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A Nod in the Right Direction? Designing a Study to Assess an Instructor's Ability to Interpret Student Comprehension from Nonverbal Communication

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A Nod in the Right Direction?
Designing a Study to Assess Teacher Ability to Interpret
Student Comprehension from Nonverbal Communication

Abstract

In the classroom environment, communication between instructor and student can be important to the learning process. While verbal messages are not always present during classroom communication, nonverbal messages are. Understanding factors which improve an instructor's ability to interpret student body language will help future generations of educators more effectively assess their classroom environment and engage students.

This paper focuses on the nonverbal communication occurring within classrooms; specifically the nonverbal messages sent by students and received by the instructor. It also describes the completed performance of a pilot study conducted to answer the research question of whether pedagogical experience influences an instructor's ability to assess student comprehension based strictly on nonverbal communication. The literature review for this paper highlights nonverbal communication research methods across a wide variety of disciplines.

The primary instrument utilized in the pilot study experiment is a series of 20 short video-only clips showing freshman college students providing written responses to a set of math questions. The video is muted to present only non-vocal, nonverbal behavior, and is framed to display the student's facial expression and upper torso body position. A sample population of instructors were shown these video clips and asked to assess the students' comprehension based on nonverbal behavior. Secondary instruments were developed to: collect the participant's assessment of student confidence, collect specific nonverbal behaviors identified by the participant in determining student confidence, and to collect demographic and pedagogical experience information, as well as specific prior nonverbal communication training background. This paper details the pilot study's methodology and draws general conclusions based on the findings.

The pilot program discussed in this paper will be used to inform the performance of a more extensive research study. Ultimately, it is anticipated that the full experiment's results, recommendations, and subsequent discussion will advance the body of knowledge needed to equip current and future instructors with the nonverbal communication training and skills to supplement their ability to quickly and accurately assess students in their classroom.

The pilot study discussed herein and planned full study have been designed to approximately replicate a previous study performed using K-12 teachers as the participants. No known prior attempts to generalize the study to a population of college-level instructors have been identified.

An Introduction to Nonverbal Communication

This paper focuses on the nonverbal communication occurring within a classroom, specifically the nonverbal messages sent by students and received by the teacher. When student verbal feedback during a lesson is minimal, due to either lesson presentation method or student personal communication preference, the teacher must rely on nonverbal cues to determine the effect of

their communication[1]. From Barry et al.[2], nonverbal communication generally falls within one of ten categories:

1. Chronemics – The timing of verbalizations and pauses
2. Haptics – Contact and deliberate touch between individuals
3. Kinesics – All forms of body language and body movement, including facial expressions, eye movement, gestures, and posture
4. Oculesics – The intentional and unintentional eye contact in the act of communication
5. Olfactics – The influence of odor
6. Physical Appearance – The characteristics of the body, clothing, and hairstyle
7. Proxemics – The arrangement of physical items and physical space
8. Silence – The absence of verbal and nonverbal communication
9. Symbolism – The meaning associated with symbols
10. Vocalics – The vocal impacts on the act of speaking, to include tone of voice, timbre, volume, and rate of speech.

Within the categories of nonverbal communication, this report focuses primarily on kinesics – the students' body language and body movement, including facial expressions, eye movement, gestures, and posture. The focus on kinesics is influenced by Jecker et. alt's[3] observation that "during the ordinary classroom presentation of a lesson…the teacher must rely predominately on nonverbal feedback – facial expressions and various bodily movements." Often, teaching methods which promote passive learning limit the range of communication channels available to students. This narrow range of channels is generally reduced to static displays, such as gaze direction, concentration expressions, and posture[4]. Kinesics itself is divided into unique categories. The number of categories of kinesics varies within professional literature, but is generally broken down into the following seven:

Gaze – gaze refers to the duration which a person's eyes are fixed on another person, object, or location. Sustained gaze can indicate interest. A student who maintains eye contact with a teacher during a lesson and displays relaxed facial and body positions may indicate positive interest in the lesson. A student who glares at a teacher and shows a frown or scowl likely indicates negative feelings for either the lesson or the teacher.

