Use of video feedback in the evaluation of clinical instruction

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ABSTRACT

Introduction: The purpose of this study was to combine efforts, made by both the educational and the medical community in regard to utilizing videotape feedback, to train future clinical supervisors.

Methods: Thirty athletic training teacher participants were randomly placed in one of three equal groups where they were provided with the following interventions: a) teaching seminar and opportunity to observe video of teaching; b) teaching seminar; and c) control group. These groups were videotaped weekly for eight consecutive weeks while teaching clinical skills. The researchers analyzed the feedback provided by the teachers, using a modified version of the Fishman's Augmented Feedback Instrument.

Results: Allowing teachers the opportunity to view their videotapes showed that the teachers provided more total feedback to their students in a clinical setting. The two groups that received either a faculty development seminar or no intervention, provided similar amounts of feedback to their students. Unlike previous studies, it was noted that males provided more total feedback than females.

Conclusion:

Traditional faculty development may not be the ideal method to train clinical instructors. The study's results demonstrate that an intensive, focused workshop on effective teaching skills cannot be used as a stand-alone intervention to improve the frequency of feedback provided by clinical instructors. However, further research in this area is needed to assist in improving clinical instruction in medical health-related professions.

OVERVIEW BOX

What is already known on this subject

- Allied health educators are addressing the need for competent teaching in clinical education in order to achieve quality educational outcomes (i.e., established student competencies).

What this study adds

- For improvement to occur, the clinical instructor needs to be able to visually review his/her teaching in order to accurately self-assess one's instructional skills.

Suggestions for further research

- Studies on effective clinical instruction and improving clinical instruction in medical health related professions are needed.

FIVE PULL-OUT QUOTES (for commentaries only)

"Clinical education is an invaluable component of medical curricula for health related professional preparation." (p.5, ¶ 1)

"Medical health educators have noted that, in order to achieve quality educational outcomes (i.e. established student competencies), the clinical instructional-environment must be enhanced by competent teaching.[4]" (p.5, ¶ 1)

"Performance has been found to be most profoundly influenced when feedback or augmented feedback is directly related to what the learner has been asked to focus on during the performance.[7]." (p.6, ¶ 2)

"An untapped, yet emerging trend is the utilization of videotape feedback to train students in performing skills. Its efficacy is still questioned despite the reported favorable outcomes in other disciplines." (p.16, ¶ 1)

"The study's results demonstrate that an intensive-focused workshop on effective teaching skills cannot be a stand-alone intervention to improve the frequency of feedback provided by clinical instructors." (p.19, ¶ 1)

Use of video feedback in the evaluation of clinical instruction

Introduction

Clinical education is an invaluable component of medical curricula for health-related professional preparation. Finding time to implement the training of clinical educators has become a challenge because of the multiplicity of roles that the health care provider is expected to perform. Unfortunately, clinical instruction has lost importance, often being completely overlooked. In addition, many clinical instructors (CI) resist the need to be pedagogically trained, or mentored. Research shows that many clinical educators are practitioners who have rolled over into an instructional position, yet have no pedagogical background.[1] Although these clinicians have been found to be just as knowledgeable as individuals in an academic teaching environment, [2] it has been suggested that a shift in research focus be placed in order to ensure that clinical educators not only have requisite cognitive knowledge, but can effectively perform what they know. Development of a quality clinical teaching assessment tool is required to determine effective pedagogical principles.[3] Practical experience for a CI is important however, if one cannot effectively communicate or provide ample feedback to a student, it limits the learning experience for the student. Research on ineffective CIs is a new facet of clinical education that is rising to importance and is becoming a concern in many medical fields. Medical health educators have noted that in order to achieve quality

educational outcomes (i.e. established student competencies) the clinical instructional environment must be enhanced by competent teaching.[4]

