

## Beliefs, Attitudes, and Behaviors That Facilitate Learning in the Orthopedic Clinical Setting: A Case Study of an Exemplary Educator

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### Abstract

#### Introduction

In recent decades' American higher education has undergone a paradigm shift. Moving from an "instructional" paradigm to the "learning"-based paradigm (emphasizes the active process of learning on behalf of the students, while envisioning the institution itself as a learner). Despite higher education's shift to emphasize and align with the science of learning, there is comparatively scarce application of these principles in clinical education. Clinical educators play a critical role in the effectiveness of clinical education and requiring them to incorporate the research-based theory of how people learn and evidence-based principles for how to design effective instruction. Given the minimal research into how this is executed in post-graduate clinical, educational programs, the purpose of the present study is to examine the integration of the science of instruction and learning in an orthopedic rehabilitation clinical setting.

## Methods

The current study was a case study using qualitative methods, consisting of structured interviews and direct subject observation, to investigate an exemplary clinical educator's attitudes, beliefs, and behavioral characteristics. Data was collected via a semi-structured Student (Resident) Interview, direct observation of the Exemplar Clinical Educator's (ECE) instruction, and a semi-structured ECE Interview. Data analysis was performed via a preliminary exploratory analysis, a subsequent coding analysis to identify common themes, and finally, triangulation and participant validation of the themes.

## Case Description

The study was conducted at a nationally recognized medical center and teaching hospital in northern California in the United States. The study setting was a hospital-based, outpatient orthopedic and sports medicine, physical therapy clinic and is the home site of an American Physical Therapy Association (APTA) accredited physical therapy orthopedic clinical residency. The Exemplary Clinical Educator selected, who had 13 years of clinical experience, was the current Assistant Clinic Manager of the respective physical therapy clinic, the Residency Committee Program Coordinator, and the Advanced Clinical Instructor through the APTA.

From the ECC's attitude, beliefs, and values regarding clinical education, six themes consistent themes were triangulated and participant validated across the interviews, observation, and field notes. These themes included: Expertise, Clarity, Self-Concept, Enthusiasm, and Empathy. The specific themes are operationally defined and the ECC's attitudes, beliefs, and values that culminated in each theme are outlined. Finally, the six themes are compared and substantiated with the current science of learning literature and recommended industry best practices.

## Conclusion

The results demonstrate that many of the same advancing principles of cognitive science, learning research, and teaching theories that have been advocated for formal classroom study are effective and transferrable in the clinical education environment. Clinical educators, instructors, and postprofessional program faculty are encouraged to use the current case as an example as to how the current science of teaching and learning can be implemented to enhance clinical education of students, residents, and fellows in the clinical setting.

## Introduction

In recent decades American higher education has undergone a paradigm shift. Moving from an instructional paradigm (where higher education institutions "created complex structures to provide for the activity of teaching conceived primarily as delivering" instruction and the transfer of knowledge) to the learning paradigm (emphasizes the active process of learning on behalf of the students, while envisioning the

institution itself as a learner - “over time, it continuously learns how to produce more learning with each graduating class, each entering student.”) (Delvin, 2009) [1] Subsequently, research advances in cognitive science, psychology, neuroscience, and teaching theory have offered greater insights into the science of human learning and how educators can enhance learning, motivation, and student engagement [2-7]. These learning and teaching advances have helped establish a set of skills and knowledge that consistently achieve better learning outcomes than the traditional and still predominant teaching methods practices [8].

Despite higher education’s shift to emphasize and align with the science of learning, there is comparatively scarce application of these principles in clinical education [9,10]. Previous research has identified a correlation between teachers’ understanding of what and how their students learn and the teachers’ success in teaching [11,9]. According to Falk (2017) [9], “there is reason to believe that a good knowledge of the basics of pedagogy can sensitize health care personnel to develop a pedagogical practice among health care personnel in the clinical setting.” [9,12-14] The results of previous literature reviews of what makes an effective clinical educator identify general trends of teaching skills, attitudes, communication competencies, and personalities [15,16]. Though necessary skills and knowledge for effective clinical education, these characteristics may not be enough for exemplary clinical education as they do not cover the full breadth of the concepts, techniques, and methods of science of learning and instruction.

Clinical educators have an “extremely important role in the effectiveness of clinical education in supporting learners” that requires incorporating the research-based theory of how people learn and evidence-based principles for how to design effective instruction. However, given the minimal research into how this is executed in post-graduate clinical, and educational programs (i.e., residency and fellowships), the purpose of the present study is to examine the integration of the science of instruction and learning in the clinical setting. The research question guiding the study is: “What are the beliefs, attitudes, and behaviors of an exemplary clinical educator?”

## Methods

### Research Design

The current study was a case study using qualitative methods, consisting of structured interviews and direct subject observation, to investigate an exemplary clinical educator’s attitudes, beliefs, and behavioral characteristics. A case study design enabled the investigator to explore a singular process, person, or circumstance through the lens of an individual instance or situation [17]. A qualitative approach was used as the investigation’s primary focus was to explore a field-based, recent case over time, through detailed, in-depth data collection involving multiple sources of information and reports on clinical education description and themes [18]. The reporting of the methods and findings of the current study is consistent with the Consolidated Criteria for reporting qualitative research (COREQ) and the current consensus of reporting qualitative research findings [17,19,20].

functional recovery post-hip fracture surgery are available, thus more preventive efforts to secure the health and safety of the older community-dwelling adult at present may be strongly indicated.

The current study was conducted through a post-positivist approach (i.e., emphasizing independence between the researcher and the researched person) involving a prospective case study protocol, structured interview process, and careful consideration of validity and potential bias [21,22]. (See Appendix A for the respective structured interview protocols.) Such personal factors, characteristics, and experiences of the investigator that could potentially influence the current investigation's execution are candidly disclosed in the limitations section of the manuscript.

## Setting and Context

The study was conducted at a nationally recognized medical center and teaching hospital in northern California in the United States. The study setting was a hospital-based, outpatient orthopedic and sports medicine, physical therapy clinic with sixteen full-time therapists, unanimously provide-on-one one patient care while seeing an average of 130 patients per day. The clinic hosts an average of ten doctors of physical therapy students per year. It is a home site of an American Physical Therapy Association (APTA) accredited physical therapy orthopedic clinical residency. The residency accepts two residents per annual cohort and has recently (2020) been accredited by the American Board of Physical Therapy Residency and Fellowship Education (ABPTRFE) through 2030.

**Exemplary Clinical Educator Observation:** The observation of the exemplary educator took place in the 1500-square-foot physical therapy clinic. To provide candid details of the space and a 360° perspective of the teaching space, panoramic photos from the instructor's, students', and the investigator's perspectives were, and two videos are provided in Figures 4a-4e of Appendix B.

**Student Interview:** The student interview was conducted one on one, in a conference room located in the same medical building and pavilion as the physical therapy clinic. For clarity of the space and full transparency, a panoramic photo and subsequent video of the room are provided in Appendix B.

**Exemplary Clinical Educator Interview:** The exemplary clinical educator interview was conducted one on one, in Ben's office's privacy and comfort, which is a 15 x 12 square foot room directly connected to the physical therapy clinic space. Photos and videos of Ben's office were not taken to preserve Ben's identity and privacy. A prospective, structured protocol with open-ended questions related to the questions asked in the student interview was used to elicit Ben's candid responses and safeguard against unduly influencing her replies. The interview lasted sixty minutes.

## Participants Selection

The selected residency program has had twelve graduates. Of those twelve, eight prior residents were available for questioning. Each available resident was asked to identify a residency faculty member whom they deemed to be an exemplary educator (operationally defined as an individual who is especially successful at promoting student learning) and why that person was selected, and what behaviors are most evident in

his/her teaching. From the prior residents questioned, one resident was selected for the current case study based on the learner's ability to name a specific professor and articulate how that person has helped him, or her learn.

The identified exemplary clinical educator was informed of his nomination, the purpose of the study, and whether he would be willing to participate in the case study. Using a pre-scripted informed consent document, the investigator described in full detail the nature of the study, the exemplary clinical educator's role, and the willingness to allow the researcher to conduct a participatory classroom observation and subsequent one-on-one recorded structured interview. After the educator verbally acknowledged his understanding and signed the consent form, the selected student was also notified, briefed again on the study's nature, signed the respective consent form, and arranged for an interview time. (See Appendix C for a blank copy of the student and educator informed consent forms. Both informed consent forms were approved by the Institutional Review Board (IRB) of Azusa Pacific University).

## Participants

Note that for confidentiality, the names of both participants have been falsified. The student participant, Alex, is a 29-year-old, Caucasian male from the mid-west. After completing a Bachelor of Science (B.S.) in biology in 2013, a clinical doctorate in physical therapy (DPT) in 2019, and being licensed as a physical therapist in the state of California (2019), Alex was offered and accepted a position at Stanford Health Care's Orthopedic Clinical Residency from September 2019 through October 2020. A Daktronics National Association of Intercollegiate Athletics (NAIA) Scholar, NAIA Academic All-American, and most outstanding college male athlete award recipient, Alex has consistently demonstrated his dedication to academic and athletic excellence.

The exemplary clinical educator, Ben, who received multiple recommendations from residents as an exemplary educator, is a 39-year-old Caucasian male, Assistant Clinic Manager of the respective physical therapy clinic, the Residency Committee Program Coordinator, and Advanced Clinical Instructor through the APTA. Since earning his DPT in 2007, Ben has over 13 years of outpatient orthopedics and sports medicine physical therapy clinical experience and is dual credentialed as a board-certified orthopedic and sports clinical specialist through the APTA. He oversees the Outpatient Orthopaedics and Sports Medicine Physical Therapy team. Committed to education, he performs numerous lectures on shoulder and knee evaluation and treatment and has published a book chapter on such topics. Ben is a co-founder, appointed faculty, committee chairperson, and program coordinator of Stanford Health Care's Orthopedics Physical Therapy Residency program since 2013. He has also assisted in the development of the Accredited Stanford Geriatric and Hands Therapy residency programs. In 2015, Ben won the prestigious clinical instructor of excellence award through the Northern California Clinical Education Consortium (NCCEC). Ben has performed numerous lectures and published multiple articles related to orthopedic clinical expertise in addition to his clinical and educational pursuits. Ben was humble, responsive, and genuinely interested when asked to participate in the current case study of an exemplary clinical educator.

## Procedures

**Consent:** Formal verbal and written consent of voluntary study participation of both the student and the educator was obtained prior to any data collection (See Appendix C for blank copies of informed consent documents).

