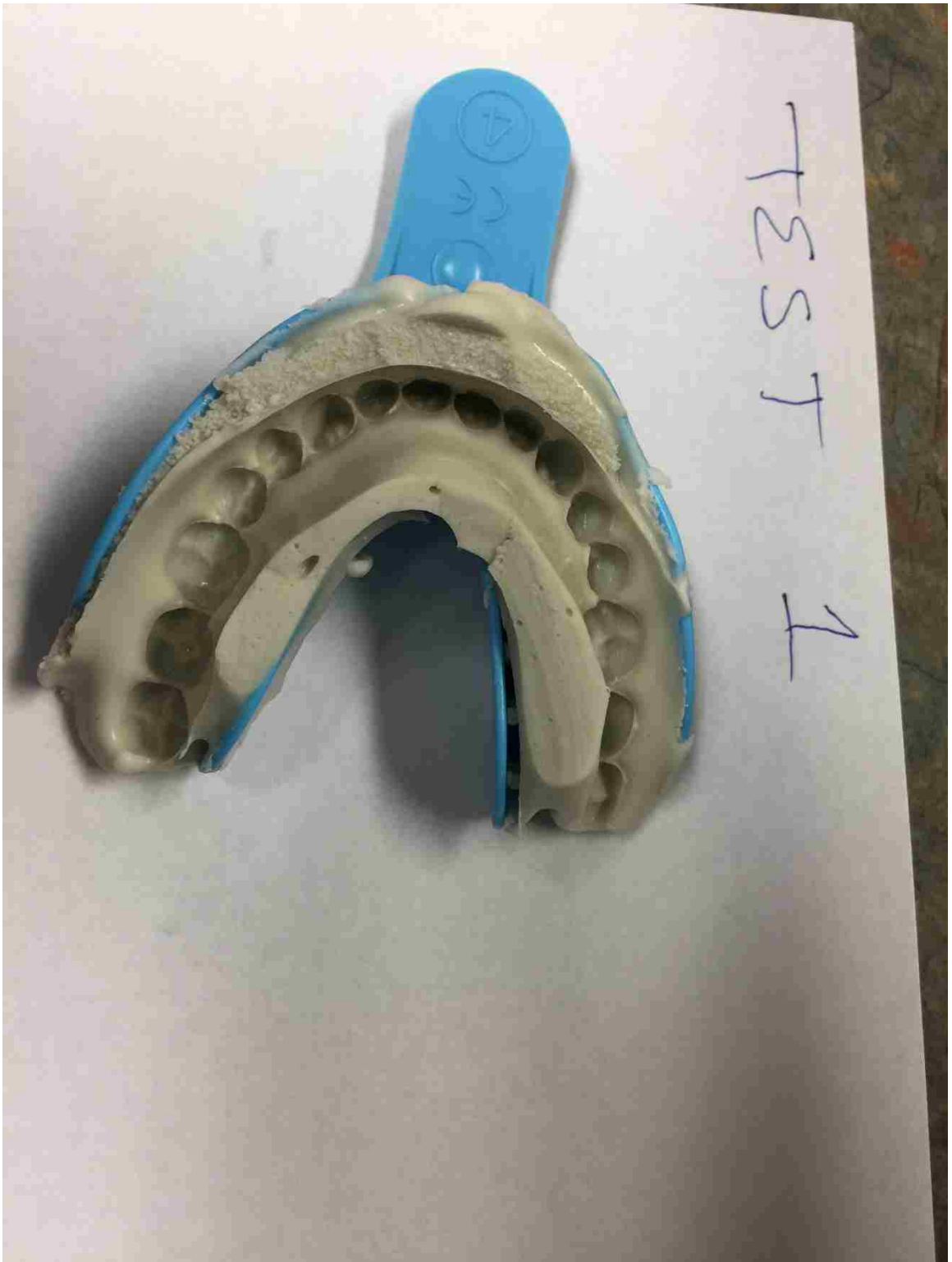
TEST 1











CSE X1C P 4



CSE X1C P 8



CSE X1C P 6



CSE X1C P 10



CSE X1C P 1



CSE X1C P 2



CSE X2C P 13



CSE X2C P 5



CSE X2C P 21



CSE X2C P 3



CSE X2C P 7



CSE X1A P 5



CSE X1A P 13



CSE X1A P 8



CSE X1A P 3



CSE X1A P 10



CSE X1A P 11



CSE X1B P _____



CSE X1B P _____



CSE X1B P _____



CSE X1B P _____



CSE X1B P 6



References

- Akinbobola, O., & Adeleke, A. (2012, March). EDUCATOR'S SELF-EFFICACY AND COLLECTIVE EDUCATORS' SELF-EFFICACY AMONG UNIVERSITY ACEDMIC STAFF: AN ETHICAL ISSUE. *ife PsychologyIA*, 20(1), 57-69.
- Archer , J. (2010). State of the science in health professional education: effective feedback. *Medical Education* , 44(1), 101-108.
- Bandura, A. (1977). Self-Efficacy:Toward a Unifying Theory of Behavioral Change. *Psychological Review*, 84(2), 191-215.
- Bandura, A. (1993). Perceived Self-Efficacy in Congnitive Development and Function. *Educational Psychologist*, 28(2), 117-148.
- Boehler, M. L., Rogers, D. A., Schwind, C. J., Mayforth, R., Quin, J., Williams, R. G., & Dunnington, G. (2006). An investigation of medical student reactions to feedback: a randomised controlled trial. *Medical Education*, 40, 746-749.
- Bronson, P., & Merryman, A. (2009). *Nurture Shock: New Thinking about Children*. New York.
- Busser, D. (2012). Delivering Effective Performance Feedback. *T+D*, 66(4), pp. 32-35.
- Cantillon, P., & Sargeant, J. (2008). Giving feedback in clinical settings. *BMJ*, 1292-1294.
- Cheng, P.-Y., Lin, M.-L., & and Su, C.-K. (2011). ATTITUDES AND MOTIVATIONS OF STUDENTS TAKING PROFESSIONAL CERTIFICATE EXAMINATIONS. *Social Behavior and Personality*, 39(10), 1303-1314.
- Costello, A. B., & Osborne, J. W. (2005). Best Practices in Exploratory Factor Analysis: Four Recommendations for Getting the Most From Your Analysis. *Practical Assessment, Research & Evaluation*, 1-9.
- Dweck , C. (2016, January 29). Praise the effort, not the outcome? Think again. *The Times Educational Supplement* .
- Dweck, C. (2008). The Perils and Promises of Praise. *Educational Leadership*, 34-39.
- Dweck, C. S. (2010, January). Mind-Sets and Equitable Education. *Principal Leadership* , pp. 26-29.
- Fugill, M. (2005). Teaching and learning in dental student clinical practice. *Eur J Dent Educ*, 131-136.
- Hattie , J. (2013). Calibration and confidence: Where to next? *Learning and Instruction*, 24, 62-66.
- Hattie, J., & Jaeger, R. (1998, March). Assessment and Classroom Learning: a deductive approach. *Assessment in Education*, 5(1), 111-122.

- Hattie, J., & Timperley, H. (2007, March). The Power of Feedback. *Review of Educational Research, 77*(1), 81-112. doi:10.3102/003465430298487
- Hattie, J., Fisher, D., & Frey, N. (2016, April). Do They Hear You? *Educational Leadership* .
