

A Critical Look at the Bigger Picture: Macro-Level Discourses of Language and Technology in the United States

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Abstract

*Despite its numerous benefits and potentialities for language learning and teaching, digital technology can also play a role in creating and maintaining inequality. While critical CALL often focuses on micro-level issues and contexts, macro-level perspectives, including discourses, are also essential to consider: From ecological and language-as-discourse perspectives, macro-level discourses have the potential to impact and shape CALL practices and contexts. Using critical discourse analysis methods, this article takes the 2017 American Academy of Arts and Sciences (AAAS) report, *America's Languages: Investing in Language Education for the 21st Century*, as a window into macro-level discourses of language and technology in American society today. Findings reveal a series of interrelated frames and scales that, taken together, suggest a neoliberal discourse that positioned language, technology, and ultimately CALL as tools to enhance national competitiveness on a global marketplace. The article concludes with implications of these findings for the CALL field.*

KEYWORDS: LANGUAGE EDUCATION; ECOLOGICAL CALL; CRITICAL DISCOURSE ANALYSIS; NEOLIBERALISM

Introduction

In 2017, the American Academy of Arts and Sciences (AAAS) published an assessment of the United States' non-English language competences (Commission on Language Learning, 2017). Entitled *America's Languages: Investing*

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in *Language Education for the 21st Century*, the report examined the current state of language learning in the United States and detailed a series of findings and recommendations intended to bolster language competencies.

Digital technologies figured into both these findings and recommendations: as one of the reasons why the United States needed to improve its language competences and as one of the ways to do so. While most CALL scholars and practitioners would agree with the basic premise of the AAAS report—improving language learning in the United States through digital means,—questions remain about how and to what ends technology was positioned in the report—as well as in language education more broadly: While often painted as overwhelmingly positive, technology also holds the potential for creating and maintaining inequality in a range of different ways (Kern, 2014; Selwyn, 2013).

The AAAS report offers an interesting opportunity to the CALL field: a venue for a critical look at the bigger picture, namely macro-level discourses of language and technology. This examination is critical in two ways. First, these discourses are critical to our understanding of CALL: From ecological and language-as-discourse perspectives, these discourses, articulated primarily through language and captured in language policy documents like the AAAS report, produce real-world impacts in common CALL contexts (Blin, 2016; Blommaert, 2005). Second, this examination assumes a critical lens, engaging with and interrogating sources of power and inequality in relation to CALL (Helm, 2015).

To that end, the current article sets out to explore macro-level discourses of language and technology in the United States by way of a critical discourse analysis of the AAAS report. To do so, I first discuss discourses of language and technology that frame the analysis. I next summarize the theoretical approaches that prompt this analysis and why the AAAS report serves as an appropriate analytical target. Following a review of the research design, I then discuss how language, technology, and technology in language learning were positioned in the AAAS report and what this suggests about discourses of language and technology in the United States. I conclude with a discussion of the implications of these findings for CALL.

Background

Discourses of Language and Technology

Language and technology have been positioned in a variety of ways in the United States through a range of different discourses—the ways of understanding and organizing the world and, more specifically, language and technology within that world (Foucault, 1978; Pennycook, 1994, p. 128). For instance, non-English languages in the United States have been understood

in national-level conversations in terms of bolstering economic profit (Lo Bianco, 2014), cultivating cultural understanding (García, 2009), promoting national security (Council on Foreign Relations, 2012; Perkins, 1980), and preserving heritage and equality (García, 2009; Ruiz, 1984). Digital technology has also been positioned in terms of economic profit (Selwyn, 2011) and national security (Council on Foreign Relations, 2012), as well as in terms of promoting, transforming, and democratizing learning (Selwyn, 2016; U.S. Department of Education, 2016). (For a review of additional discourses, see Hellmich, 2018; Selwyn, 2013, 2016.)

Of particular concern to the current endeavor are macro-level discourses linked to inequality. Despite its numerous benefits and potentialities, technology in language learning is not neutral and can play a role in maintaining and promoting unequal relationships (Kern, 2014; Selwyn, 2016). One discourse linked to inequality that has been gaining attention in the applied linguistics community is neoliberalism (Bernstein, Hellmich, Katznelson, Shin, & Vinall, 2015; Block, Gray, & Holborow, 2012; Duchêne & Heller, 2012). Originally an economic theory rooted in the logic of the free market, neoliberalism has spread beyond economics over the past few decades, extending an increased focus on competition, meritocracy, and individual responsibility to a range of societal domains (Bernstein, et al., 2015; Harvey, 2005). Importantly, this organization around the market is not neutral: When markets decide, people lose, making vulnerable populations more vulnerable as unequal power relations are solidified.