**Data Collection:** The investigator observed the exemplary clinical educator in a classroom instructional role during a six-hour residency lecture titled “Shoulder Examination and Evaluation.” The course syllabus described the course as follows: “This course will prepare the resident to perform a comprehensive shoulder examination. The resident will be taught algorithmic shoulder assessment to appraise the shoulder and surrounding joints clinically. Emphasis will be placed on discerning clinically relevant information versus simple data gathering to make an advanced practice clinical decision, diagnosis, and prognosis. Where applicable, evidence will be utilized to support decision-making related to the diagnosis and prognosis of the patient. The course will emphasize the integration of individual clinical expertise, best available evidence, and patient values in a clinically relevant way” (SHC, 2020) [23]. A prospective observational assessment form that had been pre-piloted by prior graduate school students was used by the investigator to rate on a standard scale the educator’s verbal and non-verbal behaviors, expressions, and attitudes while teaching. In addition to rating the frequency of behaviors, the investigator also took extensive, hand-written notes about participants’ reactions, the classroom atmosphere, and the content delivered. A completed electronic version observational assessment form with ratings and field notes can be accessed in the supplementary material provided in Appendix D.

There were four-course attendees (not including the investigator), two orthopedic physical therapy residents, a staff physical therapist, and an occupational therapy resident from the same institution. As to avoid the participants’ testimony influencing the investigator’s perceptions of the classroom session, the teaching field observation occurred two months before the interview.

Prospective structured protocols with open-ended questions were used for both the student (50 minutes) and the educator (60 minutes) interviews to elicit authentic responses and safeguard against unduly influencing participant responses. See Appendix A for the respective structured interview protocols. The interviews were conducted on the same day, and both interview sessions were recorded in their entirety. As described in the informed consent form, before completing the data analysis, the respective audio recordings of their respective interview sessions were provided to the student and the educator. Upon reviewing the recording, the participants were given the opportunity to make any necessary corrections or clarifications of their responses.

**Data Analysis:** Both the interview and observational field notes required editing, reformatting, and clarification before analysis. Though initially typed, the notes and scaled responses on the observational assessment form were synthesized, formatted, and edited to produce the final electronic document referenced in the Data Collection section above. The two interview audio files were recorded using Voice Recording App [24]; the MP3 files were downloaded to a PC, copied and pasted into Microsoft© PowerPoint slide, and converted to an MP4 through exporting the slide show as a video. After uploading the MP4 file to an unlisted YouTube© video, each interview transcript was generated by copying and pasting the video

subheadings into Microsoft Word©. The transcripts were reviewed multiple times by the investigator for editing, formatting, and clarity. During the transcript editing and formatting, the audio files were simultaneously referenced to ensure transcription accuracy. Once edited and formatted, the transcripts and the completed observational assessment form were used for the final analysis. (See the supplemental materials provided in Appendix D for full interview audio recordings and the completed interview transcripts.)

After ensuring the interview transcripts' accuracy, a preliminary exploratory analysis of the data was completed prior to coding and analyzing them for themes [25]. First, the interview transcripts were read through and annotated with comments in Microsoft Word©. The transcripts were reread to generate preliminary codes. The identified preliminary codes were aggregated into categories that were organized into four subcategories. Finally, each of the categories was indexed under five major themes. The operational definitions of *beliefs*, *values*, versus *attitudes* for the data analysis, findings, and discussion are defined below. An *attitude* "is a psychological construct, a mental and emotional entity that inheres in, or characterizes a person" [26], while a *belief* is "an attitude that something is the case, or that some proposition about the world is true or false." (Primer 2018) [27]. Values are "*relatively stable beliefs that are infused with effect*" and can belong to an agent, be it an individual, group, culture, or other beings [28].

To overcome the limitations of limited exposure to participants through single interviews, grasp a comprehensive understanding of the exemplary clinical educator's attitudes, beliefs, and behaviors, and ensure the validity of findings, two measures were implemented as recommended by Creswell (2012) [25]. First, a triangulation level was built into the research design through data collection of a resident interview, extensive field observation, and faculty interview. Second, member checking was a second source of validation where the exemplary clinical educator was invited to review the identified categories, subcategories, and themes and provide feedback on accuracy [25,29].

## Findings

### Description of the Class Observation

The teaching observation took place mid-morning (9:00 am) on a Saturday in the clinic gym, as is custom for the residency lectures. The traditionally used space for clinical care is re-arranged to accommodate a combination of the didactic and lab practice aspects of the Shoulder Evaluation and Examination course. Ben arrived twenty minutes ahead of the scheduled start time to set up space and rearrange the treatment tables to accommodate the planned learning activities. One resident, Alex, had also arrived well before the scheduled start time to set up his laptop and prepare for the class. The other three participants arrived sequentially within ten minutes of the start time. The teaching space, pre and post-lecture setup, a 360° view of the learning environment, and vantage points from the educator, the students, and the investigator are shown in Figures 4a-e in Appendix B.

For several weeks leading up to the class, Ben had been a one-on-one mentor for Alex during clinical hours. Beyond the rigors of the residency program's academic and professional demands, Ben had strongly encouraged Alex to take the time to watch one romantic comedy movie per week. Something that Ben had said would help Alex to disengage and relax while also observing and learning nuances of communication styles and interpersonal relationships. These details are relevant as Ben initially engaged the students with a humorous and entertaining five-questions pre-test of *The Devil Wears Prada* [30]. During the interview, Ben would describe how his intention in initiating the teaching session was to bring positive and relaxed emotions into the classroom while simultaneously grasping the audience's attention.

Ben then transitioned to asking prompting questions of the audience regarding their current shoulder examination. "What does your current shoulder exam look like? Do you have a consistent shoulder physical examination flow? Why or why not? What is your rationale for having that particular test sequence? These questions were seemingly rhetorical and intended to prompt the audience's internal processing as there were no volunteers who immediately spoke up with an answer. Ben further prompted, "Let us see what your current shoulder examination looks like." He had the participants pair up, and over the initial fifteen minutes, the participants took turns performing their current shoulder examinations on one another. Though each student demonstrated a meaningful and logical flow to the sequence of their testing, the testing sequence of their exams was not automatic as the students would intermittently pause between assessments to determine what test(s) they would perform next. Ben silently orbited the groups- observing techniques. Upon the class coming back together, Ben asked for a volunteer to perform their shoulder examination sequence for all to observe and with a five-minute time limit. "How much information can you glean in the first five minutes of the physical examination?" Ben inquired. It was apparent from learners physically replicating specific movements and the dialogue between learners. The initial lab breakout and the volunteer's five-minute examination sequence stimulated the learners to self-reflect on the sequence and the physical execution of the current shoulder examinations.

The class proceeded with alternating lab sessions with fifty to sixty-minute didactic (PowerPoint © guided lecture) covering the clinically relevant shoulder anatomy, cervical spine screening, scapula assessment, shoulder range of motion sequencing, and a logical, algorithmic-based diagnostic clinical testing sequence of the shoulder complex. Ben was well prepared for the presentation. He rarely had to look at the slides, consistently scanning the audience and intermittently making eye contact with each of the learners while conversationally identifying the critical take of slides (never reading the content verbatim). The didactic blocks of time were peppered with specific case examples offered by Ben and intermittent questions from the learners that lead to an unplanned, open dialogue of the material. There was a reciprocal balance of communication and inquiry between Ben and the audience. Ben would pause strategic at crucial time points to ask open-ended and application-based questions of the audience regarding the current material. There were also time points where the learners would share a clinical case that they had or were experiencing and asked how assessments may provide them more clarity about the patient's condition. It was evident that the learners simultaneously acquired the content knowledge and translated it to real-world scenarios and applications.

The didactic blocks were broken up by either ten-minute breaks (for the participants to hydrate, informally chat, or use the facilities) or by more hands-on lab practical sessions that allowed the learners to practice the recently covered material and/or content that had been previously discussed in the lecture. During the lab sessions, learners were encouraged to switch partners, assess and “feel” different shoulders and bodies, refine specific tests, and/or run through a series of tests. Ben would bounce back and forth between the groups and provided specific and timely feedback on handholds, vectors of manual force, and clinically relevant tips. Learners had the opportunity to perform the techniques on one another, on Ben, and have Ben perform their techniques. The subsequent lab sessions followed a similar format; the small group breakout period would be followed by everyone coming together and observing Ben or a volunteer perform the particular skill. The learners were active, engaged, enthusiastic, and inquisitory during the lab sessions. There were free-flowing questions, dialogue, and unprompted peer-feedback amongst partners. Of particular importance was the final lab session that mimicked the initial breakout. There was a stark difference in the sequence and the execution of the learners’ shoulder examinations but the confidence and the intentional flow that they demonstrated from one assessment to the next were the most evident. Overall, the PowerPoint© format composed 3.5 hours, and the lab-style composed 2.5 hours of the entire course.

Beyond the class’s organization, the elaborate explanations, the deconstructing of the research content, and the detailed, timely feedback that Ben provided during the session were his non-verbal gestures and communication. Ben was rarely completely stationary, often transitioning across the front of the teaching space as if on stage or demonstrating animatedly with his hands and upper extremities. Between his lecture, power-point slides, and discussion. Ben’s passion and enthusiasm for the material and his joy of teaching were clearly expressed in his animated tone of voice and physical movements, whether this is telling a story, describing a prior patient, or demonstrating a typical movement pattern of the shoulder and upper extremity. The attentive gazes, thoughtful expressions, and intermittent yet consistent note-taking gave all indications that they were absorbed in the learning environment that Ben was creating. Frequently, he stepped from behind the podium and walked towards the students to thoughtfully pose a well-formed question.

Ben concluded class, summarized the key concepts, and provided ample opportunity for lingering questions, comments, concerns, and any open loops that the learners may have had. He emphasized the necessity of continual practice and refinement of skills and assessments presented in the class period are essential for ongoing mastery and expertise. The learners nodded to themselves and seemed motivated. Ben shared his journey and development briefly in becoming more competent in examining and evaluating the shoulder through deliberate practice and self-reflection. See the Supplemental Data Collection Files in Appendix D for the completed Observation Assessment Form that provides candid notes taken during the didactic observation.

## Description of the Interviews

**Student Interview:** The interview with Alex took place in a conference room that is adjacent to the physical therapy clinic. (See Figures 2a and 2b in Appendix C for visuals of the conference room.) It was apparent in his thoughtful and deliberate responses that Alex saw value in taking part in the interview and the study as a whole. He maintained a pensive and professional demeanor throughout the interview’s duration, yet would often smirk, laugh, and bemused emotions as he recounted Ben’s individual experiences and characteristics.