Practitioners are the ones leading students through the discovery of theory to application. Ideally, in any of the professional settings, the associated clinical skills, or psychomotor competencies, would involve an ideal student-to-instructor ratio of 1:1, with a limit of 8:1.[5] Having effective communication skills when dealing with such an intimate number of learners, is an absolute and needs to become second-nature for the CI. Educational research indicates that strong communication skills are essential for effective clinical practice. A common technique used in effective communication is feedback. Improvement of communication skills have been consistent when the implementation of video review and feedback of student performance is utilized.[6]

Performance has been found to be most profoundly influenced when feedback or augmented feedback is directly related to what the learner has been asked to focus on during the performance.[7] This is critical to enhancing the learning process of performing psychomotor skills.[8] Due to the versatility of feedback, it is very common to see it used in "real world" skill learning situations.[9] The combination of feedback, along with video review of skill acquisition as been shown to be effective in the ability of self-assessment.[10] Some interventions using video feedback did not find statistical significance regarding improvement of performance. Deficiencies in the measures of performance and providing feedback negatively influenced the effectiveness of the video feedback.[11, 12] This process is not commonly performed and considered still new in the scope of research because of the reported difficulties of implementation and time investment.[6]

In athletic training (a health profession that is recognized by the American Medical Association) curricula, clinical instruction and/or experiences mirror medical curricula, in that students are placed in real-time situations under the guidance of practitioners in professional practice. This too, is a profession that is using practitioners to lead the clinical instruction of students who have minimal pedagogical background. Currently the only requirement to serve as an Approved Clinical Instructor (ACI) is to show evidence of having completed a five hour educational workshop hosted by the institution that focuses on effective teaching skills, every three years. Research by Curtis[13] suggests that interaction between supervisor and student positively or negatively affects the athletic training student's (ATS) growth and development in an athletic training education program.

The purpose of this study was to determine the effects of different instructional interventions over time on teaching behaviors in a controlled clinical athletic training setting. Approval was obtained by the institution's human review board.

Methods

Participants who were teaching consisted of 30 volunteer students (male = 53.3%; female = 46.7%) identified as upperclass athletic training students (ATS) enrolled in a Commission on Accreditation of Athletic Training Education (CAATE) accredited undergraduate ATEP in a Human Performance and Recreation Department (HPR). In order to be classified as an upper class ATS, the ATS had to successfully complete a taping and wrapping course with a grade of "B" or better; therefore, an assumption was made that they all had a comparable knowledge base because of the cohort design. None of the participants had prior teaching experience.

A total of 30 pre-professional students, or intended majors, volunteered to serve in the role of a student being taught skills by the upperclass ATS, or teacher. All student participants signed a form stating that they did have any previous knowledge of the skills that were being taught in the study.

Group One was the only teaching group given 25 minutes after each teaching session to view their recording. Following the viewing period, the researcher and the teacher discussed analysis of the teaching sessions in regards to feedback given to the student's skill performance. Group Two consisted of teachers who participated in the effective teaching seminar; however, they were not allowed to view their own teaching on videotape. Group Three served as the control group and did not attend the effective teaching seminar, nor were they allowed to view their videotapes.

Groups One and Two received training in a four-hour focused effective teaching seminar prior to the recorded teaching sessions. Three professors with a pedagogy background and more than 10 years of teaching and educational experience led the seminar. Topics included introduction to psychomotor skills, task analysis, demonstration, cueing, creating quality practice time, providing augmented feedback and making useful applications.

The designated teachers, students, and models completed an informed consent and a video release form, and were provided information pertaining to the institutional human review board approval. Teachers, subjects, and models were randomly assigned to Groups One (seminar and video), Two (seminar), and Three (control). Before conducting the study, some participants had to be switched between groups because of class conflicts.

Four volunteer doctoral students were randomly assigned as models for Groups One, Two, and Three across the eight weeks. The models did not speak and only responded to the direct instruction of the teacher and/or student. The sole purpose of the model was for demonstration and practice purposes.

