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Assessing Preservice Teachers' Presentation Capabilities: Contrasting the Modes of Communication with the Constructed Impression

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Abstract: A research-based understanding of how to develop and assess classroom presentation skills is vital for the effective development of pre-service teacher communication capabilities. This paper identifies and compares two different models of assessing pre-service teachers' presentation performance – one based on the Modes of Communication (voice, body language, words, and alignment between those elements) and another based on features of the Constructed Impression of the communication acts (confidence, clarity, engagement and appropriateness). The Modes of Communication and the Constructed Impression of 164 pre-service teacher presentations were rated. The Constructed Impression model provided a better fit to data, while averaging of Modes of Communication elements offered more accurate prediction of overall score. All elements in both models made a significant contribution to the overall perception of communication performance. The study also reports on the relative contribution of voice, body language, words and alignment to the perceived confidence, clarity, engagement and appropriateness of the pre-service teacher presentations. Implications for developing pre-service teachers' presentation capabilities are also discussed.

Introduction

Principals, teachers, teacher educators and researchers are in general agreement about the important role that effective communication plays in high quality teaching (Johnson, 1994; Johnson & Roellke, 1999; Worley, Titsworth, Worley, & Cornett-DeVito, 2007). Teacher communicative effectiveness has been shown to correlate with teacher credibility and perceived teacher competence (Rubin & Feezel, 1986), as well as influence student achievement (Rink, 2010). Positive relationships have been found between students' perceptions of their teachers' communication behaviours and students' attitudes toward their subject (She & Darrell, 2002). Effective communication has been associated with less need for disciplinary intervention (Gillies, 2004).

In Australia, the new National Professional Standards for Teachers (NPSTs) (Australian Institute for Teaching and School Leadership, 2012) explicitly identifies effective classroom communication as a key focus area. For instance, NPST 3.6 requires graduate teachers to

"demonstrate a range of verbal and non-verbal communication strategies to support student engagement". Similar communication standards pervade in the UK (Training and Development Agency, 2007) and throughout state jurisdictions in the US (for instance as part of the widely used Californian Standards for the Teaching Profession, California Department of Education, 2009). Research suggests that practice and training are crucial in order to improve communication capabilities (Rubin, Rubin, & Jordan, 1997; Seibold, Kudsi, & Rude, 1993). Not surprisingly, and perhaps on this basis, researchers and teacher educators advocate the inclusion of communication training development activities into teacher education programs (Hunt, Simonds, & Cooper, 2002).

Keyton, Beck, Messersmith and Bidel (2010) highlight the difficulty of evaluating communication behaviours, and the critical need for better tools to assess communication and provide feedback in order to improve practice. Effective feedback allows people to not only improve their communication performance, but also affective aspects of communication such as their confidence and willingness to communicate (Authors, 2011). Practising speaking skills is also important to reduce communication apprehension (Richmond, 1984), a condition which has been repeatedly shown to negatively impact on people's communication ability (Allen & Bourhis, 1996). Students value communication capabilities and appreciate having this explicitly developed as part of their university curriculum (Bower & Richards, 2006; Cronin & Glenn, 1991).

Throughout the last four decades research studies in communication have reflected a diversity in emphases, varying from investigations of the way in which people use non-verbal communication to studies of the perceived and actual social influence of different communication strategies (Berger, 2005). Similarly, there is a range of methodologies for studying communication, with variations including the unit of analysis, qualitative examination of constructed meaning versus the frequency of behaviours, or the way in which people encode and decode different sorts of behaviours (Hall Koivumaki, 1975). Perhaps it is this inherent theoretical and methodological diversity that has lead to such a variety of research instrument designs and epistemologies in the communication assessment field.

This article compares two philosophically different models of communication evaluation in the context of pre-service teacher presentation capabilities. The first model positions its focus on concrete aspects of presenter behavior such as voice, body language, words, and the alignment between those features. This more elemental emphasis has featured in popular and contemporary communication assessment instruments (Morreale, Moore, Surges-Tatum, & Webster, 2007; Yamashita & Nakajima, 2010) and will be referred to as a Modes of Communication approach. The second model bases its assessment upon the impression that the communication acts make on the audience, including the perceived confidence, clarity, engagement and appropriateness of the presenter. More holistic constructs have been applied in other communication assessment frameworks (Blunck, 1997; de Vries, Bakker-Pieper, Konings, & Schouten, in-press; Iramaneerat, Myford, Yudkowsky, & Lowenstein, 2009) and in this study shall be referred to as a Constructed Impression approach. As well as comparing the efficacy of these two models this study also examined the way in which the Modes of Communication contribute to the Constructed Impression of pre-service teacher presentations, which contributes to an overarching understanding of communication praxis. Research literature from both inside and outside the Education field has been synthesised in order to rigorously inform how body-language, voice, words and their alignment relate to confidence, clarity, engagement and appropriateness in this teacher education setting.