Facial Expression – facial expressions are described as movement and position of facial features (brow, eyebrows, and mouth). Facial expression can be categorized with head position as the two are often signaled together. Of the two, facial expression is given more prominence as a display of emotional affect. Head position can be used to indicate dominance. Smiling and frowning are the most easily recognized facial expressions displayed in a classroom. Smiling is generally believed to be an innate expression for comfort and agreement. In contrast, frowning can imply multiple emotions, which is why it is difficult to distinguish a concentration frown from an anger frown. The frown, by itself, does not distinguish whether the sender's concentration is due to interest or annoyance. Additional facial expressions include puzzled and surprised looks.

Body Position – is described as the lean or tilt of a person's torso and position of arms and legs. Posture signals a person's intentions. It can be thought of as the intention of a person's motion if they were to engage in motion. For example, leaning towards a person signals an increase in intensity and attention.

Eye Movement – eye movement is the direction and speed of a moving eye, and its movement frequency. Blinking can be included within this category as can gaze. Gregersen[5] conducted a study of the anxiety experienced by foreign language students during oral exams. The study found that non-anxious students glance and maintain eye contact with their instructor with greater frequency than their anxious counterparts. Non-anxious students were found to maintain slightly less than normal blinking frequency (the average person's spontaneous blink occurs at a rate of 14-17 blinks/minute) while anxious students blinked at a rate 1.5 times the average[5].

Gesture – involves hand and body movements which serve to emphasize a verbal statement (a geography teacher pointing to a map to indicate the location of a city), give form to an idea (a history teacher moving hands in the shape of a pyramid when describing a medieval social structure), or provide control and structure within a classroom (a student raising their hand to ask a question, a teacher identifying a student to speak by pointing at the student).

Self-Touch – takes many forms and may indicate multiple nonverbal messages. Self-touch includes touching the hand to the face or body. The touch may scratch; massage; adjust clothing, hair, or an accessory; or provide support as when the chin rests on a hand. Self-touch may also include the appearance of hanging onto oneself (when an arm is brought across the body to grip an opposite side of the body) or giving oneself a hug (tightly folding the arms in front of one-self).

Article Manipulation – is similar to self-touch adjustments. Manipulated articles often include small, handheld objects carried by a person or within a person's reach. Frequently manipulated objects include pens, pencils, papers, coins, and clothing accessories. Article manipulation is displayed by individuals who are anxious, non-attentive, or bored so it must be assessed in the context of other nonverbal signals. Looking out over a classroom, teachers frequently finds students who are flipping pencils between fingers or clicking pens[6].

As mentioned above, the frame of reference held by each person during communication has a direct impact on the verbal and nonverbal signals they send as well as their interpretation of the verbal and nonverbal signals they receive. Much literature investigates and reports on the impact of gender and culture on communication. The pilot study described herein incorporates both genders into its primary instrument.

How Teachers Process Student Nonverbal Information

To provide a pedagogical benefit, after teachers learn to identify the nonverbal cues of students' comprehension, they must be able to mentally process the information and make cogitative decisions to modify their lecture or otherwise engage with confused students. Successful teaching relies heavily on successful two-way communication between the teacher and students. While communicating a lesson, the teacher must continually assess the effectiveness of their communication. In one-on-one settings, feedback is often immediate and continuous. When a teacher addresses a small group, occasional verbal feedback is possible, but is largely limited. Student responses and questions are a useful source of immediate information, but these are often limited to a few students within a group. When addressing a sizeable class, the teacher

must use other means to assess the comprehension of students not actively responding or asking questions[1].

It is difficult, if not impossible, for a teacher to construct and present a lesson which is completely understood by every student. A multitude of classroom assessment techniques are available to teachers as means to check student understanding. Classroom assessment techniques may take the form of in-class or small group discussions or debate; probing questions from the teacher in line with Bloom's taxonomy; short writing assignments; class projects; or quizzes and tests[7]. The difficulty in using these assessment techniques is the time delay in receiving feedback of student comprehension. Projects, tests, quizzes, and written assignments must all be graded to assess comprehension. In-class or group discussion provides an expedited method for receiving feedback if the teacher is able to observe that each student is participating and correctly applying the lesson material. Questions by the teacher directed to individual students may provide opportunities for confused students to ask questions or afford the teacher an opportunity to clarify lesson points, but first the teacher must identify a student who looks confused. Rapid feedback assessment is gained when a teacher accurately assesses a student's comprehension at critical points during the lesson. It was Jecker et. alt's belief that nonverbal feedback provides useful cues in making such assessments[3].