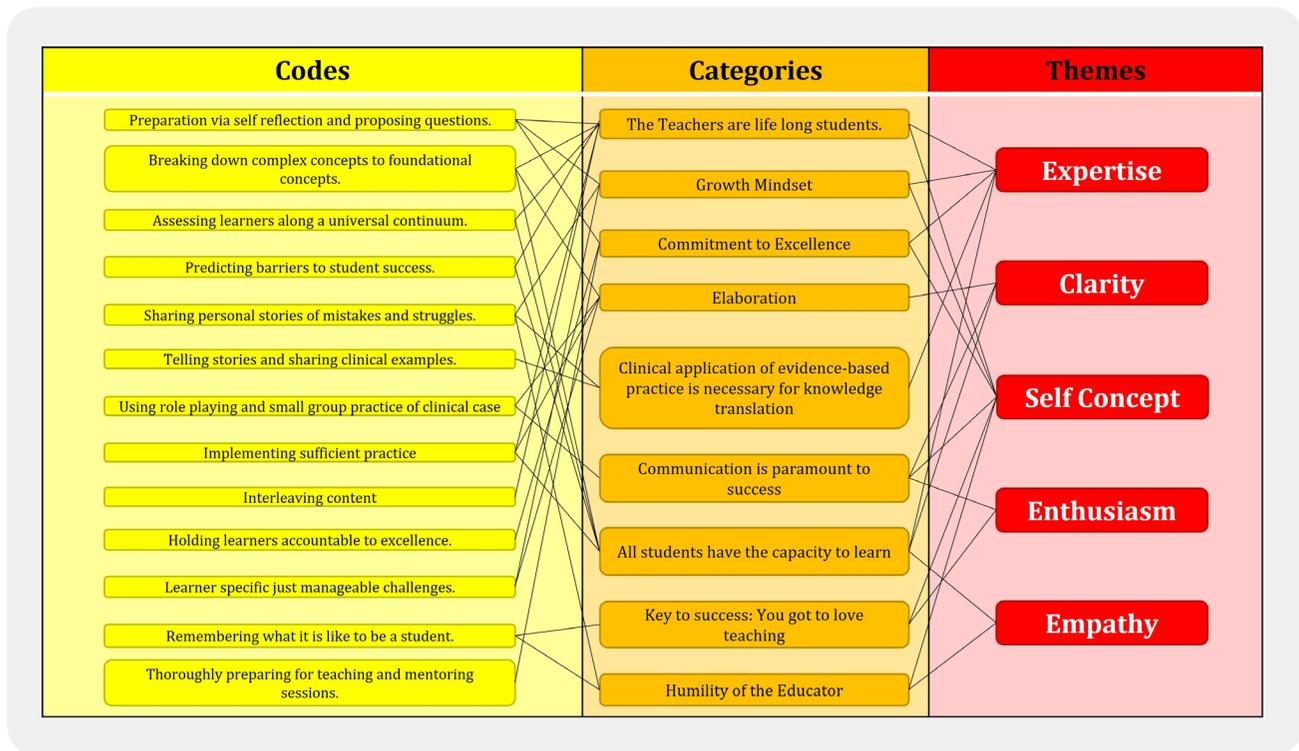
Through sharing specific stories and via his non-verbal communication, Alex projected the positive relationship that he fostered with Ben through a combination of one-on-one mentoring, didactic lecture sessions, and through the day-to-day interactions within the clinic. Alex's reverence and affinity for Ben as an instructor and therapist were quite evident. He concluded that he saw Ben as a role model in the clinical environment and beyond. The audio recording of the interview (see Figure 5a) and transcript are available in Appendix D.

**Exemplary Educator Interview:** When asked to conduct the interview, Ben readily agreed with a sense of humility and intrigue. He expressed similar emotions during the initial answers to the interview. With each subsequent question, Ben seemed to become more absorbed in the responses providing thorough and comprehensive answers and, at times, even circling back to elaborate on answers to related questions. Amidst Ben's calm and professional demeanor, his passion and enjoyment of teaching, learning, and assisting clinicians and residents to become the very best versions of themselves was exact. It was notable in multiple answers how Ben spoke about the development of his affection for teaching and learning across time. The stories that he told spanned the duration of his professional career and stretched back to his adolescence during competitive athletics and to the foreseeable future the ongoing role that Ben has in enhancing the teaching of residency faculty, teaching teachers essentially.

Nevertheless, he never lost the underlying sense of modesty and consistently returned to his development as a teacher as a student of pedagogy. Ben's final response regarding the one piece of advice that he would pass on to others pursuing a path in education was, "You got to love it!" (i.e., teaching) provides a summary statement that captures what he brought to the interview. The audio recording of the interview (see Figure 5b) and transcript are available in Appendix D.

## Themes

The following section describes the five themes identified through the preliminary exploratory analysis and coding of the empirical evidence [25]. For transparency of analysis, how the initial coding and category generation process of the exemplary educator's interview leads to the five themes is shown in Figure 1. The lines between the codes, categories, and themes represent how each code and category were aggregated and synthesized to derive the next sequence of categories or themes, respectively. The rationale for multiple lines per code or category represents that each one contributed to the generation of more than one category or theme, respectively.



**Figure 1:** Visualization of the Coding Process and Theme Generation

**Expertise.** By “expertise,” it is meant that the exemplary clinical educator demonstrated clinical practice patterns that were consistent with the operational definition and characteristics that have been associated with an “expert” or “master” clinician in the current literature (see Table 1). Within the teaching session, Ben specifically described the importance of providing the right care to the right patient at the right time and how a thorough and algorithmic assessment can reliably facilitate such acts [31,32]. Ben’s expertise was also evident in detail and extensive knowledge that Ben shared during the shoulder evaluation session was well beyond the common knowledge of a physical therapist, even in comparison to other Orthopedic Clinical Specialized (OCS) therapists [33]. Tangible support of the perceived Ben’s content mastery and comfort level of expressing that knowledge to others is his previously published book chapter [34]. Supporting evidence of Ben exhibiting these characteristics were corroborated through both interviews and the teaching observation session.

**Table 1:** *Defining Characteristics and Behaviors of an Expert Clinician*

Reference (Author, Year)	Clinical Practice Characteristics or Behavior Compared to Novice Clinicians Expert Practitioners:
Rothstein, 1990 [32] Resnik & Jensen, 2003 [31]	<ul style="list-style-type: none"> <li>• are thought to “do something better” because they know how to do the “right thing at the right time,” and thereby “provide better care.”</li> </ul>
Jensen <i>et al.</i> , 1990 [35]	<ul style="list-style-type: none"> <li>• spend more time with patients in providing hands-on care, seeking information, and evaluating and educating the patient.</li> <li>• are able to handle interruptions of direct intervention more efficiently</li> <li>• spend more time in social interchange with patients, and with patient education</li> </ul>
Jensen <i>et al.</i> , 1992 [33]	<ul style="list-style-type: none"> <li>• knowledge was more extensive, and that master clinicians were more comfortable with their knowledge base</li> <li>• individualized their evaluation and teaching for each patient, were more responsive in their therapeutic interaction with patients, and integrated more verbal encouragement and tactile cues with intervention</li> </ul>
Jensen <i>et al.</i> , 2000 [36]	<ul style="list-style-type: none"> <li>• have an inner drive for lifelong learning and a broad knowledge base consisting of formal knowledge and knowledge of movement, patients, and their clinical specialty</li> <li>• shared a focus on patient education</li> <li>• understood their limitations and appreciated what they did know as well as what they needed to learn</li> <li>• clinical reasoning focused on patient-specific functional outcomes and was based on collaborative problem-solving and decision making</li> <li>• shared a belief in patients’ responsibility for their health</li> <li>• studied demonstrated a well-developed ability for self-reflection, with a continual reassessment of their practice</li> <li>• experts intertwined intervention and evaluation to fine-tune the patients’ programs</li> </ul>

The therapeutic alliance and communication qualities of expert and master clinicians (see Table 1) are consistent with the communication skills Alex described of Ben during his interview. In describing how Ben conveys information to patients, Alex stated:

If you know the information and you're really good at delivering it, you can get people to believe a whole lot. And you know, Ben's getting the patient to believe what they should be believing. But the confidence and the projection is in a way that is very calming for [patients], and I don't think I formally appreciated how important it was to have the confidence in the projection. (Student interview transcript, lines 210-215)

Moreover, in his interview, Ben also re-iterated the necessary mastery of communication of clinicians "the most important thing you learn is not the technical skills but is the communication style and how to interact with the patient" (Exemplary clinical educator transcript, lines 85-86).

Ben described an expert skill as having a projected, theoretical mental model of clinical growth within orthopedic rehabilitation and being able to efficiently and accurately assess where on the continuum a learner is and predict the pending barriers to their continued growth. One of his rationales for having the learners perform their physical examination in the initial lab session during his teaching lectures is to "get a baseline of where [the learners] are at." (Exemplary clinical educator transcript, lines 271). Whether in a one-on-one mentorship or within the class setting, Ben is able to assess the learner competency and adapt in life to time to accommodate:

Where I need to spend my effort in my lecture or where I need to spend my effort in my lab is sort of determined by the feedback that I'll get on how good, or not so good, they are within that lab. How much feedback I might provide to [the learners]. How much I'm going to have to step in and do it on them and then have them do it to someone else and then have them do it to me so I can make sure they're doing it right and provide the proper feedback. (Exemplary clinical educator transcript, lines 278-283).

To be able to place a learner along a continuum of clinical growth and tailor their teaching accordingly requires extensive breadth and depth of discipline. A hallmark characteristic of expertise.

**Clarity:** Two self-identified aspects of Ben's teaching style that differentiates him from other educators are the "structure" that he brings to the learning environment and the ability to break complex concepts into easily grasped fundamental components. Both aspects enhance the clarity of expectations, content, and theoretical models for the learner(s). For instance, when Ben was asked: "what aspects of yourself come through most clearly in your teaching?" Ben replied:

One of the other [aspects myself that come through] is structure. I don't know where my desire for structure comes from, maybe growing up in a non-structured household... I really like structure, and I learned that I don't know [why], but my mind thinks in terms of structure... [For example] when is it time to progress from basic exercises to higher-level exercises?... I like to bring structure to [the student's clinical] practice pattern because a lot of times [the novice clinician can be] all over the map. (Exemplary clinical educator transcript, lines 156-169).

