Disembodied Teaching and Learning: Contributions from Speech Acts, Peircean Sign Theory and Multimodal Approaches to Embodied Cognition

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The following article is the first of three in a series that attempts to frame a set of principles for measuring the outcomes of the introduction of remote teaching and learning across U.S. universities and K-12 schools during March-May, 2020. The framework of the first analysis is one of the common mediums and platforms for course realizations, Zoom, and how remote synchronous (real-time) teaching and learning measures up in comparison with typical campus-based, face-to-face classroom teaching and learning. Speech act theory, communities of practice and speech communities will be the focus of the analysis in order to provide a research basis for designing the analysis. The second article will be about embodied cognitions and neuroscience contributions to language learning, and the final article will focus on best practices in collecting behavioral data for cognitive neuroscience and linguistic studies of language acquisition, maintenance and loss.

Key words: speech acts, remote learning, speech communities, communities of practice, face-to-face, online technologies

By way of introduction

Across the globe, the spring of 2020 brought about unprecedented changes in teaching and learning across all levels of education – from elementary schools through vocational and technical schools, community colleges, graduate and professional university programs. Due to the pandemic crisis of COVID-19, educational institutions closed their doors and moved to remote instruction in an extraordinarily short time frame. For most school systems in the United States and many other countries of the world, students did not return to their classrooms to complete the academic year.

In the first of three articles, I would like to focus on university undergraduate teaching and learning, and outline pathways to determining a range of best practices for using remote and online courses in different contexts on a continuum of face-to-face, on-campus teaching and learning to hybrid models of remote and online courses. Understanding how languages are important to the channels and knowledge-sharing that define the teaching experience is the foundation for moving forward with (1) description and analysis of teaching and learning outside of the traditional classroom, and (2) formulating robust research projects that will produce evidence-based empirical data for improving the multi-platform process that will be with us for many years to come. By bringing important research from linguistic theory, cognitive neuroscience and sociolinguistics, our goal is to show that decisions about how to best achieve deep learning can and should be grounded in scientific methods across the sciences, social sciences and humanities.

How We Became Zoombies

While a multitude of computer platforms and apps became available for remote teaching and learning, one of the most popular platforms for course delivery in the United States is Zoom. While many faculty and students were skeptical about how this would actually work, it turned out that for many people with adequate internet service, it was indeed possible to continue learning until the end of the term. The advantages of the Zoom platform is that classes can be conducted in a variety of formats, which include recorded lectures, live lectures, active student participation, showing power point presentations, break out rooms, and simulating face-to-face where all parties can see and hear each other in real time. Zoom provided for a variety of screen formats and for synchronous meetings and classes for up to 300 people.

I was responsible for three faculty, including myself, to launch and conduct a total of 16 class meetings each week for 5 weeks and a final week of exams. The courses included graduate-level cognitive neuroscience, a film course, a literature course, and 3 separate Russian language courses (intensive elementary through advanced levels). Given the spectrum of disciplines involved, I was not only an active participant in my graduate cognitive neuroscience course of 30 people, but I witnessed on a daily basis the interactions in the classes of my colleagues who relied on me for technological support. In the following sections, I would like to critique the process of remote learning using Zoom, and embed my remarks in important evidence-based empirical data and modelling that we have from cognitive neuroscience and linguistic theory.

How speech acts explain the utility of face-to-face interactions: *It matters who is talking and who is listening*

The recent shift from face-to-face teaching and learning to remote teaching and learning was experienced across all 50 states and most of the countries of the world. It happened quickly and without time for much preparation. While some institutions were already deeply involved in online teaching, many were not. Nonetheless, we witnessed a remarkable responsiveness and what I believe to be an even more remarkable success in learning outcomes. Students were very reticent and had low expectations in the beginning, and faculty worried about how this would all work out. With a classroom of students now spread across a dozen different time zones with very variable internet capabilities, there were many compelling reasons for concern.