Approaches to Assessing Communication and their Instruments

A variety of instruments have been created to assess an assortment of face-to-face communication capabilities; for instance, the ability to present, socialise, coach, and work in teams (Morreale et al., 1996). However, assessing face-to-face communication such as presentation skills can be more challenging than assessing writing or reading skills, in part due to the subjective nature of non-verbal behaviours (Jones & Richarde, 2005). It is perhaps for this reason that of 45 instruments reviewed by the Office of Educational Improvement (Morreale et al., 1996) for assessing listening, interpersonal skills, public speaking, communication apprehension, conflict management and other 'various dimensions of communication' in non-discipline specific contexts, the majority is comprised of written tasks and only five involved an actual presentation by students. While there is contention over whether competent communication is more a matter of knowledge or demonstrated performance (Blunck, 1997), assessment of communication capabilities should contain a behaviour sample (Daly, 1994) because knowing about the components of effective communication does not necessarily mean people are able to apply that knowledge during an actual performance (Jones & Richarde, 2005).

One approach to examining communication performance focuses on the way modalities are used together to create messages (see Jewitt, 2006; Kress, Jewitt, Ogborn, & Tsatsarelis, 2001). A variety of skills that underpin spoken communication have been identified, such as choice of words, vocal variety in rate, pitch, intensity, clear articulation, employing appropriate language, and demonstrating nonverbal behaviour that supports the verbal behaviour (National Communication Association, 1998). The way in which the 'Modes of Communication' (body language, voice and words) combine to create and share meaning has been the focus of well renown and influential communication research (for instance, Knapp, 1972; Mehrabian & Ferris, 1967).

There is a range of assessment instruments that focus on how students use their modes of communication. Possibly the most well-established of these is the 'Competent Speaker' instrument used by the Speech Communication Association of America (Morreale, et al., 2007). This instrument assesses student presentations based on elements such as their organisation, language, voice and physical behaviours. As another example, Yamashita and Nakajima (2010) assess oral, visual, content, and resources elements to assess students' presentation capabilities as part of an online a video-based training system. While such models of communication assessment provide a clear identification of the mechanical elements requiring student attention, they do not incorporate knowledge of and adaptation to interaction in a particular context such as the classroom, particularly the constructed perceptions of the pupils..

A different understanding of the operation of language and communication emerges from the work of Firth (1966) and his student Halliday (1978), who pioneered approaches which attend to the operation of language and communication in their social context. Under such approaches communication must be adapted to the audience to whom it is addressed, and to the purposes and intents of the speaker. Some argue that effectiveness in communication can only be judged by reference to the contextual and communicative purposes for which language is employed (Babcock, 1954). This is especially true for pre-service teachers as they prepare to teach.

Aligning with this second approach, a number of communication assessment studies focus on assessment by audience of qualitative perceptions of higher-level constructs, with little or no emphasis on speaker modes of communication. For example, Iramaneerat, Myford, Yudkowsky and Lowenstein (2009) investigated the effectiveness of an instrument for measuring medical

practitioner to patient communication abilities. The instrument contained category descriptors for 13 items such as "friendly communication", "respectful treatment", "interest in me as a person", and a range of other criteria that operate exclusively at the level of patient interpretation of higher order communication constructs, excluding the actual way that words, sounds and body language are being used to communicate messages. Similarly, in the area of optometry, instruments have been used to assess the ability to perform professional tasks such as "discuss controversial health-related topics with patients" and "communicate with support personnel in a professional setting" (Gross, Zoltoski, Cornick, & Wong, 2000). Because these sorts of instruments do not operate at the level of how to use communication acts (words, voice, and body language) they may be limited in helping students to improve their communication performance.

Other approaches have attempted to assess communication styles in terms of the personality traits they appear to represent, as perceived by the interlocutor or audience. The Communication Styles Inventory (CSI) is a six-dimensional behavioural model of communication styles and their relation with personality (de Vries, et al., in-press). The CSI distinguishes between six domain-level communicative behaviour scales: Expressiveness, Preciseness, Verbal Aggressiveness, Questioningness, Emotionality, and Impression Manipulativeness. Interpersonal communication competence has been similarly assessed on a range of impression elements such as interaction management, empathy, affiliation support, behavioural flexibility and social relaxation (Weimann, 1977). While such communication assessment approaches have the potential to provide communicators with feedback on their underlying attributes of communication, they remain limited insofar as they do not specifically address the sorts of concrete component skills that individuals may need when interacting or presenting, such as when a teacher is giving a lesson.

Some communication evaluation instruments focus on both the modes of communication and the constructed impression in an attempt to create more holistic and meaningful assessment of communication. Blunck (1997) proposes a matrix for assessing communication that incorporates both modes of communication (verbal and non-verbal) as well as elements relating to the constructed impression (effectiveness, appropriateness, and responsiveness). In the area of Health Science, Scheffer, Muehlinghaus, Froehmel and Ortwein (2008) argue the validity of a global rating scale incorporating elements of empathy, coherence, verbal expression, and non-verbal expression. In order to evaluate communication training, Seibold Kudsi and Rude (1993) not only examine delivery elements such as eye-contact, gestures, volume, and vocal variation, but also broader presentation elements such as clarity and dynamism. While all three of these models do incorporate both modalities and the higher level constructed impression, they do not explicitly consider alignment between the modalities. As well, Blunck's (1997) instrument is vulnerable to confounding of effectiveness with the other constructed impression elements, the Blunck (1997) and Scheffer et al. (2008) instruments do not distinguish body language from vocalics, and the Scheffer et al.(2008) and Seibold et al. (1993) models only include two constructed impression elements. None of the models analyse the interactions between elements.