A weekly teaching episode occurred for eight consecutive weeks throughout the spring semester. Each group received the same taping and wrapping skill instruction for various orthopedic pathologies for peer instruction. Within the three groups, all subjects were individually videotaped for every instructional session of the targeted skill. The targeted skills instructed by the teachers had already been mastered (with a passing score of at least 80%), as part of their pre-professional preparation courses. Videotaping occurred at the same time and designated location every week. In order to maintain continuity, each teacher was paired with the same student throughout the study. Each instructional session was filmed for a 20 minute duration. Although instruction may have lasted longer, it was not recorded.

Video records were made using a standard VHS video camera. In order to try to decrease the obtrusiveness and nervousness that the teacher and student may have faced while being videotaped, the video camera was placed in a dark room behind a glass window adjoining the office space,. Each teacher's recordings were compiled on a separate videocassette during the eight weeks of teaching. In order to clearly hear all verbal interactions between the teacher and student, a lavaliere microphone was used on every teacher when videotaping. This process reoccurred every week of the study for all Groups.

Fishman Augmented Feedback Observation Guide

In order to measure exhibited augmented teacher feedback, a slightly modified version of Augmented Feedback Observation Guide by Fishman[14] was used. The modification was the addition of the two subcategories, auditory, tactile and visual and no space. The Fishman tool was originally designed to record augmented feedback given by physical education teachers during the instruction of motor learning. This instrument was easily transferred for application with instruction of clinical skills taught in a medical health major.

The amount of feedback and the methodological and substantive type of feedback was observed and categorized using the modified Fishman tool. The definitions and descriptors are described in Table 1. Each teaching behavior was coded. When an item on the Fishman tool was observed, the primary investigator placed an "x" next to the appropriate type of feedback. At the end of each observational session, the researcher then tallied the total number of "x's" in each of the utilized categories and input them into the SPSS package.

Experts in the fields of motor learning and descriptive research established validity of the evaluation tool through a panel review. Reliability yielded a mean of 91.98% self-agreement overall.[14] For this study, intra-observer agreement of the primary and secondary investigators was 90%. Both intra-observer and inter-observer values were checked at equal points during the eight-week period to ensure drift was not taking place.

Table 1 Categories of the Fishman's Augmented Feedback Tool

FORM
Auditory: feedback provided orally
Auditory tactile**:** feedback provided orally and within manual assistance
Auditory visual**:** feedback provided orally and by teacher demonstration
Visual**:** feedback provided visually only
Tactile**:** feedback provided with manual assistance only
Auditory-tactile-visual**:** feedback provided orally, by teacher demonstration and with manual assistance

DIRECTION
Single student**:** feedback directed only one student
Group**:** feedback directed to more than one, but less than all students

TIME
Concurrent**:** feedback provided during the performance of a skill
Terminal**:** feedback provided after the performance of the skill

INTENT
Evaluative**:** provides an appraisal of the performance
Descriptive**:** provides an account of the performance
Comparative: provides an analogy related to the performance
Explicative: provides an interpretation of explanation of the performance
Prescriptive: provides instructions for the subsequent performance of the skill
Affective: provides an attitudinal or motivational set toward the performance. Can be positive or negative

GENERAL REFERENT
Whole: feedback provided about the multiple components in the performance of skill
Part: feedback provided about one component other than the outcome of the performance of the skill
Outcome: feedback provided about the result of the performance of the skill

SPECIFIC REFERENT
Rate: feedback provided about the time or duration of the movement involved in the performance
Force: feedback provided about the strength of power expended in the performance
Space: feedback provided about the direction, level or magnitude of the movement involved in the performance
No space: no specific influence provided by the teacher.