To make use of nonverbal feedback, a teacher must first accurately observe the classroom. In addition to accurate observance, a teacher must understand the desired lesson outcomes and be able to differentiate the performance of each student regarding these outcomes. Teacher perception of student activity and actual student activity can be vastly different. Novice teachers may feel overwhelmed by the stimuli and misidentify critical student behavior or may misinterpret the behavior. Experienced teachers are said to have developed a feel for the classroom such that they are able to glance around the room and make sense of the same mass of stimuli[8].

Fortunately, for novice and expert teachers alike, research shows that training in student nonverbal behavior significantly increases a teacher's ability to correctly assess student comprehension from nonverbal behavior. During his 1965 experiment, Jecker[3] successfully determined that teachers who received 6-8 hours of training on student nonverbal cues showed a 7% increase in assessment accuracy of student comprehension when compared to their pre-training test.

Research Question

The focus of this paper is the development and execution of a pilot study to answer the question of whether pedagogical experience influences assessment of student comprehension from nonverbal communication. Understanding factors which improve teacher's ability to interpret student nonverbal communication helps future generations of teachers more effectively assess their classroom and engage students.

This pilot study proposes to achieve its goal by advancing a study conducted by Webb, et al.[9]. The hypothesis is based on cognitive development theory, specifically meta-cognitive development. The proposed research question is as follows:

Instructors with more teaching experience possess a developed schema and deeper problem solving techniques, and therefore, will respond with greater accuracy than instructors with less teaching experience, when evaluating student comprehension from nonverbal communication.

Literature Review

The literature review presented in this paper focuses on publications from 2011 to the present. A detailed synthesis of prior literature can be found in Barry et al.[10]. The literature review conducted by Barry et al.[10] found surprisingly little content specific to decoding student generated cues. A journal publication by Webb et al.[9] was identified by Barry as one of the few recent publications to test the ability instructors have to accurately interpret student nonverbal communication.

While very few publications discuss how teachers can identify and interpret student nonverbal cues, several interesting trends exist within recent publications. These include articles discussing research methods and results of action research as applied to the use of video and software technology to aid teachers with interpreting nonverbal behavior of students, and instructor use of nonverbal behaviors to create proximity within distance learning environments.

Several recent studies[11-13] have used cameras and video recognition software to conduct real-time analysis within a classroom. The availability of high-resolution video cameras, high speed processors, and high memory computers allow researchers to use software capable of detecting verbal and nonverbal behavior of recorded individuals.

Brown[13] used videos and computer software to simultaneously analyze the behavior of a teacher and corresponding behavior of her students. It was designed to serve as a tool to help school administrators clinically supervise and provide specific guidance to pre-service teachers.

Cooper[12] discussed the use of a virtual interviewing system (VIS) with real-time video monitoring in English as a foreign language (EFL) classes in Japan. Due to the difficult nature of learning EFL and the high student to teacher ratio (60:1), Cooper explored VIS as a detection tool to identify areas in real time where students struggled. Armed with a real-time assessment, VIS allowed teachers to intervene and provide clarification.

Despite the absence of recent discussion on decoding student nonverbal communication, several studies performed within the past decade provide useful instruments, procedures, and analysis methods from which a discussion can begin. Dickson and Burton's[14] investigated 9- and 13-year-olds' ability to recognize and interpret non-verbal communication accurately. While the overarching focus of this research sought to determine whether teachers consistently conveyed non-verbal messages and whether effective communication assisted with classroom management and behavior, their method for testing student recognition of nonverbal communication applies to this paper.