Despite the limited scope of the Modes of Communication and Constructed Impression elements outlined in the three previous composite models, incorporating both dimensions in the assessment of communication provides the opportunity to compare how they each contribute to communication performance. Analysing the Modes of Communication elements in conjunction with the Constructed Impression elements also enables students and researchers to understand how the various elements of each dimension are interrelated.

Body Language, Voice, Words, and their Alignment

Throughout the research literature Modes of Communication elements (vocal, visual, verbal) have repeatedly been shown to influence the creation of meaning. For instance vocalic elements such as loudness, pitch, and timing (i.e., speech rate and rhythm) are important characteristics of any spoken communication performance (Pittam, 1994). The pitch, variation, and rate of a speaker's voice have been found to influence audience perception of the authority of the speaker (Tusing & Dillard, 2000). Persuasiveness has been shown to depend on fluency of speech and pitch variety (J. K. Burgoon, Birk, & Pfau, 1990). In the field of education, vocal qualities, such as the teacher's rate of speaking, variability in tone and pitch, and volume, have been shown to enhance teacher clarity (J. C. McCroskey, Richmond, & McCroskey, 2006) and influence students' perceptions of their teachers (Hinkle, 2001; Richmond, 1984).

Non-verbal communication forms a fundamental part of quality teaching, and as such features in communication assessment instruments such as the Teacher Communication Questionnaire (She & Fisher, 2002). The use and positioning of the speaker's body may influence the extent to which they are perceived to be engaging other people in communication (Robinson, 1998). Visual cues have been found to make a greater contribution to communication of emotional meaning than audio cues, though this can depend on the emotions being conveyed (Burns & Beier, 1973). Communication competence has been found to depend on facial pleasantness and expressiveness, whereas persuasiveness was positively correlated to vocal pleasantness (especially fluency and pitch variety) (J. K. Burgoon, et al., 1990). Persuasiveness has also been positively correlated with facial expressiveness, and bodily relaxation (J. K. Burgoon, et al., 1990). Effective non-verbal support in the Science classroom has been found to correlate to higher levels of student achievement (She & Fisher, 2002). Analysis of non-verbal teacher communication in the English as a second language classroom suggest that gesture and other non-verbal behaviour make a salient contribution to the language acquisition process (Lazaraton, 2004). The power of words and non-verbal strategies used by teachers have also been found to be particularly influential in particular contexts, for example, in interaction with Attention Deficit Hyperactivity Disorder student behaviours (Geng, 2011).

The verbal content or 'words' that are used in a presentation undoubtedly play a fundamental role in teaching. For instance, teaching using more positive language in the form of confirmation can lead to greater cognitive and affective learning, as well as less challenging student behaviour (Goodboy & Myers, 2008). Language elements become more important than non-verbal modalities as the purpose of the communication act shifts from communicating emotional to factual meaning (J. K. Burgoon, 1985). In experiments by Merhabian and Ferris (1967) 93% of the emotional meaning communicated by actors was attributed to non-verbal elements. However in a presentation context, while auditory and visual elements can enhance a presentation, the content of the speech plays a much more significant role than is often assumed (Marsh, Hart-O'Rourke, & Julka, 1997). In an analysis of the relative contribution of different communication modes on the persuasiveness of presentations, Jackob, Roessing and Petersen (2011) concluded that auditory and visual stimuli could either enhance or detract from the persuasiveness of a presentation depending upon how they were used. Other research supports the general conclusion that language choice and the sequencing of ideas have a critical influence on the quality of a presentation (Blunck, 1997).

The effect of perceived alignment between body-language, voice and words has also been of interest to researchers. In an education context, congruence between verbal and non-verbal

messages from the teacher have been implicated as influencing the effectiveness of classroom management (Brown, 2005). When verbal and non-verbal cues are incongruent, there is greater credence given to the latter rather than to the former (M. Burgoon, Hunsaker, & Dawson, 1994). In experiments on incongruent communication, non-verbal cues were 3 to 4 times more important in the attribution of superiority/inferiority than were the verbal statements (Argyle, Salter, Nicholson, Williams, & Burgess, 1970). The way in which verbal and non-verbal communication constructs are blended can also enhance the perceived sense of presentation clarity (Argyle, et al., 1970).