Ben provides a tangible learning activity where he had a resident map out a periodized eight-week rehabilitation progression with specific exercises and exercises dosage. Ben identified that structured learning activity as a pivotal event in the resident's learning. It aided in her ability to translate the skills and apply the

resident's knowledge to several other subsequent clinical cases that extended the mentorship's timeframe. Ben summarizes this example later in the interview with:

My foundational belief is that I can take almost any student, no matter what their skill level is, and if you put them in a structured environment, you can teach them. And teach them up and make them better. And why they'll walk out of here at least good, if not better, or great. (Exemplary clinical educator transcript, lines 378-81).

Moreover, Ben supplements his structured instruction methods by dividing complex concepts into foundational skills or simplified content that improves the learners' retention and clinical application. For example, within the observed shoulder evaluation and examination teaching session, Ben provided the residents with a five-minute, reliable and valid, algorithmic assessment of the shoulder that included observation, range of motion, strength testing, and fifteen diagnostic tests. Given the fact there are over 180 shoulder special tests and multiple degrees of freedom of the shoulder complex, Ben's ability to efficiently and effectively instruct novice clinicians a succinct workflow within a single class session necessitates the ability to distill complexity to easier-to-learn parts [37]. Alex specifically highlighted this point:

So thinking back to the lectures [Ben] gave on the knee and the shoulder. [As students], we had certain ways of doing [the performing examinations] and how we'd go about conducting what would seemingly be a basic evaluation, and then Ben would present information and ... show us another way of doing it that would result in better efficacy for technical reasons and then also flow for time-saving reasons... One thing that's really stuck home about [Ben's and my] time together is ... the importance of mastering the fundamentals (Student transcript, lines 171-175).

Not only does Ben instinctually seek to bring clarity into the clinical learning environment, but he believes that is a fundamental principle of excellent teaching that allows nearly all students to learn effectively.

**Self-Concept:** Shlegel *et al.* (2009) [38] define the operational definition of self-concept that is used here: "a cognitive schema representing those aspects of the self that are considered, by the person, to be most emblematic of his or her true nature." During his review of the validation and feedback of the themes, Ben was asked to label each of the categories as guiding principles of "teaching," "learning," "the discipline" (i.e., clinical practice), "fundamental truth" (i.e., a principle that extended beyond the confines of teaching, learning, of the discipline) or "Other." Ben's purpose to do so allowed the investigator to determine which of the beliefs that Ben shared were specific to teaching and learning or were more personal fundamental truths, values, and morals. Ben identified six of the nine categories has to be fundamental truths that he associated as part of, in his words, his self-identity. This association, in addition to his agreement to affirmed agreement with Parker Palmer's quote, "We teach who we are." suggests that Ben believes that infusing our authentic self and personal principles into our pedagogy is an essential aspect of exemplary clinical education.

Ben's case is ironic that several of the aspects he associated have also been identified as favorable beliefs, attitudes, and behaviors of some of the best educators [2]. His teaching aspect that Ben associates with his self-identity include his "grit," having a growth mindset, and a commitment to excellence. He simultaneously

balances these ambitious characteristics with cornerstones of humility, effective communication, and a love for teaching. Ben has captured his continual improvement mindset and tenacity during the interview: ... that's sort of how I see my life transpiring; is having to really work hard to get to where I'm at and finding those people and being able to put pressure on them and say you're going... you know, I've always strived to be the best I can be in everything (Exemplary clinical educator transcript, lines 126-128). This is Stanford. We're going to be one of the best. If not, we're going to strive to be the best academic medical center, and I'm going to [challenge learners] to the limit to make [them] the best version of [themselves] that [they] can possibly be... I personally have always felt like I've tried to do that in anything that I've committed to. You know and so I see myself as that, but I see trying to pull that out of people. (Exemplary clinical educator transcript, lines 136-140).

There are multiple other time points where Ben consistently discusses the importance of incremental improvements in not only his students and residents but in his own development as a therapist and educator. For instance, the word "growth" is used over twenty times throughout the interview; that's once every two and a half minutes.

A key to Ben being able to stretch and challenge learners without overwhelming them is that he can individualize expectations for each learner. He tempers that competitive nature with the nurturing aspects of communication, humility, and love for helping students be the best versions of themselves. One way that Ben connects with his students is through strategically revealing moments of his own vulnerability.

[Instances] where the [educator/mentor] can convey... their past difficulties. I sometimes think when you come in after an evaluation and [learner] is just like, "Oh my god. I have no idea what to do. [The Patient] has got these 12 problems. I'm not sure which they're here for." It's chaos, and you (as the mentor) go. "Yeah, I agree. I have no idea what to do. So what's the easiest thing we can work on? That's a moment that [student/resident] needs to see because not always do you (the mentor) have the correct answer. (Exemplary educator transcript, lines 465 - 471)

Alex described how Ben balanced high expectations with establishing an authentic teacher-student alliance through "being able to know someone as the whole person and establishing a solid context and where they are at, what their goals are, and where that all fits into the picture." Alex attributed the strength of the teacher-student alliance, at least in part, to Ben's humility. Alex recounts:

One thing that I really appreciated was Ben being vulnerable enough to share his own mistakes because he can throw out a lot of information. And you're like man this guy's a genius! He can be like "Dude, I screwed this up for the first three years of my career and I did horrible with this and it's like okay." This is kind of nice, you know? This guy's not like infallible, right? And that he like is human here and it... yes, so it's human. It humanizes him when sometimes he seems like someone who is very well-established in their path. (Student transcript, lines 348-353).

Ben's ability to bring his authentic self and personal values of ambition and humility into the clinical, and educational environment and inter-personal dynamic was another key theme that was recognized and appreciated by both Ben and Alex.

**Enthusiasm.** A consistent theme across both interviews, and the teaching observation session was Ben's energy and enthusiasm that filled the learning environment. Part of Ben's intrigue for the shoulder likely stems from his prior participation in high-level, competitive tennis, and being nationally ranked during his adolescents. His personal connection with the shoulder in combination with a personal mission the help others, be this student or patient and be the best that they can be was apparent in the energy of his speech and his non-verbal communication through moving around the room and physical demonstrations of upper extremity movements. As noted in the observation assessment form (See Supplementary media in Appendix D), the audience seems to feed off the energy and enthusiasm Ben brought to the didactic and the lab sessions. Ben corroborated that his behaviors and enthusiasm were intentional as he believes these strategies lead to effective learning. "I think having a teacher or mentor that's passionate and is engaged [leads to effective learning] because the more engaged you are, the more engaged [students/residents] will become."

Ben sees passion (i.e., enthusiasm), not only for the subject matter but also for teaching, and an essential component of effective clinical education. In his own words.

Right, you have to have passion for [teaching]. If you put yourself in the learners' shoes, but you're not passionate, you're not going to care enough to continue to dig. To dig. To get better at teaching." (Exemplary educator transcript, lines 761-763). There are people that have to [teach]. There are people that don't like doing it. There are people that don't think they're good at doing it or don't think they're good enough to do it, and I think those people don't love doing it because of those reasons. So, I think you've got to just love it, or you've got to really enjoy it or be passionate about it. (Exemplary educator transcript, lines 777-781).

Ben's passion and enthusiasm for teaching and discipline translate into making the learner's experience "fun." According to Alex, Ben's positive demeanor allowed him to thoroughly enjoy the mentorship, "celebrating the successes along the way" while establishing further confidence in the learner's beliefs and self-confidence (Student transcript, lines 43-49).

**Empathy.** At multiple time points during the interview, Ben expressed the importance of the teacher's ability to relate to the learners' perspective and experience. This is consistent with Berger's (1987) definition of empathy: "Empathy is the capacity to understand what another person is experiencing from within the other person's frame of reference, i.e., the capacity to place oneself in another's shoes." Ben recounts:

I refuse to forget what it's like to be a student. I said that really early on in my career when I had a really negative experience with a clinical instructor. I said, "I'm never going to forget this moment." And I don't. And when I start to; when I feel like I'm doing it and I'm starting to forget a little bit, I go back to that moment. I think about it. I internalize it. (Exemplary educator, lines 366-369).

The above testimony, in combination with Ben's closing remarks (where he states that the one, most important thing it takes to be an effective teacher is passionate empathy), capitalizes on how much he profoundly values teachers being able to see the world through the eyes of their students.

From the learner's perspective, Alex described Ben's empathy as a sixth sense. A sixth sense extended beyond the mentor-to-mentee but to the therapist-patient relationship as well.

[Ben] does a really good job of being able to sort of interpret what someone is thinking or feeling without them saying it. He has almost this like sixth sense about him... Being able to kind of get inside someone else's head and then even anticipate what they're feeling. And then how that may translate to whether or not they're comfortable.

According to Alex, Ben's empathy enabled Ben to recognize what particular social or contextual factors Alex was most uncomfortable with and then ask probing questions to foster Alex's recognition of these patterns through self-reflection and metacognition. It was apparent from the interviews that Ben not only highly valued empathy but also effectively related to the feelings and perspectives of others, but that he was able to use his ability to connect to improve learning.

## Discussion

The results of this exemplary clinical educator case study several attitudes and behaviors were identified through the structured interviews and teaching observation. Through the exploratory analysis and coding process, the attitudes and behaviors were organized into five themes: expertise, clarity, self-concept, enthusiasm, and empathy. Each theme and the respective associated categories are analyzed using existing literature on teaching and learning below. With the intent to translate the findings into real-world applications, the discussion concludes with specific recommendations for clinical educators.

For conceptual ease and improved efficiency in comparing Ben's attitudes and behaviors with the current evidence for each theme are analyzed using a table format. See Tables 2-6. Within each table, the major categories and/or codes are labeled as attitudes or behaviors. (Keep in mind that the operational definition of an *attitude* consists of *values* and *beliefs*.) Each of the categories and/or codes are substantiated with supporting evidence from teaching and learning literature. It is important to note that the supporting evidence offered for each code or category is by no means exhaustive. It is beyond the scope of the current analysis to provide a comprehensive review of the literature for each code or category. Readers are encouraged to continue seeking the growing body of teaching and learning research to pursue each of these concepts in further detail.