No discussion of nonverbal communication would be complete without acknowledgment of the influence of gender and culture on both the transmission and interpretation of nonverbal messages. The interested reader is directed to Barry et. al[2], Hall[15, 16], Helweg-Larsen et. al[17],

and Neill & Caswell[18] for a discussion related to gender influences. Further, see Barry et. al[2], Hartley & Karinich[19], Matsumoto[20], Neill & Caswell[21], Pease & Pease[22], Riggio & Feldman[23], and Suinn[24] for additional information related to the influence of culture.

Experimental Method

This section provides a detailed description of the instruments, population, and experimental procedures used to conduct the pilot study. The instruments used to conduct the pilot study include: Student Video Clips, a Participant Response Sheet, a Post-clip Interview, and a Post-session survey.

The Experimental Procedure

The completed pilot study was conducted as an individual interview between one of the authors and each volunteer participant. The experiments occurred at a location and time of the participant's choosing. Locations for the experiment included either the participant's personal office or a nearby conference room. The times for conducting each experiment varied, but generally occurred between 8am-5pm. In general, the sessions were completed in less than 60 minutes. After signing a consent form and receiving an overview of the experiment's procedures, the participant was shown the first video clip. At the conclusion of the clip, the video screen was blanked out and the participant was given upwards of 30 seconds to record their assessment of whether the student in the video clip appeared confident or not confident in answering the math question. During the clip, no additional information about the student's academic history, past performance, or environmental factors were given. After recording their answers, the investigator began recording audio and asked the participant to describe the specific behaviors (or lack of behaviors) exhibited by the student which supported their conclusion. Following this brief interview, the audio recording was paused and the next clip played. This process repeated itself for the remaining 19 video clips. After viewing the final video, the participant was asked to complete the post-interview survey.

Pilot Study Participants

During performance of the pilot study, the primary investigator was in residence at the University of Texas at Austin. Accordingly, participants in the pilot study were selected from Professors and Associate Professors currently teaching in the College of Education and the Cockrell School of Engineering at The University of Texas. The University of Texas at Austin is a research intensive university. Instructors possessing a wide range of teaching experience were invited to participate. Ideally, the experience range of participating volunteers would include 1st year professors through professors with multiple years of teaching experience. The pilot study sought approximately six volunteers. Instructors within The University of Texas at Austin College of Education and Cockrell School of Engineering were sought for convenience, but all instructors were welcome to participate. No restrictions were imposed to limit participants with respect to gender or ethnicity. Demographic information collected included the participant's prior teaching experience, data regarding completion of prior formal or informal nonverbal communication training, and ethnic background. Collected data was anonymized and linked only by a participant number. Table 1 provides a summary of the participant related data.

Years of prior teaching experience among the six participants ranged from four years to over 35 years. All of the participants had experience teaching at a public university (University of

Texas) and one participant also had prior experience teaching at a private university. There was a range of reported teaching level experience, with several participants indicating prior experience teaching at the primary and secondary school level, in addition to college-level. Three of the participants teach engineering and the other three teach either in education, science and/or English. Reported class size also captured a significant range. Two of the participants had no prior formal or informal nonverbal communication training. Two other participants reported no formal training, but were knowledgeable of the subject at a basic level as a result of reading occasional publications on the topic. The remaining two participants indicated having received formal training in nonverbal communication. Finally, four of the participants indicated that they were Caucasian and were raised in the United States (2 male and 2 female), one participant was a Caucasian born in the United States (male), but attended a US school in Mexico, and one participant was Asian born in China (male), but received his college-level education in the United States.

	Participant #					
	1	**2**	**3**	**4**	**5**	**6**
Gender	Male	Male	Female	Female	Male	Male
Years Teaching Experience	4	20	14	35	17	29
Public/Private Institution	Public	Public	Public	Public	Public	Public/Private
Teaching Level		Graduate / Undergraduate	Graduate / Undergraduate	Primary / Undergraduate / Graduate	Primary / Secondary / Undergraduate / Graduate	Secondary / Undergraduate / Graduate
Subject Area	Engineering	Engineering	Engineering	Physics	English, Science	Science / Education
Typical Class Size	8 - 15	2 - 35	10 - 80	15 - 400	8 - 25	10 - 25
Nonverbal Training	none	Attended a series of lectures on subject	none	Interpersonal communication training 30 years ago	Reads occasional papers and articles	Reads occasional papers and articles
Country of Origin	China	USA	USA	USA	US in Mexico City	USA