Both language and technology have been positioned by and implicated in neoliberalism. For instance, neoliberalism has been tied to the reduction of language to a commodified skill, the reduction of language teachers to expendable knowledge workers, and the establishment of global language learning industries (Bernstein, et al., 2015; Block, Gray, & Holborow, 2012; Duchêne & Heller, 2012). Technology can be seen as both a driver of neoliberalism (facilitating the spread of free-market principles) and a by-product of neoliberalism (technological innovation as rooted in the search for new markets) (Harvey, 2005, pp. 68–69). Moreover, technology in education specifically has been criticized for promoting neoliberal tendencies: emphasizing the commodification of education, contributing to the free-marketization of education, and underscoring economic competition and educational efficiency (Selwyn, 2013; Veletsianos & Rolin, 2017).

Theoretical Approach: Ecological CALL and Language-as-Discourse

While CALL research and practice often focuses on micro-level issues and contexts, these macro-level discourses are also essential to consider (Helm, 2015). This importance stems from two intertwined theoretical approaches:

ecological CALL and language-as-discourse. Ecological CALL represents an instantiation of an ecological metaphor to computer-assisted language learning (Hubbard & Levy, 2016) and hinges on an understanding of technology-mediated learning environments as *ecosystems*: the multiple components—e.g., languages, learners, teachers, technologies—and multiple scale levels—e.g., spatial (local, national, international) and temporal (past, present, future)—that interact to impact the use of digital technologies in language learning (Blin, 2016, p. 75; Kramsch, 2002). From an ecological perspective, macro-level discourses are a component of these ecosystems and, therefore, have the potential to impact how digital technology is used for language learning at lower scale levels.

How and why discourses matter for CALL is further articulated by a language-as-discourse theoretical stance (Blommaert, 2005). Discourses are commonly, although not exclusively, articulated through language. From a language-as-discourse perspective, language both reflects and constructs social realities, producing real-world effects. Discourses of language and technology, then, both reflect and construct current understandings of these constructs and have the potential to enact and reproduce particular ways of organizing society, including those rooted in inequality. This relationship reinforces the potential of macro-level discourses to impact CALL practices and points to discourses' textual manifestations in language policy documents as a way to analyze them (Stemper & King, 2017).

The AAAS Report

The American Association of Arts & Sciences' 2017 report on language represents one venue for such an analysis. The report stemmed from a bipartisan and bicameral Congressional request to “examine the relationship between language learning and the nation's strength, competitiveness, and well-being” (Commission on Language Learning, 2017, p. 39). The report asserted that English, while maintaining its importance as a lingua franca, was “not sufficient” (p. viii) and identified a national “language deficit” (p. 3) that was incompatible with current national and individual needs. Following these findings, the report provided a series of recommendations to improve non-English language learning/teaching and proficiency.

This report stands as an appropriate venue for the proposed analysis for several reasons. First, the centrality of language in the report, evidenced in its topic and scope, is paired with important roles ascribed to technology. Within the report's seven findings, two involve technology: the importance of digital technology in supporting language learning (Commission on Language Learning, 2017, p. ix) and the importance of language competencies in science and technology research (p. viii). Of the report's five recommendations,

digital technology figures prominently in the first and largest recommendation (increasing the number of language teachers): It is cited in two of the four sub-recommendations. In addition, as we will see, technology also played a role in the production of the report itself.

Second, while it is not yet known how the AAAS report will be taken up and the extent of its influence, we do have a few indications of its potential impact. The only other national report on the status of non-English language competences in the United States, the Perkins Report (Perkins, 1980), prompted shifts in applied linguistics following its publication, namely toward standardization and measures of proficiency (Kramsch, 2005, p. 556). Moreover, despite its recent publication, the AAAS report has already been cited in prominent applied linguistics journals, such as *Foreign Language Annals* (e.g., Hlas, 2018), and listed on the websites of prominent applied linguistics organizations, such as the Center for Applied Linguistics. These past and future indicators suggest the potential influence of the AAAS report on the teaching/learning of non-English languages and fortify the need to understand the discourses indexed in the report.

To that end, this study asks:

What does a critical discourse analysis of the AAAS report suggest about macro-level discourses of language and technology in the United States?

Research Design

Critical discourse analysis (CDA) served as the methodological framework for the study (Blommaert, 2005; Fairclough, 2001). CDA looks to examine “the way social power abuse, dominance, and inequality are enacted, reproduced, and resisted by text and talk in the social and political context” (Van Dijk, 2001, p. 352).