I interviewed a group of students and faculty at Duke University and other Triangle institutions at the end of the semester about their evaluation of the experience. The most salient comments from both groups included the following: (1) initial expectations of failure and disaster; (2) extraordinary relief at the end of the semester and a sense that the experience ended better than anticipated; (3) a deeper appreciation of the face-to-face classroom experience; (4) everything took 3-4 times longer to do in the disembodied context, and (5) a desire not to ever teach or learn this way again. [Our research team intends to conduct a more substantive interview process when students and faculty return to campus to examine how these views change or intensify as they reflect on this past semester with some temporal distance and continue to do hybrid or remote teaching and learning.]

An interesting question emerges from this specific context: In the case of synchronous teaching on Zoom, why did both students and faculty fail to embrace remote teaching and learning as a *preferred form* of interaction? It is not unusual for many students (and even faculty) to spend lots of time in virtual chats, email and texting, Facetime, WhatsApp, games, etc. These are not people who lack experience in online, web-based enterprises. Why did it take so much more energy and concentration? I would suggest that one of the major reasons is explained using language modeling and speech acts.

The Jakobsonian speech act model (JSAM) can help clarify how meanings are negotiated through language (1960/1987: 66-71) (see Figure 1). Understanding the importance of speech acts plays a critical role in the teaching/learning process since knowledge is shared and internalized through language(s). While this is obvious, it is not trivial. How does the mechanism work? How to speakers and hearers fit into the model?

Jakobson's model is a dynamic representation of the *minimum* number of factors and functions (six of each) that are present in each and every speech act; each of these factors and functions are in a hierarchical relationship defined by constant internal renegotiation of dominance within each individual act. In fact, this relative and dynamic hierarchy often results in multiple outcomes within one and the same moment of discourse.

Figure 1 (adapted from Jakobson 1987: 66-71)

All individual communication acts are at least *dialogic* and require translation both as an internal mechanism of signification, as well as an external mechanism of signification and communication. [NOTE: *Signification* is primary and the basis for *communication* and *text generation*. Signification is the "human ability that underlies human language and all of human cognition" and is essential to the creation of non-hereditary collective memory/cultural systems (Andrews 2013: 49). For a discussion of the importance of signification and invention of collective symbols, see Donald (2004) and Andrews (2013: 49-51, 60-63).] However, while such an approach guarantees translation mechanisms, it does not guarantee the achievement of a coherent, meaningful result. Human language in

action often leads to *misunderstanding* as well as understanding. Theoretical approaches to language and brain would benefit from incorporating empirical aspects of actual language usage, which includes instability, ambiguity and redundancy of linguistic meanings, while avoiding notions of idealized speakers and hearers.

Consider the following description of each of the factors and functions. Speech acts that focus on the speaker's intentions or meanings yields a speech event dominated by the *emotive function;* a focus on the hearer, which is commonly found in utterances characterized by commands, imperatives, compelling the addressee to act is called *conative;* a focus on the context results in the *referential function;* a focus on the channel itself – whether it means opening the channel or checking to see if the channel is still viable – is called the *phatic* function; a focus on the code, which is one of the central functions involved in language acquisition across the life cycle, is the *metalingual function;* a focus on the message itself (for its own sake) yields the *poetic function.* It is no coincidence that the term *poetic* is used for this function. This is part of Jakobson's important claim that the basis for language as aesthetic, poetic, or artistic is not peculiar to literature and poetry, but is an ever-present characteristic of all of human language and is embedded in each and every speech act. Jakobson's model is also compatible with semiotic modeling of communication as given in Sebeok (1991) and Lotman (1990). [Note: One of the fundamental differences between Jakobson's speech act model and the work on speech acts by Austin and Searle is found in explanatory power and scope: JSAM is a minimal mechanism for explaining how meanings emerge across any language in the multi-factor negotiations that are enacted in any and all speech acts, while Austin and Searle offer more of a descriptive taxonomy of prescribed meanings embedded in English verbal acts. [For more about these 3 approaches, see Andrews 2014: 51-58.]