- Hauser, A. M., & Bowen, D. M. (2009). Primer on Preclinical Instruction and Evaluation. *Journal of Dental Education, 390-398*.
- Johnson, A., & Svingby, G. (2007). The use of scoring rubrics: Reliability, validity, and educational consequences. *Educational Research Review, 2*, 130-144.
- Johnson, R. L., Penny, J., & Gordon, B. (2000). The Relation Between Score Resolution Methods and Interrater Reliability: An Empirical Study of an Analytic Scoring Rubric. *Applied Measurement in Education, 121-138*.
- King, P. E., Schrod, P., & Weisel, J. J. (2009). The Instructional Feedback Orientation Scale: Conceptualizing and Validating a New Measure for Assessing Perceptions of Instructional Feedback. *Communitication Education, 235-261*.
- Kluger, A. N., & DeNisi, A. (1996). The Effects of Feedback Interventions on Performance: A Historical Review, a Meta-Analysis, and a Preliminary Feedback Intervention Theory. *Psychological Bulletin, 119*(2), 254-284.
- Kluger, A. N., & DeNisi, A. (1998, June). Feedback Interventions: Toward the Understanding of a Double-Edged Sword. *Current Directions in Psychological Science, 7*(3), 67-72.
- Messick, S. (1993). *Foundations of Validity: Meaning and Consequences in Psychological Assessment*. Princeton, New Jersey: Educational Testing Service .
- Parkes, J., Abercrombie, S., & McCarty, T. (2013). Feedback sandwiches affect perceptions but not performance. *Adv in Health Sci Educ, 18*, 397-407. doi:10.1007/s10459-012-9377-9
- Ramani, S., & Krackov, S. K. (2012). Twelve tips for giving feedback effectively in the clinical environment. *Medical Teacher, 787-791*.
- Ryan, R., & Deci, E. (2000). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology, 25*, 54-67. Retrieved from <http://www.idealibrary.com>
- Schonwetter, D., Lavine, S., Mazurat, R., & Nazarko, O. (2006). Students' Perceptions of Effective Classroom and Clinical Teaching in Dental and Dental Hygiene Education. *Journal of Dental Education , 70*(6), 624-635.
- Shute, V. J. (2008, March). Focus on Formative Feedback. *Review of Educational Research, 78*(1), 153-189.
- Wilkins, E. M. (2017). *Clinical Practice of the Dental Hygienist 12th Edition*. Philadelphia: Wolters Kluwer.
- Wolters, C. A. (1998). Self-Regulated Learning and College Student's Regulation of Motivation. *Journal of Educational Psychology, 90*(2), 224-235.

Xeroulis, G. J., Park, J., Moulton, C.-A., Reznick, R. K., LeBlanc, V., & Dubrowski, A. (2006). Teaching suturing and knot-tying skills to medical students: A randomized controlled study comparing computer-based video instruction and (concurrent and summary) expert feedback. *Surgery, 141*(4), 442-449.

Yong, A. G., & Pearce, S. (2013). A Beginner's Guide to Factor Analysis: Focusing on Exploratory Factor Analysis. *Tutorials in Quantitative Methods for Psychology, 9*(2), 79-94.