Table 1. Summary of Participant Data

Description of the Instruments: Student Video Clips

The primary instrument used in the this pilot study was a series of 20 short video-only clips showing freshman college students providing written responses to a set of 10 mathematics questions. The videos vary in length from 25 to 70 seconds and show each student in a traditional classroom setting, with classroom seating arranged in a 'U' shape. The use of short duration, video-only film clips is consistent with previous studies of teacher interpretation of student nonverbal behavior conducted by Jecker[1, 3], Webb et al.[9], and Allen & Atkinson[25]. Each video is framed to display the student's facial expression and upper torso body position. The audio in each clip is muted to focus the participant on assessing only kinesic forms of nonverbal communication (as described previously). See Figure 1 for example still shots of the student video clips. All students in the video clips were enrolled at the U.S. Military Academy, West Point.

The day of the taping, four cameras were placed throughout the classroom; each camera focusing on a selected student. The cameras were positioned to appear as if the entire class was being filmed – it was not obvious or announced that the cameras focused on four specific students. The entire class was told they would be taking a mathematics quiz as part of a research study on student confidence. The selected students took the same quiz as their classmates.

In addition to recording their answer, students were instructed to record their level of confidence in answering each question. Confidence level ratings included: 'not at all sure,' 'somewhat unsure,' 'somewhat sure,' sure,' and 'very sure,' using a five-point Likert scale.

Figure 1: Example still shots of student video clips.

After filming, the video clips were analyzed and matched with the student's score sheet. The test scores helped identify videos when the student correctly answered a question and possessed a high confidence level, as well as videos when the student incorrectly answered a question and possessed a low confidence level. After identifying high-confidence correct and low-confidence incorrect video segments, further scrutiny was applied to identify five video clips for each student (20 clips in total) that displayed the most overt forms of corresponding nonverbal communication.

Description of the Instruments: Participant Response Sheet

During the experiment, participants recorded each of their responses on an answer sheet. The participants were restricted to two responses, either 'The student appeared confident' or 'The student did not appear confident.' Adjacent to these two responses, the answer sheet provided five blocks for the participant to record their level of confidence in their assessment of the clip.

The five blocks used a Likert scale whose response labels ranged from 'Not at all sure' to 'Very sure.' See Appendix A for an example of the participant response sheet.

Description of the Instruments: Post-Clip Interview
After providing a response and confidence rating for each clip, the primary investigator asked the participant one question, "Please describe the student behaviors which indicated to you comprehension or non-comprehension." Participant responses were recorded using an audio recorder. The purpose of this instrument is to identify the nonverbal behaviors exhibited by the student that the participant believed indicated comprehension or non-comprehension. Similar to the 'think aloud' methods conducted by deGroot[26] during his *Thought and Choice in Chess* experiment, this instrument intended to frame an understanding of the participants' student behavior schema, breadth of metacognition, and problem solving methods used to reach a conclusion. Additionally, transcriptions of the audio recordings allowed for qualitative examination of the key words used by the participants. See Appendix B for an example of Interview Sheet.

Description of the Instruments: Post-Session Survey
At the conclusion of watching the 20 video clips, participants were given a multi-question survey (see Appendix C). The survey requested demographic information pertaining to gender, cultural background, highest level of education achieved; the participants' educational employment (school name where currently/previously employed, location, school type, years of employment, student grade level taught, participant taught, and average class size), an inquiry into any formal or informal training in nonverbal communication, and, if such nonverbal training had been received, the approximate time lapse since its completion. In their conclusion following completion of similar research, Webb et al.[9] suggested that future studies focus on the effects of nonverbal communication training, independent of teacher experience. This post-session survey sought to gather demographic information to aid in understanding the participant's particular teaching experience and nonverbal communication training.

Results and Discussion
Each participant's response was compared against the sample population and against the student's report confidence to identify whether overall nonverbal message discrepancies exist. The results of the expert and participant responses are provided in Table 2.