Clarity, Appropriateness, Engagement and Confidence

Throughout the literature Constructed Impression elements of confidence, clarity, engagement and appropriateness have been associated with the quality of presentation performance. Teacher clarity has been associated with positive student achievement (Hines, Cruickshank, & Kennedy, 1985), as well as affective learning and student motivation (Comadena, Hunt, & Simonds, 2007). Clarity as a communication element has formed part of assessment instruments such as the Quality Measures of Teaching Performance Scale (Werner & Rink, 1989) and has at times been used as an objective measure of teaching performance in educational research (Rubin & Feezel, 1986). Clarity can be explained in terms of perception as "the degree of effort required by an active listener to understand a speaker's delivery in any given situation" (Millar, 1993, p. 288). Clarity is a fundamental component of ensuring understanding, which Bartsch (1987) defines as the "overall goal of communication" (p. 287). Perception of clarity of communication is often related to phonetic and paralinguistic phenomena, such as notions of pragmatic and auditory correctness (Millar, 1993). Based on an analysis of texts that focused upon elocution, public speaking, voice training, and remedial speech education, Millar (1993) proposed that clarity depends on pronunciation and articulation, rate and rhythm, loudness, pitch and voice quality.

Appropriateness involves the impact on the audience of the speaker's knowledge of and adherence to social rules, norms, and pragmatics (Westmyer, Di Cioccio, & Rubin, 1998). The impression of appropriateness depends upon the meaning as communicated by speakers and interpreted by listeners (Yule, 1996). Social appropriateness depends on the context in which the communication episode is being enacted (Kellermann & Park, 2001). Language choice is also an espoused component of appropriateness (Blunck, 1997). Dohen, Schwartz and Bailly (2010) see appropriateness as the true challenge of communication, "to take into account and integrate information not only from the speakers but also from the entire physical environment in which the interaction takes place" (p. 477).

Engagement has been shown to positively correlate with teacher confidence, which in turn is positively related to student performance (L. L. McCroskey, Richmond, & McCroskey, 2002). Teachers who use appropriate eye contact, gesturing and moving around the classroom, smiling, voice modulation, and humour have been found to be highly effective in engaging students (Hsu, 2010). In the area of persuasion, greater vocal pleasantness (especially fluency and pitch variety), kinesic and proxemic immediacy, facial expressiveness, and kinesic relaxation all play an important role (J. K. Burgoon, et al., 1990).

Confident communication has been associated with expert and experienced teachers (Webster, 2010). Behaviours associated with confidence include good eye contact, strong voice, and limited adaptive gestures (Blunck, 1997). The antithesis of communication confidence is

'communication apprehension', which can negatively impact on the quality of a communication act (Duran, 1983; J. C. McCroskey & Richmond, 1991). For example, during oral presentations a highly apprehensive speaker may lose their line of thought, may not speak audibly, or may make language choices that mean the communication act is perceived as less effective (Blunck, 1997).

Aims of This Study

The goal of the present study was to compare a Modes of Communication (body language, voice, words and alignment between those modes of communication) approach of presentation assessment to one based on the Constructed Impression of the communication performance (confidence, clarity, engagement and appropriateness). The study also investigates the relative contribution of body language, voice, words and alignment to the perceived confidence, clarity, engagement and appropriateness of pre-service teacher presentations. While previous research has investigated each approach in isolation, considering the approaches in tandem offers insight to researchers at the same time as providing practical utility to teachers and teacher educators.

These aims are operationalised by the following five research questions:

RQ1: Do body language, voice, words, and alignment significantly contribute to overall presentation performance of pre-service teachers, and if so to what degree?

RQ2: Do clarity, appropriateness, engagement and confidence contribute to overall presentation performance of pre-service teachers, and if so to what degree?

RQ3: Does a Modes of Communication or a Constructed Impression model provide a better estimate of overall presentation performance?

RQ4: Are there significant differences between pre-service teacher communication capabilities in the Modes of Communication elements (body language, voice, words and alignment) and Constructed Impression elements (clarity, appropriateness, engagement and confidence)?

RQ5: To what extent do the Modes of Communication elements of body language, voice, words and alignment contribute to (predict) the Constructed Impression elements of clarity, appropriateness, engagement and confidence?

The first two research questions (RQ1 and RQ2) validate body language, voice, words, alignment, clarity, appropriateness, engagement and confidence as constructs that contribute to overall presentation performance in this context. The third research question (RQ3) compares the efficacy of the two models as means of evaluating presentation performance so as to inform communication assessment practice. The fourth research question (RQ4) dissects whether the pre-service teachers in this study found some elements of communication more difficult than others so that these students and teacher educators may understand where to focus their attention. The final research question (RQ5) deconstructs how Modes of Communication elements contribute to the Constructed Impression elements to provide educators and communication researchers insight into how the constructed impression of a presentation may be enhanced through changes to the modalities of communication.

Method

Three groups of pre-service teachers from the XXXX University School of Education recorded four presentations during the 2010 academic year. The students were completing Mathematics, Languages or Technology methodology units in their teacher education programs. This diversity of disciplines afforded greater generalisation of results than if the communication acts were from one discipline area. The analysis is based on 41 students, of whom 26 were female and 15 were male, with participant ages across the three classes forming an approximately uniform distribution between the ages of 20 and 50 years.