Results

For each Group (One-seminar and video; Two-seminar; Three-control), scores were obtained for total feedback, as well as totals over time for eight weeks, and totals for each category using Fishman's definitions. Data was entered into SPSS 14.0 (Scientific Package for Social Sciences) for statistical analysis. Descriptive statistics and one-way ANOVAs with Tukey HSD post hoc comparisons were obtained to describe the data and determine differences between the groups. The level of significance was set at $p<.05$. Selected socio-demographic variables are described in Table 2. There were slightly more males (53.3%) than females in the overall sample, and more females were found in Group One (70%), and fewer in Group Three (30%). The unevenness of numbers was due to class scheduling conflicts. Distribution of race was: Caucasians (80%); African-Americans (16.7%); and Asians (3.3%). Group One reported the most Caucasians (90%) and Group Three had the least (70%). There were more slightly more senior level students (56.7%) participating in the study than junior level students (43.3%), but the groups were split in regards to academic level. Effect size for the groups was examined using the eta-squared statistic, which describes the proportion of variance explained by the differences among groups.

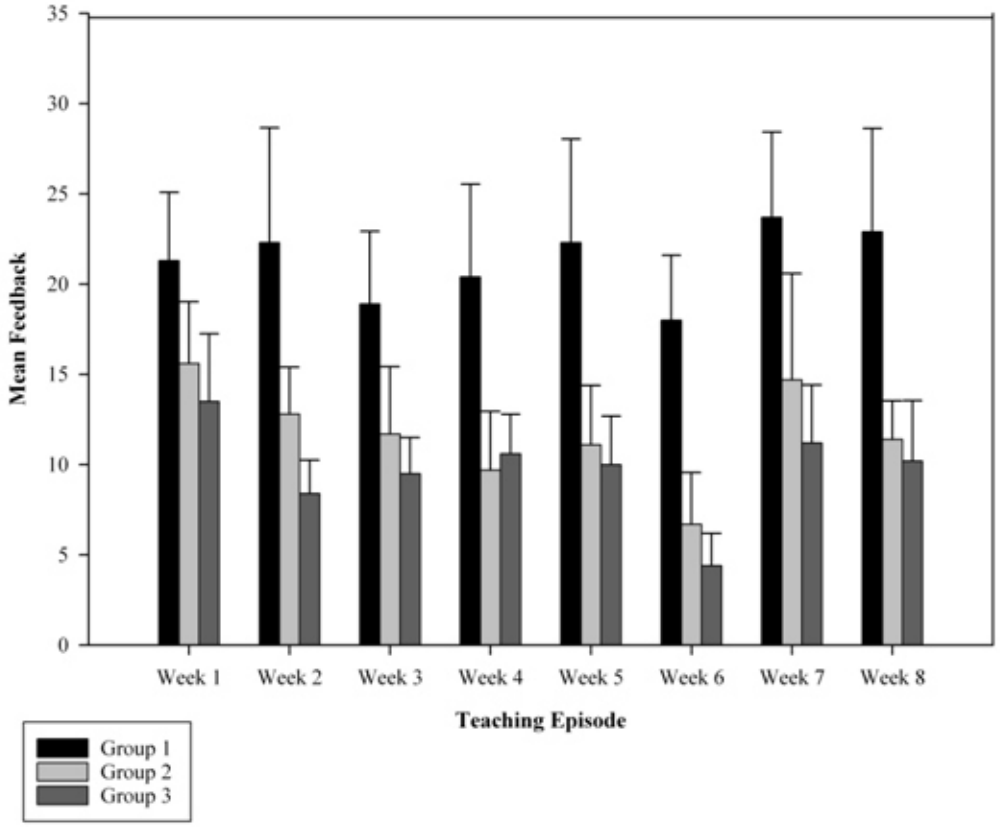
Partial eta-square statistics for total feedback time per teaching episode ranged from .256 (Teaching Episode One) to .707 (Teaching Episode Six). In figure 1 it is noted that mean feedback across teaching episodes for group one was always higher in the quantity of feedback provided across the eight-week period than in Groups Two or Three. Even though Group One did have seven males to the three females, the average total feedback scores within Group One showed males (198.6%) reported higher percentages

than females (157.4%). Furthermore, Group Three's males (80.5%) and females (66.3%) were unbalanced. Group 2 reported males (92%) and females (94%). Weeks three and six, among the groups showed a decrease in providing feedback.