The percentages calculated in each row reflect the portion of the population that correctly matched their assessment (either confident or non-confident) with the students reported confidence for an individual video clip. Notably, there is a significant range in the percentage of matched results for individual video clips. A reported percentage of 100% indicates that all participants correctly matched their assessment with the student's reported confidence. Any clips with less than 50% matched results will be further evaluated and would not likely be used in the subsequent full study.

The percentages calculated in each column show the portion of correct matches for each individual participant. A calculated value of 75% indicates that the individual participant correctly matched their assessment with the student's report confidence on 15 of 20 video clips.

The shaded boxes in Table 2 are an indication of correct matches between the participants' assessment and the reported student confidence. On an aggregate level, the six participants correctly matched their assessment with the students' reported confidence on 78 of 120 (65%) of all videos reviewed.

			Participant #						
			1	2	3	4	5	6	
Video Clip #	Student Gender	Student Reported Confidence	Participant Assessment of Confidence						Percent of Participant Assessments Matching Student Report
1	M	NC	NC	NC	NC	NC	NC	C	83%
2	F	C	C	C	C	NC	NC	NC	50%
3	F	C	NC	C	C	NC	C	C	67%
4	M	NC	C	NC	C	NC	C	NC	50%
5	F	C	C	C	C	NC	C	C	83%
6	M	NC	NC	NC	C	NC	C	NC	67%
7	F	C	C	C	C	C	C	C	100%
8	M	C	NC	NC	C	C	NC	C	50%
9	M	NC	C	NC	NC	NC	NC	NC	83%
10	F	C	NC	C	C	NC	NC	NC	33%
11	M	C	C	NC	C	C	C	C	83%
12	F	C	C	NC	C	NC	C	NC	50%
13	M	C	NC	C	NC	C	C	C	67%
14	M	C	NC	NC	NC	NC	C	C	33%
15	F	C	C	NC	C	C	C	C	83%
16	F	NC	NC	C	NC	NC	NC	NC	83%
17	F	C	C	C	C	C	C	C	100%
18	M	C	NC	NC	C	C	C	C	67%
19	M	C	NC	NC	NC	NC	NC	NC	0%
20	F	C	NC	C	C	NC	NC	NC	33%
			50%	60%	75%	60%	75%	70%	**65%**
			Percent of Participant Assessments Matching Student Report						

C = confident response
NC = non-confident response

Table 2: Participant Assessment in Comparison to Student Reported Confidence

Participant #1 had the lowest percent of correct assessment matches (50%). Looking at Table 1 and Table 2 collectively, it can be seen that Participant #1 had the least amount of teaching experience and the literature would suggest that culture may have been an impediment to correctly identifying nonverbal signals.

Conversely, Participants #3 and #5 garnered the highest percent of correct assessment matches (75%). These participants had 14 years and 17 years of prior teaching experience, respectively.

Participant #4 had the most years of prior teaching experience (35 years) of all the participants, but only correctly assessed 60% of the videos she observed. Participant #4 also reported

receiving prior training in interpersonal communication; although, that was many years prior to participating in this pilot study.

Participant #2 has 20 years of prior teaching experience and reported having recently attended a series of lectures on the topic of nonverbal communication. This participant also correctly assessed 60% of the observed video clips.

Interviews and post-test surveys were each transcribed and then analyzed for content. Content analysis consisted of conducting a key word search of the transcripts. Key words included all the kinesics behavioral descriptions described in a prior section of this paper (Gaze, Facial Expression, Body Position, Eye Movement, Gesture, Self-touch, and Article Manipulation). Due to their frequent mention in the transcripts, key words for categories of Eye Movement, Mouth Position, Forehead/Brow Position, Eyebrow Position, and Timing were included in the analysis. The authors counted the type and frequency of each key word mentioned by each participant when describing the student video clips. The results were organized into the frequency of behavior occurrence for confident and not confident participant assessments and are presented in Table 3.