Thus, we see how all speech acts are heterogenous, multi-faceted conglomerates of dynamic components in shifting hierarchies embedded in multiple and changing *speech communities* and *communities of practice* (see next section). Also, speech acts are dialogic in nature – even if you are talking to yourself, the roles of speaker and hearer remain distinct. It is much more difficult to negotiate meanings and outcomes of speech act when there are fewer cues available. Face-to-face interactions provide a rich context of multidimensional factors and functions that are impoverished in the distance- learning context. Synchronous, web-based interactions (specifically synchronous audio/visual web-based interactions), while on the surface may appear to be most similar to face-to-face interactions, are fundamentally different and fall short in the end. You may love to watch The Daily Show with Trevor Noah and enjoy laughing at his jokes. But it is much harder to watch Trevor at home alone talking in front of his computer or camera. The absent audience changes everything. And that is just one example of why *it matters who is talking and who is listening.*

The importance of *speech communities* and *communities of practice*

The field of sociolinguistics has contributed significantly to our understanding of how languages are learned and maintained through exposure to groups of speakers in *speech communities* and *communities of practice* (Hymes 1972 and McConnell-Ginet 2003) and the fact that speakers are always members of multiple and changing speech communities and

communities of practice. Note the following definitions:

Speech Community: Dell Hymes (1972: 54) defines a speech community as "a community sharing rules for the conduct and interpretation of speech, and rules for the interpretation of at least one linguistic variety." For Hymes, these communities are based on face-to-face interactions. Speakers and hearers are simultaneously members of multiple speech communities and these memberships are dynamic and changing in and over time.

Communities of Practice: (from Sally McConnell-Ginet 2003: 69-97)

"A community of practice (COfP) is a group of people brought together by some mutual endeavor, some common enterprise in which they are engaged and to which they bring a shared repertoire of resources, including linguistic resources, and for which they are mutually accountable….Communities of practice are not flee-floating but are linked to one another and to various institutions. They draw on resources with a more general history – languages as well as various kinds of technologies and artefacts."

Our time in college is a moment where our exposure to and participation in a range of new speech communities and communities of practice is extraordinary robust. We are looking for ourselves, seeking to affiliate ourselves with intellectual endeavors and careers, make lifelong friends and spouses. All of those things required multidimensional embodied encounters.

The Muted Student: From Talking Heads to Disembodied Voices

One of the challenges of remote teaching and learning is the ability to have an interactive classroom. In a face-to-face classroom, the instructor can see when a student wants to speak from facial expressions alone, not to mention hand raising and spontaneous speech. In the Zoom world, it is more challenging for students to interact with each other and for them to actively insert themselves into the conversation. Since they can't see everyone at the same time (a large class of 30 people doesn't work on a single screen), it's hard to know when to jump in. Also, if there are internet challenges, or significant background noise from the home environment, dogs barking, etc., the student will be muted. While Zoom is ostensibly "real time", there is often a very slight time lag (especially for those with unstable internet connections) and this makes it more difficult to jump into a conversation without overlapping discourse. Also, unmuting takes additional time and action, and for many participants, all of these lead to a set of deterrents to speaking. Neuroscience research on speech acts and turn taking has something to contribute to this issue. Gissladottir, Bögels, Levinson (2016) and Barthel, Meyer, Levinson (2017) conduct experiments using EEG and eye tracking and confirm the importance of anticipation and pre-processing in comprehension of speech acts and cues for speaking. New research should be conducted on how muting and unmuting changes the dynamic in turn taking and initiating speech acts.

To Mask or how to Mask: Faces and Articulation

One of the issues that arises consistently in public discourse is the persistent presence of hyberbole across mass media – television, print media, blogs, iPhone news, etc. It seems that even PBS is getting frisky these days. Face-to-face

discourse is also experiencing *mood swings* –extremes range from the new ***silence*** while we socially distance from each other in the park or on the trail to outbursts of verbal violence and rage when someone behaves counter to our belief system in a public space. After the CDC suggested that masks be worn in public, the United States has documented extraordinary behaviors that have not generally been characteristic of other countries. This trend continues as violence and hostility are manifested across the U.S.