In order to reduce students' communication apprehension, the tasks were not an assessable component of the units. The topics for the four brief presentations were 'Introducing my teaching subject to students in the first class of the school year', 'Presenting my teaching subject to parents at a parent-teacher evening', 'Addressing a large group at assembly' and 'Farewell talk to students on the last day of classes for the year'. These were chosen because they provide authentic contexts for PSTs to develop their communication skills. Students were advised that the emphasis of the activity was on their presentation skills rather than the subject matter, and they were provided with the topic one week in advance so they could think about the content of their presentation.

Using the web-cam and the Photobooth application available on MacBook Pro laptops, students recorded presentations in pairs, with the length of presentations typically between 60 and 180 seconds. Students then uploaded the recordings to a University blogging tool where they reviewed their presentations and wrote reflective comments.

A panel of five assessors from XXXX University evaluated the presentations. Other methods of assessing presentations were considered, including student evaluations, however previous research has identified limitations of these other approaches including student bias in order to provide socially desirable responses, and lack of discriminant ability (Rubin & Feezel, 1986). The panel included three staff from the School of Education, a lecturer from the Department of Media Studies, and an educational researcher with several years of high school teaching experience. The School of Education staff each held a doctorate in education, and had a combined total of 45 years of teaching experience including several years of teacher education experience. The lecturer from the Department of Media studies held a doctorate in communication studies and had extensive experience in the film and television industry. The high school teacher, not part of the project team but with several years of teaching and education experience, served to provide a measure of inter-rater reliability. This approach of using an expert panel of five assessors mirrored approaches from previous research (McCaleb, 1984; Rubin & Feezel, 1986).

Each of the students' presentations was rated by each assessor on the following items:

1. the quality of overall presentation performance
2. the quality of body language
3. the quality of voice
4. the quality of words used
5. the alignment between body language, voice and words
6. the confidence of the presenter
7. the clarity of the presenter
8. the extent to which the presenter was engaging
9. the appropriateness of the presenter's presentation.

The Modes of Communication were represented by the body language, words, voice and alignment variables. The Constructed Impression was represented by the confidence, clarity, engagement and appropriateness variables.

In order to develop standardised conceptions of the constructs, each of the assessors initially rated a selection of 10 videos (not from those included in the final data-set), scoring each item out of ten. From this sample marking it was determined that providing descriptions of performances at different levels of accomplishment for each of the items was not feasible due to the multiplicity of factors that could affect performance of an item. For instance, describing a medium level of performance for the quality of voice item was problematic because tone, rhythm, projection and so on could contribute to the quality of voice in many different ways. Instead, it was decided that the most appropriate way to assess each item was to define poor and excellent performance for each of the constructs and rely on the expertise of the raters to allocate a mark from 0 to 10. The use of numeric scores on rating scales has been used to objectively compare communication constructs and instruments in previous research (McCaleb, 1984; Rubin & Feezel, 1986).

The descriptions of poor and excellent performance for each of the items are provided in Tables 1 and 2 below.

Modes	Poor performance	Excellent performance
Body Language	Moving around too much	Centred
	Shuffling	Open body posture
	Slouching	Upright
	Rigid stance	Shoulders back
	Withdrawn posture	Head up
	Defensive arm positioning	gestures convey meaning
	Wandering eyes	Inclusive eye contact,
	Shoulders, Head down	Relaxed stance
	Distracting/unclear gestures	Expressive gestures
	Stiff gestures	Smooth gesture
	Cold facial expression	Warm facial expression
Voice	Contrived	Natural
	Too loud/soft	Appropriate
	Monotone	volume/projection
	Stammering	Melodic variety/intonation
	Unclear enunciation	Clear enunciation
	Too fast/slow	Appropriate pace
Words	Unexpressive	Expressive language
	Negative	positive
	Poorly organized/structured	Structured/organised
	Confusing meaning	Clear meaning
	Not inclusive	Inclusive
	Inappropriate slang	Register relevant to
	Too many pausing/filling words	audience
	Poor use of humour	Positive use of humour
		Use of strategies to engage

| Align-ment | Disparity body/voice/words (Messages mixed) | Congruent body/voice/words (Messages aligned) |

Table 1: Characteristics of positive and negative communication performance for body language, voice, words and alignment

Constructed impressions	Poor performance	Excellent performance
Confidence	Appears anxious or apprehensive Manner conveys nerves, lack of authority or connection Inflexible – fixed script	Appears relaxed and stable Manner conveys knowledge authority, relationship with audience Flexible
Clarity	Meaning difficult to understand	Meaning easily understood
Engagement	Appears uninterested in presentation Impression that audience would be bored, easily distracted, even alienated Lacks impact No interaction/does not connect	Interested and enthusiastic Anticipate that audience would likely be engaged, interested in presentation Makes an impression Interacts/connects
Appropriate-ness	Content and delivery unsuitable Talking to wrong level of audience (context)	Content and delivery (language register) suitable for audience Talking to the level of the audience and situation

Table 2: Characteristics of poor and excellent communication performance for the Constructed Impressions of Communication (confidence, clarity, engagement and alignment)

The overall score was based on the assessors' evaluation of the presentation as a whole. Assessors rated the overall score first and the other items afterwards so that their first impression of the performance would not be influenced by the other component scores they allocated. There was some discussion after the sample marking regarding what should and should not be included in the assessment of words. It was decided amongst the panel that the words item related to the language that was used as if it were a written as a script, not to the manner with which the words were spoken (as this would be voice) and not to the quality of discipline specific information provided (as this would relate to subject area knowledge rather than communication ability).