Table 2. *Frequencies for sample characteristics for teaching participants*

	Group 1 (n = 10)		Group 2 (n = 10)		Group 3 (n = 10)	
Variables	No.	%	No.	%	No.	%
Gender						
Male	3	70	6	60	7	30
Female	7	30	4	40	3	70
Race						
Caucasian	9	90	8	80	7	70
African-American	1	10	1	10	3	30
Asian	0	0	1	10	0	0
Academic level						
Junior	5	50	4	40	4	40
Senior	5	50	6	60	6	60

Figure 1. Mean feedback across teaching episodes



When comparing differences among the groups, statistically significant results were noted in total feedback score ($F = 28.046$, $p < .001$), and total feedback for each episode including first ($F = 4.644$, $p < .05$), second ($F = 15.275$, $p < .001$), third ($F = 10.887$, $p < .001$), fourth ($F = 12.941$, $p < .001$), fifth ($F = 13.912$, $p < .001$), sixth ($F = 32.628$, $p < .001$), seventh ($F = 9.468$, $p < .01$), and eighth ($F = 15.491$, $p < .001$). Examining pairwise differences among the groups for total feedback time found that Group One to Group Two had lower mean differences than Group One did to Group Three for every teaching episode except for episode four. Pairwise comparisons for total feedback score and all eight teaching episodes are noted in Table 2.

Table 3 Significant pairwise differences among the groups for feedback time totals

Variable	Groups	Mean Difference
Total feedback	One and Two	76.10‡
	One and Three	92.60‡
First episode	One and Three	7.80*
Second episode	One and Two	9.50‡
	One and Three	13.90‡
Third episode	One and Two	7.20‡
	One and Three	9.40‡
Fourth episode	One and Two	10.70‡
	One and Three	9.80†
Fifth episode	One and Two	11.20†
	One and Three	12.30‡
Sixth episode	One and Two	11.30‡
	One and Three	13.60‡
Seventh episode	One and Two	9.00*
	One and Three	12.50†
Eighth episode	One and Two	11.50‡
	One and Three	12.70‡

* $p < .05$, † $p < .01$, ‡ $p < .001$

The following are the Fishman categories and subcategories that found statistically significant differences. Subcategories of the Form category were auditory ($F = 21.260$, $p < .001$), auditory visual ($F = 5.297$, $p < .05$), and auditory, tactile and visual ($F = 4.672$, $p < .05$). Time's subcatgories, concurrent ($F = 9.218$, $p < .01$) and terminal ($F = 13.650$, $p < .001$) had statistically significant differences, along with the subcategories for Intent, evaluative ($F = 20.989$, $p < .001$), explicative ($F = 9.876$, $p < .01$), and affective positive ($F = 7.983$, $p < .01$). Within the General Referent category, subcategories whole ($F = 4.114$, $p < .05$), part ($F = 4.734$, $p < .05$), and outcome ($F = 10.381$, $p < .001$) reported statistically significant differences. Lastly, there was a significant difference between groups in the Specific Referent subcategory of space ($F =$

19.791, $p < .001$). Pairwise comparisons for the differences between groups in the Fishman categories are noted in Table 3.