I am including the full recommendation from the CDC here from from April 13, 2020 (https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html). I believe it is important to read the original text.

CDC on Homemade Cloth Face Coverings CDC recommends wearing cloth face coverings in public settings where other social distancing measures are difficult to maintain (e.g., grocery stores and pharmacies), especially in areas of significant community-based transmission. CDC also advises the use of simple cloth face coverings to slow the spread of the virus and help people who may have the virus and do not know it from transmitting it to others. Cloth face coverings fashioned from household items or made at home from common materials at low cost can be used as an additional, voluntary public health measure. Cloth face coverings should not be placed on young children under age 2, anyone who has trouble breathing, or is unconscious, incapacitated or otherwise unable to remove the cloth face covering without assistance. The cloth face coverings recommended are not surgical masks or N-95 respirators. Those are critical supplies that must continue to be reserved for healthcare workers and other medical first responders, as recommended by current CDC guidance.

Why has the mask become so controversial? How did it become one of the central symbols of the underlying fragmentation of social groups? Is this related to other types of bias against face coverings? These are questions that will be the subject of research and analysis for many years to come.

One of the positive outcomes of thinking about masks is the emergence of a group of innovative people who have anticipated the needs of the Deaf community and are making clear masks so that they can continue to communicate with others (Huffington Post, April 3, 2020). Our own teams at Duke University have also been working on different prototypes that can facilitate communication for the hearing impaired and others who may be more comfortable with clear masks where they can breathe normally and not “fog up”.

Normative hearing does not eliminate difficulties that may arise in understanding each other in masks. Those communities of practice that typically wear masks are already ahead of the curve and understand the challenges and how to overcome them. It is essential to understand the important integration of visual and auditory cortical areas in perception and production of language, including speech acts. Visual-auditory integration is a complex developmental process that is driven by how we *language*. There are numerous experiments using eye tracking, as one example, that demonstrate how important visual processing is to understanding speech (cf. Tanenhaus et al.1995). We rely on not only our ears to hear, but also our eyes. We become accustomed to certain articulatory cues that enable us to translate the acoustic sounds of

the languages that we speak. When those cues are missing, we have trouble comprehending simple speech acts.

Expectation and habit also play a role in the current situation. Many of our moment-by-moment cognitive processing is *nonconscious* and *unarticulated*, and it makes it more difficult to explain why we are struggling with simple activities (cf. Andrews 1990, 2014, 2019, Donald 2001, and Savan 1976). We will return to this point below. In the case of talking in masks, many share that they are struggling or frustrated, and it may lead to anxiety about one's own hearing. It also changes the way that we talk (or not) to each other, as seen in trends that are emerging. Are people more likely to speak or be spoken to if walking in a group or running with their dog? The cashier at Office Depot asked for my phone number and could not understand my repeated responses. He apologized and said he was having trouble hearing lately. I told him that his hearing was fine, and it was not his fault. Clear masks are a necessity for the hearing impaired and could also be helpful to a larger part of the population.

Speaking of *Hybridity:* One more term for 2020

There is a significant number of expressions that have become frequent in media and everyday discourse as a result of the pandemic. English is no exception. We speak of *contactless delivery and ordering, no contact drop off and service, no touch payment, please refrain from hand shaking,* and many other expressions. New abbreviations are now encountered daily (cf. F2F, nCoV, SARS-CoV-2, COVID-19, Epi curve, PUI, PPE, and many others). Note that not all of these are actually new, but they appear in print significantly more frequently than before the pandemic. For universities, the notion of *hybridity* is one of the central terms that describe our planning for moving forward, and the implementation of hybridity brings with it not only challenges, but perhaps exciting innovation and benefits for both instructors and students. Conducting face-to-face instruction with a built-in simultaneous Zoom component or asynchronous remote component might be an interesting contribution to redefining the boundaries of the classroom.