Marks for each presentation were averaged across all five raters to form an overall score out of ten for each item. For instance, the five scores for body language were averaged across the five assessors to form an overall score for body language. Averaging all five scores reduced any influence that one assessor might exert by marking relatively higher or lower than other assessors. Absolute scores were not of interest throughout the study, only the way in which

scores across items related to one another. Thus a relative measure was used to calculate inter-rater reliability (see Results section below).

To account for the longitudinal nature of the study whereby students' videos were rated at four separate time points, data were analysed using the linear mixed model procedure in IBM SPSS Version 19. The linear mixed method model allowed for the presence of both random and fixed effects, thus allowing a larger sample to be incorporated into the analysis by enabling all four time points to be included in the sample. Participants were entered as the level 2 variable and time points the level 1 variable because time points were nested within participants. Random effects ANOVA using maximum likelihood estimation were performed for each Constructed Impression variable in order to determine whether the data needed to be treated as nested by time of measurement. Estimates of level 2 variance (random intercepts for participants) were significant in all four cases: confidence, estimate = .19, Wald Z = 3.28, p = .001, estimate for residual = .28; clarity, estimate = .21, Wald Z = 3.34, p = .001, estimate for residual = .29; engagement, estimate = .28, Wald Z = 3.66, $p<$ .001, estimate for residual = .26; appropriateness, estimate = .25, Wald Z = 3.27, p = .001, estimate for residual = .37. As well as this, the intraclass correlations were above .40 for all models (indicating nearly half of the variance in the dataset is from individual participants), thus strongly suggesting the need for multilevel modelling. A series of analyses investigating the need for random intercepts and slopes for the level 2 variable detected significant variation around the intercepts in all models (analyses available from authors on request). However, random variation in slopes was not significant, so slopes were therefore entered as fixed factors in all subsequent analyses.

Since ratings on all subscales were conducted by the same raters, multi-collinearity in the dataset and the redundancy of one or more predictors was a distinct possibility. The Variance Inflation Factor (VIF) was calculated for each predictor for models predicting to Overall score in order to assess the extent of multi-collinearity. The VIF values were under 4 for all predictors, implying that there was no substantial multi-collinearity. Thus it was deemed appropriate to simultaneously include all predictors in the analyses.

Results
Validity of Modes of Communication elements

Research Question 1 (RQ1) aimed to determine whether Modes of Communication elements of body language, voice, words and alignment contributed to overall presentation performance. Parameter estimates and significance levels for all predictors in the Modes of Communication model incorporating body language, voice, words and alignment are shown in Table 3.

	AIC / BIC	Predictors	Parameter estimate	p-value
Model 2	-39.68 / -14.87			
		Body language	0.17	<.001
		Voice	0.23	<.001
		Words	0.29	<.001
		Alignment	0.38	<.001

Table 3: Linear mixed model result for body language, voice, words and alignment predicting to overall score

From Table 3 it can be seen that body language, voice, words and alignment all made a significant contribution to the prediction of overall score, thus providing validation for the inclusion of these elements in communication assessment models for pre-service teachers. By comparing the magnitude of the parameter estimates it can be seen that alignment made the greatest contribution to overall performance, followed by words, then voice, then body language.

Validity of Constructed Impression Elements

Research Question 2 (RQ2) aimed to determine whether the clarity, appropriateness, engagement and confidence elements of the Constructed Impression model contributed to overall presentation performance. The parameter estimates and significance levels for the clarity, appropriateness, engagement and confidence predictors in the Constructed Impression model are shown in Table 4.

	AIC / BIC	Predictors	Parameter estimate	p-value
Model 2	-43.44 / -18.64			
		Confidence	0.18	.002
		Clarity	0.20	<.001
		Engagement	0.31	<.001
		Appropriateness	0.32	<.001

Table 4: Linear mixed model result for confidence, clarity, engagement and appropriateness predicting to overall score

Table 4 shows that clarity, appropriateness, engagement and confidence all made a significant contribution to predicting overall score, thus also providing validation for including these elements in communication assessment models. By comparing the magnitude of parameter estimates in Table 4 it can be seen that appropriateness made the greatest contribution to overall performance, followed by engagement, then clarity and then confidence.