Table 4 Significant pairwise differences among the groups by Fishman category time totals

Variable	Groups	Mean Difference
Time concurrent	One and Two	34.50*
	One and Three	45.20†
Time terminal	One and Two	40.80†
	One and Three	46.60‡
Intent evaluative	One and Two	25.60‡
	One and Three	29.10‡
Intent explicative	One and Two	21.70†
	One and Three	21.20†
Intent affective positive	One and Three	29.40†
General referent whole	One and Three	17.90*
General referent part	One and Three	41.90*
General referent outcome	One and Two	34.50†
	One and Three	33.40†
Specific referent space	One and Two	77.10‡
	One and Three	81.60‡

* $p < .05$, † $p < .01$, ‡ $p < .00$

Discussion

An untapped, yet emerging trend is the utilization of videotape feedback to train students in performing skills. Its efficacy is still questioned despite the reported favorable outcomes in other disciplines. In a study conducted by Kpanja[15], it was noted that teachers, who used video recordings as feedback, showed significant teaching improvements over the control group. These teachers also behaved more confidently in their lessons as opposed to the control group. It is also believed that self-reflection,[16] along with video feedback, should be incorporated in an evaluation system for effective teaching. Another research study showed through microteaching, the teach-reteach cycle, that feedback behaviors of pre-service teachers changed through the repeated

opportunities of being able to practice and continue receiving feedback regarding the specific behaviors.[17]

Self-assessment is an integral component of one's professional growth. Srinivasan, Hauer, Der-Martirosian, Wilkes, and Gesundheit's[18] found that the combination of videotape and verbal feedback was needed in order to see improvement through self-assessment in clinical instruction. Further support emphasized that self-assessment without intervention and perspective could be performed inaccurately. It is believed that this provides additional support as to why Group One's frequency and demonstrated improvement of feedback occurred throughout the teaching sessions.

Although previous studies have noted that females demonstrated greater changes in communication than males[6], average total feedback scores in this study noted that the males demonstrated a greater change in communication skills than the females for Groups One and Three. Even though this was a noteworthy difference, the focus of this study was designed to address participants' skill level, not gender. In order to insure proper skill level distribution random assignment[11] occurred and the effect of gender was not addressed. The researchers felt it would have been a greater detriment to accommodate to gender rather than skill level.

An interesting observation was noted among the mean feedback scores across weeks (figure 1). Despite the fact that the groups were randomly assigned and had relatively equal distribution based on grade classification; Group One's initial number of feedback scores was notably higher than Group Two and Group Three. No identifiable differences in previous courses, or educational background, were noted among the groups. In order to insure that all groups were mutually exclusive, all three groups' data

collection was gathered concurrently. All Groups knew that they were going to be videotaped; therefore, they should have all experienced the same amount of anxiety. The researchers' only explanation for this phenomenon was the fact that Group One may have prepared more; perhaps, because they knew they were going to see themselves on videotape. This could have introduced an unforeseen limitation in the study. If this study was going to be replicated again, a suggestion would be not to inform the subjects that they would be placed in Group One and would be watching their videotape until after the first teaching episode.

Recognized limitations were noted throughout the study. A small sample size was difficult to control, due to the limited number of available participants based on participation criteria. Despite the sample size being small, it was representative of the professional population of athletic trainers. Another limitation may have been the progression selected for the material being taught. As it was addressed earlier, perhaps the limited number of components for skills taught during week three and six contributed to a marked decrease in providing feedback. This could be addressed by making each week's teaching episode increase in level of difficulty.

A final limitation was the fact that only a snapshot of time of teacher feedback was captured. By observing for a full semester, it would have enabled the researchers to identify the teachers' progression across time. Replication of this study needs to examine if the students' behaviors and successful completion of skills were influenced by the classifications in the teacher groups.

Conclusions

The study's results demonstrate that an intensive-focused workshop on effective teaching skills cannot be a stand-alone intervention to improve the frequency of feedback provided by clinical instructors. It is believed improvement occurred because Group One was able to visually review his/her teaching. Even though gender was not focused on within the context of this study, the noticeable difference in the amount of feedback provided by males is intriguing and warrants further research, especially since these findings go against previous research results.[6] In conclusion, the utilization of videotape feedback can assist in improving the amount of feedback provided by clinical instructors; however, further research in this area is needed to assist in improving clinical instruction in medical health-related professions.

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