Why on-campus education is so important: Communities, Mentorship, Friendship, Research

Successful and robust real-world research within single disciplines is conducted in communities of practice where collaboration, sharing of information, mentorship and even friendship plays an important role. Interdisciplinary and multidisciplinary research requires even more collaboration and deeper ties within and across disciplinary boundaries. The university setting provides all of these important things to faculty and students. Physical proximity, laboratory environments, lectures, discussions, hands-on learning are all components of the university experience. Many universities are planning for on-campus fall semesters with hybridity and remote components. I believe that these new challenges could lead to unexpected new directions, including a deeper appreciation of smaller classroom sizes and even outdoor classes.

What to expect from face-to-face public discourse moving forward

This is an opportune moment to start collecting data on how people are changing their linguistic habits in public spaces. Using the Jakobsonian speech act model, most *speech communities* and *communities of practice* should expect to see an increase in the frequency of heavily *conative* speech

acts ("you must put on a mask to come into this store," "six feet – six feet!") and much less of the *phatic* dominant speech acts (saying "hello" to a stranger on the street or "how are you" to someone walking by). Social distancing (a term originating from epidemiology and not new) seems to be closing the *channel* that is often opened by phatic-dominant speech acts with new, potential interlocutors. The physical distance and fear of spreading germs is a strong deterrent to opening one's mouth. Also, you have to speak clearer and louder in a mask, which is also a deterrent. Will the presence of a dog or child impact the opening (or not) of the channel? How will this affect those individuals who have already been silenced by their families and larger communities? If we are looking at issues of language discrimination in fragile and precarious communities, then this shift may be significant and could exacerbate inequality, as seen in recent events. All of these questions and more require the attention of multiple disciplines and research approaches requiring evidence-based empirical data.

Donald's Intermediate Time Frame, Mindsharing and Learning in Real Time

Merlin Donald's (2001) insights into human cognitive evolution illuminate the key moments that led to the development of spoken and written human language, including mimesis, fine motor control, and collective creation of external symbols. There are many things humans have learned to do that are often characterized as automatic or not requiring conscious effort. This type of *automaticity*, which is a phenomenon connected to learned behaviors, should not be confused with innate behaviors (2001: 57):

> *Automatization is the end result of a process of repeated sessions of rehearsal and evaluation, which rely heavily on conscious supervision ….*
>
> *Automaticity is not the antithesis of consciousness. It is a necessary complement to it. Moreover, it is one of its by-products.*

One of the ways that Donald clarifies the problem of defining consciousness is by noting that "human consciousness cannot be properly isolated and described in the short term" (2001: 89). He goes on to explain that while consciousness is "virtually oblivious of milliseconds", it may be enacted in frames between 1-15 seconds. And yet, consciousness is best examined in the "*intermediate time frame*" that can extend over periods of minutes to hours. Recognizing this important shift away from the ≤ *15 seconds* to a more significant period of time (minutes to hours) is essential to take into account when determining the temporal boundaries in ecologically-valid experimental design. In particular, Donald differentiates clinical and laboratory methods and the critical role that *time frames* play in research. The return of ecological validity to experimental design and research is essential if cognitive neuroscience research is to move forward (Donald 2001: 62). Many experiments of human cognition target only the lower limit of conscious experience, the shorter time frames in which it is impossible to see the full scope of cognitive phenomena like memory and language (ibid.: 47).

Donald identifies another crucial component of social intelligence in humans that is more developed than in other species—the ability to perceive and anticipate the intentions of others, to read "not only our own minds but also those of others" (2001: 59). Human language plays a

significant role in the ability to "mindshare," but this type of metacognition is not restricted to a linguistic realization; rather, linguistic utterances may *facilitate* this type of cognition (2001: 60). The key point is to view mindsharing as a "conscious process not in the representational sense that we explicitly notice and represent every impression but rather in the functional sense that real-time mindreading demands conscious capacity, usually occupying it to the full" (2001: 61). Donald does not idealize human metacognitive ability and "mindsharing." In fact, he clearly states that it can be useful in everyday social practice, but it is quite fallible if used as a theoretical method (2001: 62). It is the backdrop of mindsharing that facilitates a deeper understanding of why human language is *never in the one.* And it is this form of metacognition that is also critical in teaching and learning. (In later research by Donald on the evolution of human cognition, he argues for a view of human nature that takes into account "overdevelopment of conscious processing" and a unique way of "carrying out cognitive activity" – what he calls *distributed cognitive-cultural networks* (2004: 35). Donald goes on to explain that it is precisely these networks that play a role in the hybridity of cultural beings. This important work deserves more attention, and we will revisit it in our second article.)