	Behavior Observed by Participants						
	Article Manipulation	Timing	Eye Movement	Gaze	Body Position	Self- Touch	Mouth
Assessed as Confident	52%	47%	44%	15%	15%	15%	11%
Assessed as Non-Confident	53%	47%	48%	12%	24%	41%	31%

	Behavior Observed by Participants					
	Facial Expression	Brow	Body Movement	Eyebrow	Gesture	Other
Assessed as Confident	8%	8%	8%	3%	3%	0%
Assessed as Non-Confident	16%	9%	5%	5%	9%	7%

Table 3. Summary of Reported Behavior Observed

The most common reported observed behavior was article manipulation. As noted previously, article manipulation is often displayed by individuals who are anxious, non-attentive, or bored. To be appropriately assessed, article manipulation must be considered in combination with other nonverbal signals. Both timing and eye movement were also commonly reported observed behaviors for both confident and non-confident assessments.

While the overall participant population size is too small to conduct any statistically significant data analysis, an attempt was made to look for a correlation between the percent of correct assessment matches and the reported number of years of teaching experience. Figure 2 presents the results of a basic correlation plot. A regression analysis of this data set indicates a positive,

but relatively small correlation coefficient (R). Further, the coefficient of determination (R2) for this data is also relatively small. Collectively, these results would suggest that the data set shows a correlation between years of teaching experience and ability to interpret nonverbal communication in the classroom environment. However, the relationship between those two variables would not be considered strong and the amount of variation in the ability to interpret nonverbal communication is only slightly explained by the number of years of teaching experience. Again, the population size for this pilot study is entirely too small to justify further analysis at this time.

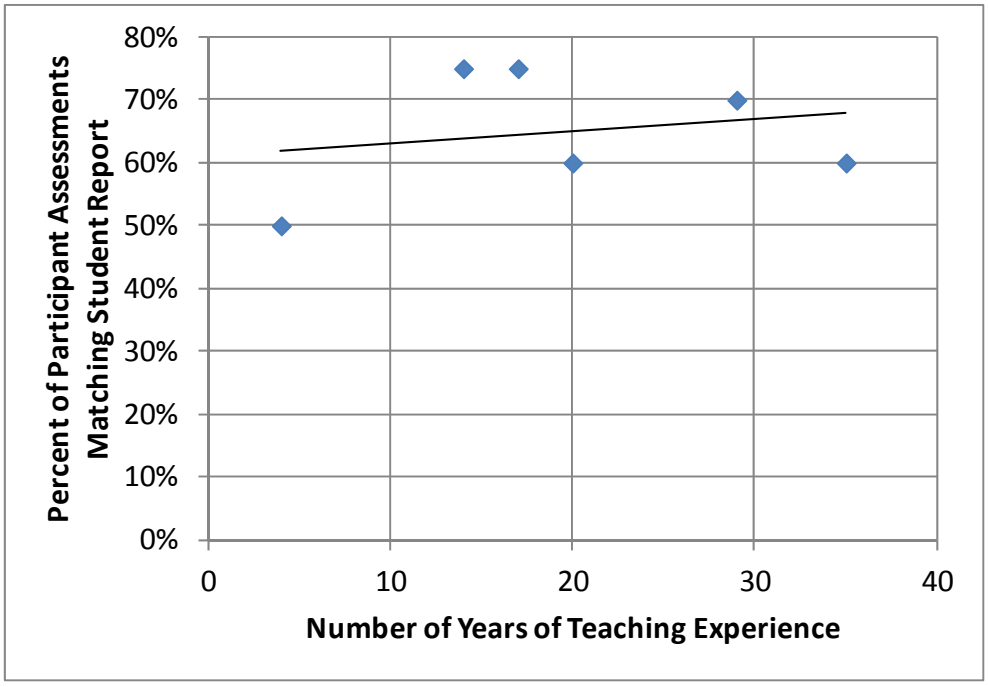

Figure 2. Correlation Plot

Conclusions

This paper presents the results of a pilot study developed, in part, to answer the question of whether pedagogical experience influences assessment of student comprehension from nonverbal communication. The pilot study was modeled after a completed study conducted by Webb et al.[9] and was designed to evaluate the following hypothesis:

> Instructors with more teaching experience possess a developed schema and deeper problem solving techniques, and therefore, will respond with greater accuracy than instructors with less teaching experience, when evaluating student comprehension from nonverbal communication.