**Table 2:** *Analysis of the Theme: Expertise*

Construct	Empirical Evidence (Code or Category)	Current Teaching and Learning Science
Attitude	Teachers are lifelong students.	<p>“Part of being a good teacher (not all) is knowing that you always have something new to learn-not so much about teaching techniques but about these particular students at this particular time and their particular sets of aspirations, confusions, misconceptions, and ignorance.” [2]</p> <p>Due to the rate of advances in the medical field, practicing clinicians require the timely and ongoing acquisition of new knowledge and skills. To consistently practice evidence-based medicine, continually updating one’s knowledge and incorporating the most up-to-date research is necessary for health care professionals [39].</p> <p>Defined as “an attribute involving a set of self-initiated activities and information-seeking skills with sustained motivation to learn and the ability to recognize one’s own learning needs.”, a Lifelong learning attitude is analogous to a ‘deep’ approach to learning [40,41]. The significance of this is that deep learning is “essential for mastering key concepts and skills in virtually all disciplines.” [42]</p> <p>“Lifelong learning has been recognized as an indicator of professionalism, competence, and critical competent of continuing professional development.” [43]</p>

<p>Attitude</p>	<p>Maintain a growth mindset.</p>	<p>“Professors who believe that teaching is primarily transmitting knowledge may think that success depends on fixed personality traits over which they have little control (“some people are just born good lecturers, but I’m not”).” [2].</p> <p>In a national study survey of over 600 K-12 teachers in May 2016, 98% of teachers agreed that growth mindset has excellent potential for teaching and learning, and 90% believe growth mindset is associated with excitement about learning, persistence, high levels of effort and participation in class [44].</p> <p>Teachers with a growth mindset can model such behaviors and beliefs in their classrooms and in their interactions with students [45].</p> <p>“Greater focus on learning and professional development. Faculty who believe they can improve are more likely to seek out opportunities to learn, including taking on directed readings, observing experienced instructors, and attending workshops and other training” [46].</p> <p>“Faculty with a growth mindset model this type of thinking for their students. In addition, if we believe our ability is fixed, we likely think the same of our students, which is limiting.” [46,47]</p> <p>Teachers with a growth mindset engage in more professional development, allow other teachers to teach their class to see how they approached working with the same students, and seek feedback on their teaching from colleagues and supervisors [48].</p>
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<p>Attitude</p>	<p>Clinical application of evidence-based practice is necessary for knowledge translation.</p>	<p>Bain (2004) [2] described how the best college teachers recognize that knowledge is not received but constructed through real-world application of the content. Moreover, the best college teachers intentionally expose learners to situations that expose flaws or limitations in their mental models, forcing them to “stop and grapple with the issue at hand.”</p> <p>In <i>Enhancing adult motivation to learn</i>, Wlodkowski and Ginsberg (2017) [5] advocate for real-world application of learned material to promote a transfer of learning (how people apply what they have learned in an educational or training setting to their life, community, or workplace). Wldokowksi and Ginsberg (2017) [5] also discuss how real-world application also facilitates ‘engendered competency’ of the learner (i.e., affirming an understanding that learners have effectively learned a concept that they value and perceive as meaningful)</p> <p>In his book <i>How People Learn</i>, John Bransford (2000) [49] states that a key aspect of effective learning is its durability (i.e., does the learning have a long-term impact in ways it influences other kinds of learning or performance?). To ensure durability, Bransford (2002) [49] states, “it is essential for a learner to develop a sense of <i>when</i> what has been learned can be used - the conditions of application. Failure to transfer is often due to learners’ lack of this type of conditional knowledge.”</p> <p>Bringing in specific real-world application and clinical case examples of course concepts meaningful to the learners’ personal and professional lives are one strategy of intentionally engaging students [50].</p> <p>One of the ten principles that Kember and McNaught (2007) [51] identified after studying the beliefs and practices of award-winning teachers in higher education was: “the relevance of what is taught must be established by using real-life, current and/or local examples and by relating theory to practice.”</p>
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<p>Behavior</p>	<p>Preparation via self-reflection and proposing questions.</p>	<p>Intensive preparation for instruction is expressed through “the relaxed familiarity” with the material,” and the instructor’s eye contact can be on the learners and the room at large most of the time [5].</p> <p>Commitment to readiness enhances the educator’s confidence, an emotion that gives the educator excellent access to their best talents and stored memories [52].</p> <p>The best college teachers consistently used self-inquiring in their preparation for teaching, which centered around four primary inquiries: “(1) What should my students be able to do intellectually, physically, or emotionally as a result of their learning? (2) How can I best help and encourage them to develop those abilities and the habits of the heart and mind to use them? (3) How can my students and I best understand the nature, quality, and progress of their learning? and (4) How can I evaluate my efforts to foster that learning?” [2]</p> <p>Ben described the self-reflective practices in his preparation for teaching and mentoring are consistent with the critical reflective practices that Brookfield (2017) [53] advocates for in his book <i>Becoming a Critically Reflective Teacher</i>. The “process of intentional and continual scrutiny of the assumptions that inform your teaching practice” helps reveal our hegemonic assumptions as instructors.</p>
<p>Behavior</p>	<p>Implementing sufficient practice.</p>	<p>In his book <i>Small Teaching: Everyday Lessons from Science of Learning</i>, James Lang (2016) [73] synthesizes the current evidence from cognitive psychologists, neuroscientists, and biologists to provide practical recommendations for any educator regardless of the setting. Lang [73] discusses the importance of allowing learners sufficient practice of the particular skills and knowledge necessary to fulfill the overarching objective(s) of the course or class session.</p>

Behavior	Interleaving content	<p>In his book <i>Small Teaching: Everyday Lessons from Science of Learning</i>, James Lang (2016) [73] synthesizes the current evidence from cognitive psychologists, neuroscientists, and biologists to provide practical recommendations for any educator regardless of the setting. A powerful strategy to facilitate long-term retention and improved recall of learned material is interleaving the specific concepts within a class session, course section, or entire curriculum.</p> <p>In their book <i>Make it Stick</i>, cognitive psychologists Henry Roediger III and Mark McDaniel from Washington University in St. Louis present the current science of successful learning. The second major concept that the researchers endorse is the power of interleaving through either spaced practice or through a varied practice of switching between different but related concepts [3].</p>
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**Table 3:** Analysis of the Theme: Clarity

Construct	Empirical Evidence (Code or Category)	Current Teaching and Learning Science
Attitude	Elaboration assists in learning higher-level skills and concepts.	<p>“...almost all genuine mastery is achieved over time.” [53]</p> <p>“the spiral curriculum design, which emphasizes and revisits clinical competencies, promotes a strong understanding and retention of knowledge in highly prevalent clinical conditions.” [54]</p> <p>“Teaching health care professionals how to make decisions and implement best practices requires a continuum of learning rather than one-time activities. Spiral learning should be applied to that continuum, and we should understand the crucial competencies throughout the process for reaching accurate answers and making appropriate decisions. Mastery of skills, knowledge, and cognition that develop over time determines the implementation of best evidence, which spiral learning emphasizes.” [55]</p> <p>The spiraling curriculum has been successfully implemented in undergraduate, health care professional programs to help learners understand the evidence-based practice and clinical outcome management concepts [56].</p>

		<p>The science of successful learning advocates for elaboration (the connection of “the information to-be-learned” to “a learner’s prior knowledge and experience or contiguously presented information”) as an active learning method [57]. When elaboration is utilized, there is no known limit to the capacity of what the human mind can retain [3].</p>
Attitude	Communication is paramount to success.	<p>Ben quoted Albert Einstein during the interview: “If A is a success in life, then A equals x plus y plus z. Work is x; y is playing, and z is keeping your mouth shut.” The strategic use of silence is also endorsed by Bain (2004, p. 173) [2]: “... We may have to learn a lot about “teaching with your mouth shut,” as Don Finkel put it in the wonderful title to his book, recognizing that teaching is not just delivering lectures, but anything we might do that helps and encourages students to learn-without doing them any major harm.”</p> <p>Wlodkowski and Ginsberg (2017) [5] thoroughly discuss the importance of communication skills and techniques in promoting learning and student participation. The authors offer two performance standards that educators should consider: (1) plan and conduct instruction so that <i>all</i> learners can follow and understand; (2) provide a way for learners to comprehend what has been taught it is not initially clear.</p> <p>The way educators communicate with their students can positively or negatively affect future performances, self-efficacy, goal setting types, and the amount of persistence that they put forth when faced with future challenges [7].</p> <p>Effective teaching in the clinical setting depends crucially on essential communication skills: questioning, giving explanations, and the provision of constructive feedback.</p>
Behavior	Break down complex concepts into foundational concepts.	<p>One of the ten principles that Kember and McNaught (2007) [51] identified after studying the beliefs and practices of award-winning teachers in higher education was: “students must have a thorough understanding of fundamental concepts even if that means less content is covered.”</p>

**Table 4:** Analysis of the Theme: Self Concept

Construct	Empirical Evidence (Code or Category)	Current Teaching and Learning Science
Attitude	Teachers are lifelong students.	As a self-concept, educators are lifelong learners are consistent with Robert Kegan's concept of <i>developmental transformation</i> , which is the process by which the whole ('how I am') becomes a part gradually ('how I was') of a new whole ('how I am now') [53,58].
Attitude	Maintain a growth mindset (grit).	"We teach who we are... Good teaching cannot be reduced to technique; good teaching comes from the teacher's identity and integrity. Good teachers share one trait: a strong sense of personal identity infuses their work. Good teachers join self, subject, and students in the fabric of life because they teach from an integral and undivided self; they manifest in their own lives, and evoke in their students, a 'capacity of connectedness.'" [59]
Attitude	Commitment to excellence.	"Experienced teachers also generally see teaching as an important part of their identity." [60]  The integration of one's teaching role with self-identity facilitates <i>identity coherence</i> . In contrast, difficulties or tensions of integrating the two can "lead to <i>identity dissonance</i> , which involves negative emotions such as having a low sense of self-worth or feeling frustrated." [61,60]
Attitude	Communication is paramount to success.	Professional self-identity is "important because it is a prerequisite for accepting the professional role's responsibilities and obligations. It can be key to developing the confidence to work as a qualified professional in the student's chosen profession... [Professional self-identity] is a necessary foundation for professionalism. Delayed professional self-identity is a barrier to a successful transition from student to professional." [62]  "Scholars increasingly acknowledge that teacher identity is central to the teaching profession. Teachers who identify with their teaching role are emotionally attached to this role, and it informs their worldview." [67]

**Note.** The empirical evidence categories and codes were explicitly identified by Ben as “fundamental beliefs” that were part of his self-identity. The evidence provided in the far-right column represents the concept of educators infusing their self-identity into their teaching philosophy and practice, rather than specific evidence for supporting the unique codes or categories listed.