Efficacy of Modes of Communication and Constructed Impression Models

Research Question 3 (RQ3) aimed to determine whether the Modes of Communication model or the Constructed Impression model provided a better estimate of overall presentation performance. Comparing Akaike's Information Criteria (AIC) and Schwarz's Bayesian Criterion (BIC) across models (both presented in smaller is better format in Table 3 and Table 4) enabled this comparison to be drawn. The lower Akaike's Information Criteria (AIC) and Schwarz's Bayesian Criterion (BIC) scores for the Constructed Impression approach indicates that it provided a better prediction to overall score than the Modes of Communication approach. However the linear mixed method of analysis does not enable determination of whether this difference in predictive ability is significant.

A second comparison was drawn by contrasting the overall performance score with the average of the Modes of Communication scores and the average of the Constructed Impression scores for all time periods combined. Averaging or totalling scores for the elements of communication being examined to derive a total score is a common assessment practice and one

that has been used extensively in communication research (McCaleb, 1984; Rubin & Feezel, 1986; Yamashita & Nakajima, 2010).   The Constructed Impression model mean (M = 7.453) was significantly higher than both overall mean (M = 7.313) and the Modes of Communication mean (M = 7.308), but the overall mean and the Modes of Communication mean were not significantly different. While this indicates that the adding the Constructed Impression elements to form a total score tended to overstate overall presentation performance, it is noted that the magnitude of this difference was not substantial.

Relative Performance of Pre-service Teachers on Modes of Communication and Constructed Impression Elements

Research Question 4 (RQ4) aimed to examine whether there were any significant differences between pre-service teacher communication capabilities in the Modes of Communication and Constructed Impression elements. The mean scores for all predictors across all 164 presentations are provided in Table 5 below.

Subscale	Mean
Appropriateness	7.517
Clarity	7.591
Voice	7.490
Confidence	7.480
Words	7.394
Alignment	7.276
Engagement	7.224
Body language	7.071

Table 5: Mean scores for all predictors across all presentations

The scores for all predictors were compared to determine if there were any significant differences between them. The following comparisons were significant: body language was lower than all other subscales, voice was higher than alignment and engagement, words was higher than alignment and engagement but lower than clarity and appropriateness, alignment was lower than confidence, clarity and appropriateness, confidence was lower than clarity, but higher than engagement, clarity was higher than engagement, engagement was lower than appropriateness. These relative differences provide an indication of where teacher educators and pre-service teachers themselves may focus their attention in order to improve communication performance.

Contribution of Modes of Communication Elements to Constructed Impression Elements

The final research question (RQ5) aimed to examine the extent to which the Modes of Communication elements of body language, voice, words and alignment contributed to the (predicted) Constructed Impression elements of clarity, appropriateness, engagement and confidence. In order to assess the predictive contribution of Modes of Communication to Constructed Impression elements, four multilevel models were run with body language, voice,

words and alignment predicting each of confidence, clarity, engagement and appropriateness in turn. As noted above, in all models, a random intercept for the level 2 variable, participant, was entered but the slope was fixed. Similarly, in all models, body language, voice, words and alignment were entered as fixed factors. Table 6 gives parameter estimates and significance levels for all predictors in the four models.

Dependent variable	AIC / BIC	Predictors	Parameter estimate	p-value
Confidence	68.66 / 93.46			
		Body language	0.06	.32
		Voice	0.14	.05
		Words	0.30	<.001
		Alignment	0.31	<.001
Clarity	73.20 / 98.00			
		Body language	-0.19	.002
		Voice	0.21	.002
		Words	0.44	<.001
		Alignment	0.47	<.001
Engagement	89.32 / 114.12			
		Body language	0.26	<.001
		Voice	0.34	<.001
		Words	0.17	.01
		Alignment	0.29	.001
Appropriateness	114.37 / 169.17			
		Body language	0.21	.008
		Voice	-0.03	.74
		Words	0.53	<.001
		Alignment	0.30	.005

Table 6: Measures of fit and significance of individual predictors for models predicting to confidence, clarity, engagement and appropriateness

This modelling revealed that all predictors were significant in all models with the exception of body language in the model predicting to confidence, and voice in the model predicting to appropriateness. The magnitude of the parameter estimates provides an indication of the relative contribution of each Mode of Communication variable to each Constructed Impression variable. It should be noted that body language was a significant negative predictor of clarity, implying higher scores on body language were associated with lower scores on clarity.

Discussion

These results demonstrate that the Modes of Communication approach and the Constructed Impression approach provide a valid means of assessing pre-service teacher communication competencies. All predictors in the Modes of Communication model (body language, voice, words and alignment) made significant contributions to overall score, as did all predictors in the

Constructed Impression model (confidence, clarity, engagement and appropriateness). Thus all elements are relevant candidates for inclusion when assessing communication performance.

The Constructed Impression model of assessing communication performance provided a better fit to overall performance than the Modes of Communication approach, according to Akaike's Information Criteria (AIC) and Schwarz's Bayesian Criterion (BIC) scores. However, the fact that the AIC and BIC scores for each model are of reasonably similar magnitude, and that all elements in each model are significant predictors of overall performance, implies that both models constitute valid approaches to assessing communication performance. Moreover, the average of the Modes of Communication scores was a more accurate estimate of the overall score for each student than the average of the Constructed Impression scores (the latter of which was significantly different from the mean). This further adds to the qualitative balance of these two approaches to assessing communication performance.