There appears to be a positive correlation between years of teaching experience and the ability to correctly interpret nonverbal communication in a classroom. However, the strength of that correlation is questionable and the degree of influence of years of experience (versus other non-identified variables) is relatively weak. As Jecker et. al[3] proved and Webb et. al[9] suggested,

specific training in the area of nonverbal communication may be a stronger variable than simply years of teaching experience.

While the population size prohibits making more definitive conclusions relative to the stated research question, the pilot study was still immensely beneficial. The secondary goal of performing the pilot study was to assist in the process of refining our experimental procedures and improving our data collection instruments. Feedback provided by pilot study participants is greatly appreciated and will strengthen the subsequent, full study.

The experiment's results, recommendations, and subsequent debates will advance the body of knowledge needed to equip current and future teachers with training and skills which supplement their ability to quickly and accurately assess the students in their classrooms. By observing and interpreting students' body language and facial expressions, perceptive teachers are equipped with an accurate, and near instantaneous, assessment method. Rapid, individual assessments, applied throughout a lesson, maximize the teacher's opportunity to impart learning into each and every student.

Disclaimer

The views expressed in this document are those of the authors and do not reflect the view expressed or implied of the U.S. Military Academy, U.S. Army, or the Department of Defense.

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Appendix A – Answer sheet used by participants during the pilot study

Participant Number: _____

	Does the student appear:		Rate Your Confidence in Your Assessment				
			1	2	3	4	5
Video Clip	Confident	Not Confident	Not at all sure	Somewhat unsure	Somewhat sure	Sure	Very sure
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

Appendix B –Sample of post-video interview questionnaire used during the pilot study

Post-Video Clip Interview Questions for Influence of Pedagogical Experience on Assessing Student Comprehension from Nonverbal Communication Pilot Research

Clip #1:
Please describe the student behavior which indicated comprehension or non-comprehension:

Clip #2:
Please describe the student behavior which indicated comprehension or non-comprehension:

Clip #3:
Please describe the student behavior which indicated comprehension or non-comprehension:

Clip #4:
Please describe the student behavior which indicated comprehension or non-comprehension:

Clip #5:
Please describe the student behavior which indicated comprehension or non-comprehension:

Clip #6:
Please describe the student behavior which indicated comprehension or non-comprehension:

Clip #7:
Please describe the student behavior which indicated comprehension or non-comprehension:

Clip #8:
Please describe the student behavior which indicated comprehension or non-comprehension:

Clip #9:
Please describe the student behavior which indicated comprehension or non-comprehension:

Clip #10 - #20:
Please describe the student behavior which indicated comprehension or non-comprehension:

Participant Number: _____

Post-Session Survey for Influence of Pedagogical Experience on Assessing Student Comprehension from Nonverbal Communication Pilot Research

Nonverbal Communication is defined as: All aspects of message exchange without the use of words. It includes all expressive signs, signals, and cues. Nonverbal communication includes the tone, loudness, speed, and timing of the words used in communication, but it does not include words and their associated meanings. Nonverbal communication is often grouped into various categories such as: Orientation, distance, posture, gesture, diffuse body movements, facial expression, gaze direction, use of artifacts, tone of voice, and rate, amount and fluency of speech. The categories pertinent to this study include: Kinesics - All forms of body language and body movement, including facial expressions, eye movement, gesture, and posture; Oculesics - Intentional and unintentional eye contact in the act of communication; Physical Appearance - Characteristics of the body, clothing, hairstyle, etc.; Use of Artifacts - manipulated objects in contact with the interacting person.

National Origin: _____

Please describe your teaching experience:

Level of education and year achieved

	Year Achieved
Undergraduate	
Graduate	
Doctorate	
Post Doctorate	

Please describe the teaching positions you currently hold, and those held in the past:

School Name	Location	Type of School (Public, Private)	Starting Year	Ending Year	Level (Primary, Secondary, Undergrad, Grad,)	Subjects Taught	Range of Class Size Taught

Have you received any formal instruction in nonverbal communication?

If so, please describe: _____

Have you received any in-formal instruction in nonverbal communication (Conferences, journal reading, continuing education, etc.)?

If so, please describe: _____

If you received any formal or in-formal nonverbal communication instruction, when did it last occur?