*Table 5: Analysis of the Theme: Enthusiasm*

Construct	Empirical Evidence (Code or Category)	Current Teaching and Learning Science
Attitude	Communication is paramount to success.	One of the ten principles that Kember and McNaught (2007) [51] identified after studying the beliefs and practices of award-winning teachers in higher education was: “Teachers should motivate students through displaying their enthusiasm, encouraging students and providing interesting, enjoyable and active classes.”
Attitude	The exemplary educator has got to love teaching.	<p>Wlodkowski and Ginsberg (2017) [5] recognize that an educator’s love of learning is an essential prerequisite to the Motivational Framework for Culturally Responsive Teaching.</p> <p>Motivational teachers are described as “someone who taught in a way that evoked their passion for what they were learning and gave value to it.” [5]</p> <p>Ben described his reverence for <i>grit</i>, passion, and perseverance for long-term goals [63]. In his love of teaching, Ben lives out what it means to have the <i>grit</i> for his discipline. “Grit is about working on something you love so much that you simply want to keep at it. Grit is falling in love and staying in love.” [63] “Love the chase [i.e., the process] as much as the capture [i.e., product or outcome].”</p>

Behavior	<p>Enthusiasm during didactic and lab sessions.</p> <p>Animated and energetic non-verbal communication.</p>	<p>“Teachers who present materials with appropriate gestures and expressiveness will have students who achieve better on tests than will the teacher who does not gesture, reads in a monotone, and generally behaves in an unenthusiastic manner.” [5]</p> <p>Wlodkowski and Ginsberg (2017) [5] identified enthusiasm as one of the five critical pillars for motivating adult learners. “Enthusiastic instruction has a powerful influence on the motivation of learners for reasons biological and psychological. Numerous studies have demonstrated that when we focus on other people, we tend to embody their emotions... The foremost psychological reason is that instructors are advocates. ‘Learn it. It’s worth it.’ If [instructors] cannot show by [their] presence, energy, and conviction that this subject has made a positive difference for us, the learners is forewarned.”</p> <p>“Enthusiasm is a ‘generic’ teaching behavior that is useful at all levels of education, in all subject areas, and for all types of students.” [82]</p>
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**Table 6:** Analysis of the Theme: Empathy

Construct	Empirical Evidence (Code or Category)	Current Teaching and Learning Science
Attitude	<p>Nearly all students have the capacity to learn.</p>	<p>“We found that the best teachers usually have a strong faith in the ability of students to learn and in the power of a healthy challenge, but they also have an appreciation that excessive anxiety and tension can hinder thinking. Thus, while they help students to feel relaxed and to believe in their capacity to learn, they also foster a kind of disquietude, the feeling that stems from intellectual enthusiasm, curiosity, challenge, and suspense, and from the wonderful promises that they make about what students can achieve.” [2]</p> <p>“Great teachers release and nurture their students’ natural power to learn, and they believe that all of their students can learn to read well.” [64]</p>

<p>Attitude</p>	<p>Educators need to remain humble.</p>	<p>A commonality across the relationships that best teachers form with their students is a strong sense of trust [2]. These exemplary educators “often display openness with students and may, from time to time, talk about their intellectual journey, its ambitions, triumphs, frustrations, and failures, and encourage their students to be similarly reflective and candid. They may discuss how they developed their interests, the major obstacles they have faced in mastering the subject, or some of their secrets for learning particular material.”</p> <p>It was apparent from Alex’s interview that Ben’s humility in recollecting prior mistakes that he had made earlier in his career had “humanized” Ben, allowing Alex to better <i>relate</i> with him. According to the Self Determination Theory of motivation, establishing a social relatedness is one of three components necessary in promoting a greater sense of intrinsic motivation. [6]</p> <p>“Our task [as a teacher] is to create enough safe spaces and trusting relationships within the academic workplace—hedged about by appropriate structural protections—that more of us will be able to tell the truth about our own struggles and joys as teachers in ways that befriend the soul and give it room to grow.” [59]</p>
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<p>Behavior</p>	<p>Holding learners accountable to excellence.</p> <p>Learner specific, just manageable challenges.</p>	<p>“The best teachers we encountered expect “more” from their students. Yet the nature of that “more” must be distinguished from expectations that may be “high” but meaningless, from goals that are simply tied to the course rather than to the kind of thinking and acting expected of critical thinkers. That “more” is, in the hands of teachers who captivate and motivate students and help them reach unusually high levels of accomplishment, grounded in the highest intellectual, artistic, or moral standards, and in the personal goals of the students.” [2]</p> <p>Providing a challenging yet supportive environment is one of the four necessary ingredients for educators creating <i>natural critical learning environments</i> (“‘natural’ because students encounter the skills, habits, attitudes, and information they are trying to learn embedded in questions and tasks they find fascinating-authentic tasks that arouse curiosity and become intrinsically interesting; ‘critical’ because students learn to think critically, to reason from evidence, to examine the quality of their reasoning using a variety of intellectual standards, to make improvements while thinking, and to ask probing and insightful questions about the thinking of other people.”) [2]</p> <p>Providing just manageable challenges, but not so much that the task is perceived as unattainable or overwhelming, is one of the eight essential elements for facilitating student engagement and a ‘flow’ state. [65]</p> <p>One of the ingredients for healthy sustainable success and peak performance is ‘just manageable challenges.’ [80]</p>
<p>Behavior</p>	<p>Remembering what it is like to be a student.</p>	<p>One of the ten principles that Kember and McNaught (2007) [51] identified after studying the beliefs and practices of award-winning teachers in higher education was: “Genuine, empathetic relationships with individual students should be established so that interaction can take place.”</p> <p>Regarding the stereotype threat of African American students, the researcher Claude Steele (1999) [67] described the power of holding students to high standards and balancing those standards with supportive reassurance. “The combination of high standards and assurance was like water on parched land, a much needed but seldom received balm’ for the minority students. It clearly said that they would be judged not by some negative stereotype but by high standards and that their mentor actually had faith that they could meet those requirements.” [2,67]</p>

The expertise of one's discipline and teaching matters have been identified as essential criteria in effective teaching [2,8]. Within the empirical evidence collected, Ben had established his expertise through (1) approaching teaching as a lifelong learner, (2) a growth mindset, (3) translating knowledge through real-world application of content, (4) using self-reflective questioning in the process of preparing for lectures, and (5) ensuring the sufficient practice of the material within the didactic and lab sessions. These instructional methods are not only identified as consistent practices of the best college teachers [2,52] and means of enhancing the motivation of adult learners [5] - but they are also supported by psychology and learning science research [7,49].

Ben's expertise likely augmented his ability to offer clarity to learners in his teaching and mentoring. To convey complex concepts, Ben was intentional in how he communicated verbally with the students but also in the way that the educational resources illustrated the content. Moreover, Ben's use of elaboration and spiraling methods is substantiated by the current literature for higher-level education, health care professional academic programs, and by cognitive science research on learning (Brown *et al.*, 2014) [54-57]. Ben used several of the principles to garner expertise in his discipline of orthopedic rehabilitation and teaching and to provide clarity in his instruction and mentoring part of Ben's self-identity. *Identity coherence* is an essential characteristic in experienced educators who are fully invested in their craft [53,59,60, 62,63 ,67].

Given the fact that educators who self-identify with their teaching role are emotionally attached to their role, it is likely that this explains, in part, Ben's enthusiasm expressed during his teaching and mentoring [67]. A consistent trait among award-winning higher education teachers is their ability to infuse enthusiasm into the educational environment [68]. The energy that Ben brings to his teaching is aligned with fundamental principles of motivational theory in adult education, perseverance for long-term goals, and the theory of establishing a psychological flow state [5,63,65].

The final theme of empathy and Ben's ability to reduce the power dynamic between him and the learners through humility and the teacher-student alliance has consistently been identified as a hallmark of excellent teaching [2,59,64]. Theodore Roosevelt stated that "People don't care how much you know until they know how much you care." If excellent teaching and exemplary education are determined by the impression that educators leave on their students and how well the lessons imparted upon them are applied to novel situations and challenges, then perhaps an educator's ability to empathize and connect with them is the highest necessity. Building trusting and nurturing relationships that foster psychological safety and invite the learner to make mistakes as they stretch their comfort zone is described as essential prerequisites for enhancing learning [2,59,64,69].

It is evident that the identified themes from the studied exemplary educator have merit when compared to the current cognitive, psychology, learning, and teaching sciences. The findings suggest that similar teaching methods, attitudes, and behaviors advocated for in the traditional academic environment can be successful when implemented within the clinical education setting.

## Recommendations

Just as outcome goals are rarely actionable, the themes identified by this exemplary educator do not in themselves provide actionable steps that clinical educators can take to enhance their clinical pedagogy. In accordance with prioritizing learning over performance goals [53], process versus outcome-oriented performance [70], and incremental (growth) over entity (fixed) mindset [7,71,72], this section provides a summary of recommended actionable steps that clinical educators can take away from this case study and current evidence in learning sciences. See Table 7 for a categorized list of the recommended behaviors and actions that clinical educators can take away and apply based upon those exemplified from the empirical evidence and substantiated by the current research.

**Table 7:** *Research-based Actions and Behaviors for Effective Clinical Education*

### **Expertise:** *develop the expertise of discipline and the science of teaching and learning*

- Draw direct connections between the material and real-world applications that the learners deem valuable, beautiful, important, or authentic (i.e., the construction of knowledge and application of content).
- Facilitate the formation of explicit mental models and, when necessary, ‘refine’ the learners’ mental models through “expectation failure” (i.e., presenting situations that will expose the flaw(s) in which the current mental model(s)).
- Incorporate peer-learning or small groups during didactic and lab sessions.
- Use self-reflection to promote the deliberate practice and lifelong learning of the discipline, teaching, and learning.
- Facilitate self-reflection, deliberate practice, and lifelong learning practices in the learners.
- Promote ‘deep’ learning of material by challenging the learner to apply seemingly unrelated content to their discipline and apply it in novel situations (i.e., taking content from the multi-disciplinary conference, relating it to physical therapy, and further converting that knowledge to enhance the patient experience.)
- Invite the learner to retrieve and demonstrate their pre-existing knowledge that the to-be-learned material is related to (i.e., have students demonstrate a body region examination flow before conducting a didactic and lab session related to that body region).
- Allow for sufficient volume, varied, and interleave practice within and across learning sessions.
- Incorporate low-stakes ‘testing’ or evaluation of material to enhance retrieval and long-term retention and reduce the learners’ illusion of fluency (i.e., having learners perform particular diagnostic testing sequences during patient encounters).
- Seek to place learners along a continuum of clinical development, identify the critical areas for improvement, and predict potential barriers or obstacles that the learner will face.
- Prioritize time, energy, and analytical cognitive exercises on content that is determined to be must-know information (i.e., foundational principles, fundamental principles, or that specific to learning goals for the respective learner).
- Be adaptive as there is no single “best way” to teach. Recognize when the invention is possible and necessary (applying the fundamental principles of learning and teaching).