The Constructed Impression elements were generally rated higher than the Modes of Communication elements, as indicated by its significantly higher mean average score. The fact that the Constructed Impression average is significantly higher than the overall score may also imply that there are negative features of presentation performance that are not captured by the Constructed Impression elements alone. On average across the entire dataset participants scored highest on clarity, appropriateness and voice, and lowest on body language, engagement and alignment. It is possible that the score on body language was somewhat influenced by the video-recording process, whereby the proximity of the camera may have caused students to be less expressive with their body language and to receive lower scores. Also performances may have been altered due to the absence of an audience for the presentations. However, overall, these relative performances provide an indication of where pre-service teachers and teacher educators may choose to focus their attention in terms of areas of need.

The study demonstrates the relative contribution of body language, voice, words and alignment to the overall presentation performance score, with alignment making the largest contribution to overall perceived presentation quality and body language the least. This has important implications for communication development and training. Firstly, use of body language, voice and words should not be taught in isolation since according to this study the alignment between these elements has a greater impact on the perceived quality of the presentation than any one element alone. Secondly, whereas previous research by Mehrabian and Ferris (1967) has led to the popular perception that body language is more important than voice, which in turn is more important than words, this more authentic study found the opposite ordering of elements applies.

The results also provide evidence relating to the relative importance of confidence, clarity, engagement and appropriateness to the overall perception of a presentation, with appropriateness making the largest contribution to predicting the overall score, followed by engagement, then clarity, then confidence. This indicates that development of pre-service teachers' communication capabilities should focus upon understanding contextual features of communication that may improve the appropriateness of the presentation, and emphasise the importance of being clear and engaging rather than becoming to concerned about appearing confident.

The study also enabled analysis of how Modes of Communication (body language, voice, words and alignment) contributed to the Constructed Impression (confidence, clarity, engagement and appropriateness). Confidence was predominantly predicted by the words and alignment, which provides evidence against over-emphasising the role of body language and voice in creating an impression of confidence. Engagement was mainly predicted by voice, then

alignment, then body language and words (all significant). This may demonstrate that when trying to engage pupils in a classroom, the way that voice, body language and alignment are used may be more important than the quality of the concepts that are spoken. Appropriateness was mainly predicted by words, then alignment and body language, potentially indicating that incorrect word choice may have a highly detrimental impact on the perceived appropriateness as compared to using an inappropriate voice. Clarity of presentation was mainly predicted by the words that were spoken and alignment, followed by the voice. Interestingly, clarity was negatively predicted by body language, potentially indicating that over-use of body language in a presentation may actually distract from the clarity of the message being delivered.

As with any scientific study, the context of this analysis should be taken into account when considering the generalisability and applicability of these results to other domains. This study related to teachers in training and assessment of a simulated performance as presenters to classes of school students. However, it is contended that this study provides a more authentic dataset than many of the laboratory analyses of communication that have gained popular attention.

Conclusion

A crucial consideration when assessing communication is whether to place emphasis on the way students utilise their Modes of Communication (body language, voice, words and alignment) or to evaluate students based on their Constructed Impression (in this case confidence, clarity, engagement and appropriateness). This study indicates that both the Modes of Communication approach and the Constructed Impression approach provide valid measures of communication performance, with all four elements in each model acting as significant positive predictors for overall performance. Both models are valid in terms of assessing presentation performance, with the Constructed Impression approach providing a better fit to data according to AIC and BIC values, whereas the average of the Modes of Communication elements offers a better prediction of overall score.

The results of this study provide evidence to guide the development of pre-service teacher communication capabilities. In this context involving pre-service teachers recording simulated practice presentations, the contribution of words to predicting overall performance was greater than voice or body language, with alignment between these three elements making the largest contribution. Appropriateness and engagement of the presentation made a greater contribution to predicting overall quality than the confidence and clarity of the presentation. Thus pre-service teachers (and teacher educators) should undoubtedly pay careful attention to the words that are used, the alignment between modes of communication, the appropriateness of their presentation and the degree to which they are engaging.

The fact that appropriateness was mostly predicted by words, whereas engagement was mostly predicted by voice, alignment and body language indicates that all modes of communication play an important role in presentation. That confidence contributed least to predicting the overall score of all the Constructed Impression elements provides some consolation to pre-service teachers, namely that they should be able to deliver effective presentations even if they are perceived as nervous.

As both novice and expert teachers contend with communication challenges, from presenting to an audience for the first time to attempting to develop the communication capabilities of students, it is useful to have an understanding of the dimensions of communication and how they

interrelate. Through our modes of communication we create a constructed impression, and in order to develop communication competence it is necessary to consider both levels. This study sheds light upon the dual utility, in classroom presentation, of not only emphasising both our modes of communication and the impression we construct, but also the interrelationships between them.

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