If we narrow the frame a bit, what about the teaching and learning of languages, including *less commonly taught languages(LCTLs)*?

Developing online materials for high proficiency outcomes in languages and cultures

The Duke Center for Slavic, Eurasian & East European Studies (CSEEES) works in close collaboration with the Duke University Title VI center, SEELRC[1], which has been devoted to developing unique and original web-based materials for high proficiency levels across the languages of Eurasia and conducting research in L2/L3 acquisition and multilingualism for 20 years. SEELRC focuses on the languages of 34 nations in Central Europe, Eastern Europe, and Central Eurasia.[2] These nations (with a combined population of approximately 2 billion)[3] are home to hundreds of languages—from Abkhazian to Yukagir; SEELRC's programs and projects concentrate primarily (but not exclusively) on 38 of those languages.[4] These languages are spoken by approximately 1.5 billion people worldwide. Duke University hosts the website for SEELRC interactive and web-based language and culture materials. These materials have been designed to facilitate the teaching and learning of LCTLs at the advanced proficiency levels (CEFR B2-C1) in hybrid teaching models. As someone involved in the design, creation and implementation of interactive, web-based materials for over 20 years, I have been fortunate to explore the boundaries between the physical-temporal classroom and the web for enhanced learning of cultures and languages. Both components are very powerful, and when used together, they can facilitate the re-imagination of teaching and learning across the curriculum.

Why on-campus education so important: *People who need people….*

All types of linguistic meanings are negotiated *in* context and require communities of speakers embedded in *speech communities and communities of practice* to stabilize these meanings. This is true not only for everyday, mundane communication, but also for the teaching and learning of all disciplines across the

natural and biological sciences, empirical sciences, social sciences and humanities. The important research we have seen on turn-taking and speech acts (Barthel et al. 2017, Gissladottir et al. 2018), applications of the Jakobsonian speech act model and Donald's important contributions to understanding distributed cognitive-cultural networks and mindsharing, provide a fruitful foundation for understanding the cultural, disciplinary, linguistic and community aspects of teaching and learning. And while there are dynamic, complex sensory-motor systems in individual brains, there is never language "in the one." Language is a consequence of humans interacting in cultural space. We are always multifaceted *users* of language(s), playing the roles of speakers, hearers and observers (sometimes simultaneously), and we always belong to multiple and variegated dynamically-given speech communities and communities of practice. When we can have a fully embodied experience with each other in the same physical location in the space-time continuum, it provides additional support for an enriched learning environment.

Notes

1. Originally the Slavic & East European Language Resource Center, our name was changed to the Slavic & Eurasian Language Resource Center to reflect a broader regional and linguistic focus. The original acronym has been retained to preserve existing Internet addresses and domains.

[2] Afghanistan, Albania, Armenia, Azerbaijan, Belarus, Bosnia, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Greece, Hungary, India, Iran, Kazakhstan, Kosovo, Kyrgyzstan, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Pakistan, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

[3] Population and language statistics are taken from *Ethnologue: Languages of the World* (www.ethnologue.com).

[4] Albanian, Armenian, Azeri/Azerbaijani, Belarusian, Bosnian, Bulgarian, Chechen, Croatian, Czech, Dari, Estonian, Georgian, Greek, Hindi, Hungarian, Kazakh, Kyrgyz, Latvian, Lithuanian, Macedonian, Montenegrin, Pashto, Persian, Polish, Romani, Romanian, Russian, Serbian, Slovak, Slovene, Tajik, Tatar, Turkish, Turkmen, Ukrainian, Urdu, Uyghur, and Uzbek.

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