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- Prioritize time, energy, and analytical cognitive exercises on content that is determined to be must-know information (i.e., foundational principles, fundamental principles, or that specific to learning goals for the respective learner).
- Be adaptive as there is no single “best way” to teach. Recognize when invention is possible and necessary (applying the fundamental principles of learning and teaching).

**Clarity:** *provide clarity of content, instruction, and expectations*

- Deconstruct complex concepts into fundamentals that are ‘easy’ to grasp and comprehend.
- Teach more complex concepts through elaboration and spiral techniques to build upon the learners’ pre-existing knowledge and foundational concepts.
- Design learning materials (i.e., lecture slides, handouts, media, etc.) in diverse formats to provide clarity across different learning styles (i.e., present words and pictures rather than words alone).
- Provide organization and structure to learning sessions, content, and feedback to enhance clarity.
- Explicitly state expectations and process (i.e., mastery-based) goals early in the clinical education experience.

**Self-Concept:** *incorporate self-identity into pedagogy*

- Strategically utilize silence to allow for cognitive processing, question generation, and self-reflection.
- Hold learners to an individualized yet elevated level of excellence. Simultaneously, provide support and overt confidence that they could meet those requirements.
- Provide constructive feedback that rewards effort and promotes a ‘growth’ mindset.
- Incorporate the principles of grit into pedagogy:
  - o Identify what about teaching is enduringly fascinating (i.e., observing learners improve who they are professionally and personally)
  - o Recognize frustrations (i.e., setbacks, mistakes, ‘failures, etc.) are a necessary part of improving
  - o Connect teaching to things inherently meaningful
- Identify personal values (i.e., those associated with one’s self-concept or self-identity) and apply them within your teaching.

**Enthusiasm:** *express appropriate energy, passion, and enthusiasm*

- Intentionally seek methods to make the learning experience enjoyable
- Communicate, verbally, and with body language, a lively, energetic, and enthusiastic demeanor.

Empathy: foster trusting relationships with students

- Demonstrate social and emotional intelligence to establish open communication, psychological safety, and trust.
- Implement strategies that reduce any power dynamic and allow for relatedness (i.e., switching roles, demonstrating humility, altering teaching and student roles, or work collaboratively on a common goal or initiative).
- Facilitate self-efficacy and confidence in the learner.
- Practice empathy by “refusing to forget what it is like to be in the learners’ role.”

**Limitations**

The current study’s findings provide valuable insights into how clinical educators and post-professional didactic programs can transfer the learning paradigm and modern cognitive sciences from the traditional higher educational, academic setting to the clinical setting. However, it is important to acknowledge the limitations of the current investigation. The qualitative case study design classifies this research report as level five evidence, according to the Oxford Center of Evidence-Based Medicine (CEBM) [73]. Moreover, the analysis included only a single exemplary educator from a small sampling within a single post-professional residency program. The current study provides a framework for future research that can be extended to include multiple exemplary clinical educators across multiple post-professional specialty programs.

Additionally, the researcher’s characteristics and reflexivity need to be acknowledged in the findings and analysis of the current results. The investigator is an alumnus and current faculty member of the residency used for sampling residents to identify the exemplary educator. Thus, though objectivity was sought to analyze the findings, the investigator’s prior experiences as a learner and now as a teaching colleague with the exemplary educator may have unknown influences on the findings.

Finally, the primary investigator had no prior study of how students learn, how educators can effectively enhance learning, and what some of the best educators do to facilitate and foster student learning. Such prior knowledge of theories and practices may have influenced the labeling categorization and derivation of the themes. Akin to the effect that a student’s prior knowledge has on novel learning experiences, investigators’ prior experiences and mental models may provide a filtered lens through which the results of any research study are interpreted [74-81].

**Conclusion**

The research question guiding this study concerned the attitudes, behaviors, and beliefs of an exemplary clinical educator. Triangulation of observation and interview data and an evaluation of the existing literature indicated that many of the same advancing principles of cognitive science, learning research, and teaching theory have advocated for formal classroom study are effective and transferrable in the clinical education

environment. Clinical educators, instructors, and post-professional program faculty are encouraged to use the current case as an example of how the current science of teaching and learning can be implemented to enhance clinical education of physical therapy and rehabilitation students, residents, and fellows. While Doctor of Physical Therapy faculty, Center Coordinators of Clinical Education (CCCE), and directors of post-professional clinical programs (i.e., residencies and fellowships) can use the current findings to stimulate systemic changes to program designs and curricula to engage and facilitate translational learning of their learners. Moreover, future research initiatives should consider qualitative case series of beliefs, attitudes, and clinical instructors' behaviors across clinical sites or programs. Future investigations may also examine the feasibility or action design studies to gather information about, subsequently improve, how respective clinical, and educational setting(s) operate, conduct their teaching, and their resident and student learning [25].

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## Conflicts of Interests

The author declares no conflict(s) of interest with the writing and publication of this research and manuscript.

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## Appendix A

### Student Interview Protocol

**Participant Selection:** Using a random selection process, talk with several students about the faculty from whom they have learned the most. Then choose one who is most articulate and is willing to participate in a more in-depth interview. The student must sign the informed consent form and complete the demographic information sheet prior to the interview.

1. Tell me a little about yourself. What have your experiences been like at Stanford Health Care so far?
2. The purpose of this interview is to learn about students' experiences with educators/mentors who really enhance their learning. Who would you name during your residency as someone from whom you learned the most?
3. What does it feel like to be in this person's 'classroom' or in the clinical setting with this person? How does that compare to other mentors or clinical educational experiences where you don't learn as much?
4. Describe for me how this person taught in ways that helped you learn most. What specific things did he or she do in the class or in clinic and how did it affect your learning? (Give me some examples of what made this person stand out in your experience.) Note: Be sure to probe here for specific examples. This question is targeting the behaviors of the exemplary educator.
5. How did this educator change the way you think? How were you different after taking a class or mentor rotation with him or her?
6. How has learning from this educator affected who you are as a person? How have they done that?
7. If you were to choose one of the following as a metaphor for what learning from this professor has been like, which of the following would you choose and why:
  - (a) like a good book whose plot unfolds over time
  - (b) like a good TV show you enjoy
  - (c) like a journey we're on together
  - (d) like a great performance
  - (e) like being in someone's home
  - (f) other one you can think of

8. What advice would you give to educators or mentors who want to understand what helps students learn best?
9. Anything else you'd like to share with us?

### **Exemplary Educator Interview Protocol**

**Note:** You should observe the educator in a classroom setting *before* conducting the interview. Be sure the educator signs the informed consent form and fills out the demographic information form before the interview begins.

1. As you know, you were nominated by a student as an educator who helped them learn the most. So tell me a little bit about how you see yourself as a teacher. What was it that led you into the teaching?
2. What energizes you about being a Residency faculty member?
3. Parker Palmer says that “we teach who we are.” Does this ring true for you? If so, what does that look like for you? What aspects of yourself come through most clearly in your teaching? (Ask for an example).
4. How did you feel about the class I observed? (Probe for whether or not what you observed was a typical class session).
5. What do you think are your strengths as an educator? How do you capitalize on those when you are teaching?
6. Describe for me how you go about preparing to teach a class. What goes into that process?
7. From your experience, you probably have some thoughts about how students learn best. What do you think leads to effective learning? What goals do you have for student learning? [Note: we are targeting cognition here]
8. Describe a typical class session for me, if there is such a thing as a “typical” one. What do you think it is you actually *do* that helps students learn so effectively? [Note: ask for examples - we are targeting behavior here!]
9. How do you know you've done a good job? What evidence do you look for that students are learning what you are teaching?
10. Tell me about some of your best days as a teacher. What happens on days when you feel really good about your work? Now tell me about some of your worst days - what happens on those days when you don't feel as good about what you do?
11. If you were to offer advice to a new professor on the most important thing it takes to be a really effective teacher, what would that “one thing” be?
12. Anything else they want to add?

## Appendix B

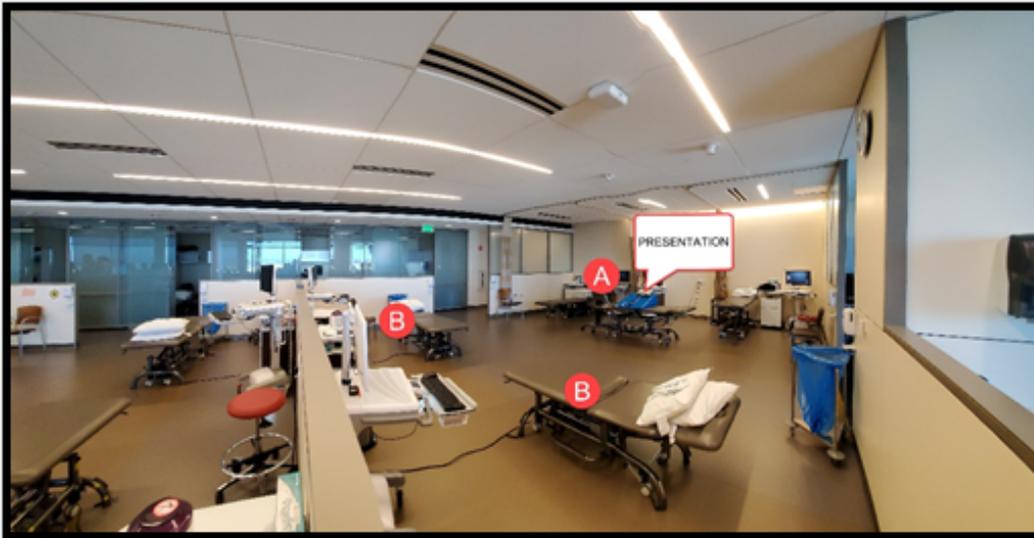


*Figure 2a: Setting of Student Interview*



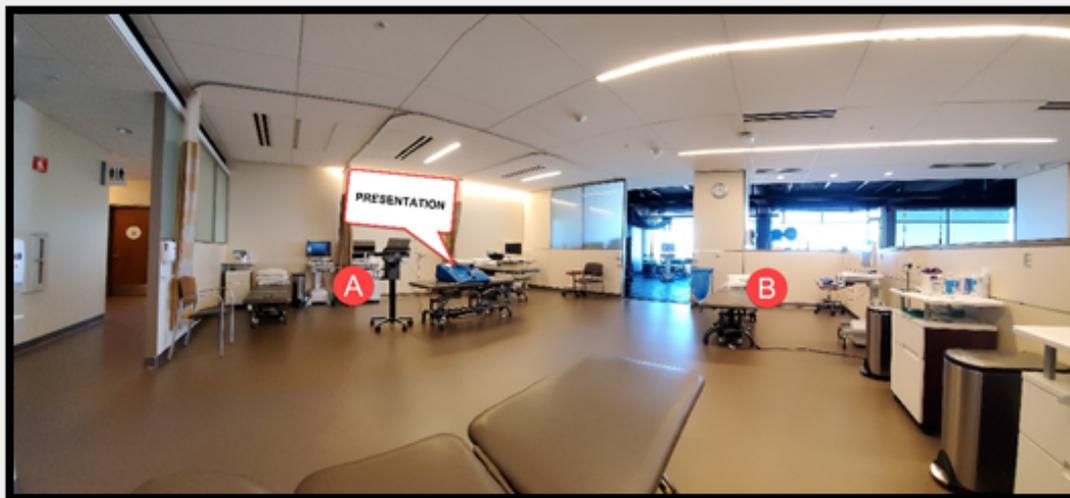
*Figure 2b: Setting of Student Interview Video QR Code*

*Note.* Scan QR code with mobile device using the camera app OR visit the following URL <https://photos.app.goo.gl/WBrBtfAKred8Rh5u9>



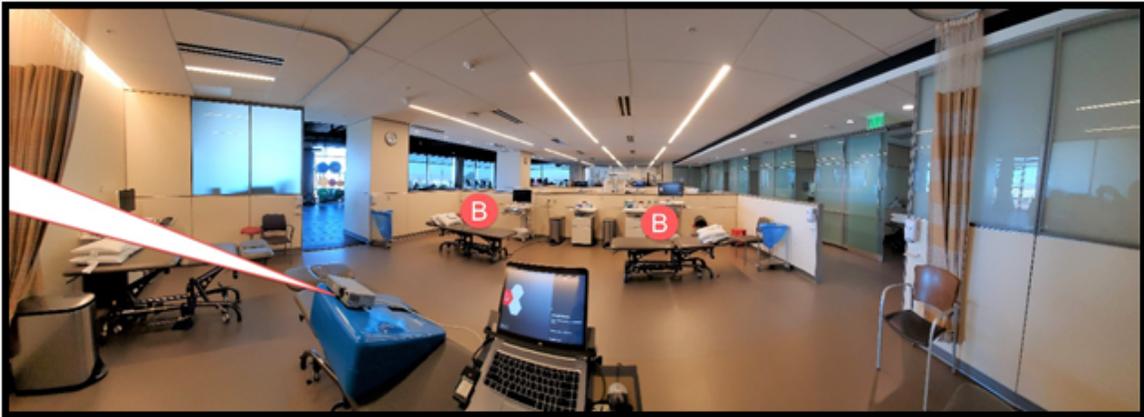
*Note.* A, represents the location of the Exemplary Clinical Educator; B, represents the location of the students.

**Figure 4a:** *Setting of Teaching Observation Investigator's View*



*Note.* A, represents the location of the Exemplary Clinical Educator; B, represents the location of the students.

**Figure 4b:** *Setting of Teaching Observation Student's View*

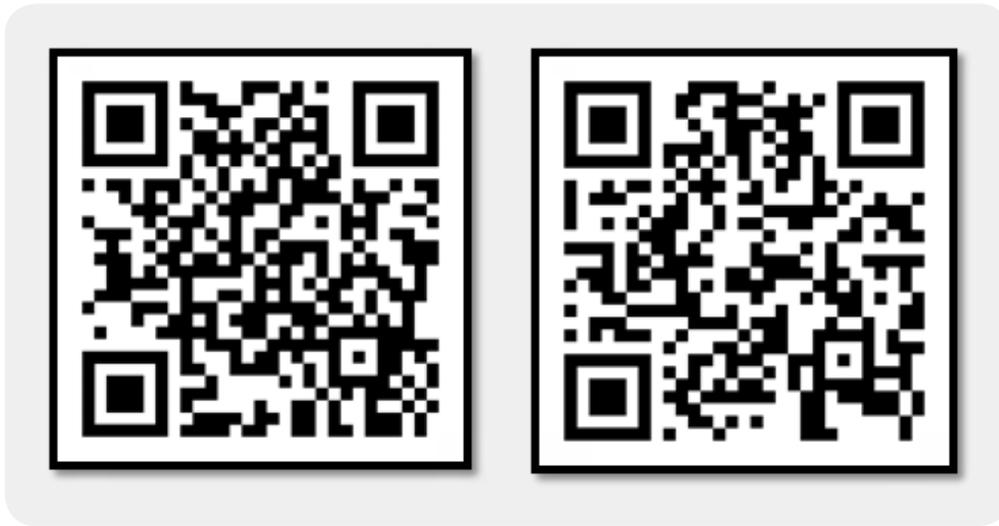


*Note.* A, represents the location of the Exemplary Clinical Educator; B, represents the location of the students.

**Figure 4c:** *Setting of Teaching Observation Exemplary Clinical Educator's View*



**Figure 4d:** *Setting of Teaching Observation Prior to Setup*



*Note.* Scan QR code with mobile device using the camera app OR visit the following URL [https://youtu.be/\\_Babi9phScI](https://youtu.be/_Babi9phScI) and <https://youtu.be/QH4uKVGKIFA>, respectively.

*Figure 4e: Setting of Teaching Observation Video QR Codes*

## Appendix C

### Student Informed Consent Form

You have been selected to participate in a research study being conducted as part of a doctoral class in Higher Education at Azusa Pacific University. The interviewer is a student in this class and the research is supervised by the course instructor whose name and contact number is listed below. This research study involves interviewing college students about professors who have helped them learn the most, in order to identify behaviors and attitudes of these effective faculty. The interview should last 30-45 minutes and will be taped so that it can be transcribed later.

I, \_\_\_\_\_, agree to participate in this interview with the full understanding that:

1. This is a research project for a class, so my interview will be taped and transcribed to be read by the interviewer, the course instructor, and the other class members.
2. No individually identifying information will be part of the written report that the class will read. All information about the participants will be held confidential. If any quotes are used in the written report, they will be either anonymous or the speaker's identity will be carefully disguised.
3. If at any time I am uncomfortable with a question or simply do not want to answer it for any reason at all, I can ask the interviewer to go on to the next question.

- 4. I am free to stop the interview at any time for any reason and do not have to state my reason to the interviewer.
- 5. I will have the opportunity to review the transcription of this interview and make any necessary corrections. I can at that time, for any reason, rescind my consent to use the interview in the written report.
- 6. I can request a copy of the final written report.
- 7. If I have any concerns about the research, I can contact the course instructor or Azusa Pacific University's Institutional Review Board to express those concerns at [disaak@apu.edu](mailto:disaak@apu.edu).

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name: \_\_\_\_\_

E-mail address: \_\_\_\_\_

Researcher:  
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Institutional Review Board:  
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Executive Director of Research & Grants  
Azusa Pacific University  
[disaak@apu.edu](mailto:disaak@apu.edu)

**Educator Informed Consent Form**

You have been selected to participate in a research study being conducted as part of a doctoral class in Higher Education at Azusa Pacific University. The interviewer is a student in this class and the research is supervised by the course instructor whose name and contact number is listed below. This research study involves interviewing and observing college professors who have been nominated by students as those who have helped them learn the most, in order to identify behaviors and attitudes of these effective faculty. The interview should last about 45 minutes and will be taped so that it can be transcribed later. The observation will be of one class session and will occur with prior arrangement and permission of the instructor.

I, \_\_\_\_\_, agree to participate in this interview and observation with the full understanding that:

- 1. This is a research project for a class, so my interview will be taped and transcribed to be read by the interviewer, the course instructor, and the other class members.

2. No individually identifying information will be part of the written report that the class will read. All information about the participants will be held confidential. If any quotes are used in the written report, they will be either anonymous or the speaker's identity will be carefully disguised.
3. If at any time I am uncomfortable with a question or simply do not want to answer it for any reason at all, I can ask the interviewer to go on to the next question.
4. I am free to stop the interview at any time for any reason and do not have to state my reason to the interviewer.
5. I will have the opportunity to review the transcript of the interview and make any necessary corrections. I can at that time, for any reason, rescind my consent to use the interview in the written report.
6. I can request a copy of the final written report.
7. If I have any concerns about the research, I can contact the course instructor or Azusa Pacific University's Institutional Review Board to express those concerns at [dissak@apu.edu](mailto:dissak@apu.edu).

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name: \_\_\_\_\_

E-mail address: \_\_\_\_\_

Researcher:  
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Institutional Review Board:  
Donald G. Isaak, Ph.D.  
Executive Director of Research & Grants  
Azusa Pacific University  
[disaak@apu.edu](mailto:disaak@apu.edu)

## Appendix D

### Supplemental Data Collection Files

#### *Observation Assessment Form*

[https://1drv.ms/w/s!ApLD5E1U1\\_Zn3ntG9AoedJk4uVUS?e=dDS16s](https://1drv.ms/w/s!ApLD5E1U1_Zn3ntG9AoedJk4uVUS?e=dDS16s)

### ***Interview Audio Recordings***



*Note.* Scan QR code with mobile device using the camera app OR visit the following URL <https://youtu.be/dvtGqFyb5v0> address.

*Figure 5a: Student Interview Recording QR Code.*



*Note.* Scan QR code with mobile device using the camera app OR visit the following URL <https://youtu.be/WUVVK29EM1Y> address.

*Figure 5b: Exemplary Educator Interview Recording QR Code.*

### ***Student Interview Transcript***

[https://1drv.ms/w/s!ApLD5E1U1\\_Zn3mbyVQHsOa9lsUPP?e=mN7Ck2](https://1drv.ms/w/s!ApLD5E1U1_Zn3mbyVQHsOa9lsUPP?e=mN7Ck2)

### ***Exemplary Clinical Educator Interview Transcript***

[https://1drv.ms/w/s!ApLD5E1U1\\_Zn3mL3exs-WCQelNlX?e=p9KhhgM](https://1drv.ms/w/s!ApLD5E1U1_Zn3mL3exs-WCQelNlX?e=p9KhhgM)