Despite its analytical potential and fit for the current analysis, CDA is subject to important limitations and biases (Blommaert, 2005; Pennycook, 2001). Several of these are addressed in the research design, described below. Additional commentary on limitations/biases can be found in the penultimate section of the article.

Data

The content of the AAAS’s report *America’s Languages: Investing in Language Education for the 21st Century* (Commission on Language Learning, 2017) constitutes the primary data used in this analysis. The report was organized into a main body (preface, executive summary, introduction, four body sections, and a conclusion) and supplementary materials (endnotes, the congressional letters that invited the report, and commission members’ information).

Three additional national reports were used to contextualize the production of the AAAS report and thereby to mediate two central limitations of CDA: a linguistic bias (not attending to what happens before and after a text is produced) and, relatedly, an a-historical approach (not attending to the historical context of production) (Blommaert, 2005). These reports are described below.

Data Analysis

In practice, CDA looks to link micro-level features of texts to macro-level discourses through iterative rounds of analysis (Blommaert, 2005; Fairclough, 2001). For the current article, the analytical targets included:

1. Frames of Language, Technology, and Technology in Language Learning

Frames—or the roles these components were seen to play—were selected for analysis as a way to examine how particular language and technology discourses were implied or reflected in the AAAS report (Valdez, Freire, & Delavan, 2016). Frames were identified through inductive and deductive coding. Deductive codes were rooted in established discourses of language and technology (e.g., national security). To respect the ecological orientation, inductive coding produced additional code categories (e.g., technology as a priority). (See Appendix 1 for an annotated list of all frame codes used in the analysis.) Iterative analysis led to establishing patterns across all codes and reorganizing them into broader categories. Frames were then analyzed in terms of salience in the document and in relationship to each other and to scales (Miles & Huberman, 1994).

2. Temporal and Spatial Scales

Scales were selected for analysis given the ecological orientation as well as to mediate CDA's often limited conceptualization of temporal and spatial contexts (Blommaert, 2005). Temporal scale markers referenced the positioning of language and technology in terms of past, present, and/or future contexts. Spatial scale markers indicated how language and technology were positioned in physical space—individual, local/state, national, or international contexts. Analysis of scales was iterative, with multiple rounds of coding used to identify the temporal and spatial scale markers in the text. Once identified, temporal and spatial scale markers were analyzed in terms of their relationships to frames and to each other in order to shed additional light on the positioning of language and technology within the AAAS report (Miles & Huberman, 1994). Examples of coded scale markers can be found in Appendix 2.

The application of codes to the data was done using qualitative data analysis software (Dedoose) and underwent inter-rater reliability procedures:

Following training in the codebook and the analysis software, a colleague with experience in discourse analysis applied the codes to the data set. A 90.2% match in code application between the author and the second coder was calculated, in line with accepted benchmarks (Loewen & Plonsky, 2016, pp. 90–91).

Genesis of the AAAS Report

The AAAS report can be linked to the publication of several other national documents. Released in 2005, two reports—*Tapping America's Potential* and *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*—decried a crisis in the country's STEM (science, technology, engineering, and math) competences, which were seen to be lacking in comparison to international peers (National Academy of Sciences, National Academy of Engineering, & Institute of Medicine, 2007). While there remains some question as to the veracity and depth of this “crisis,” these reports led to significant legislative action that increased funding to STEM research and education and to the prioritization of STEM on a national scale (Teitelbaum, 2014).

In response, a parallel advocacy effort was launched by members of the AAAS on behalf of the humanities and social sciences (Commission on the Humanities and Social Sciences, 2013, p. 6). In 2010, the AAAS was asked by a bicameral and bipartisan Congressional group to investigate the role of the humanities and social sciences in achieving national intellectual, economic, and diplomatic goals (Commission on the Humanities and Social Sciences, 2013, p. 66). The resulting report, *The Heart of the Matter*, was published in 2013 and underlined the importance of humanistic disciplines as well as how to improve American competences in these domains.

In 2015, a different but similarly structured Congressional group asked the AAAS to extend the work begun in *The Heart of the Matter* to the nation's non-English language competences. Specifically, the AAAS was asked to investigate:

How does language learning influence economic growth, cultural diplomacy, the productivity of future generations, and the fulfillment of all Americans? What actions should the nation take to ensure excellence in all languages as well as international education and research, including how we may more effectively use current resources to advance language learning? (Commission on Language Learning, 2017, p. 40)

In response to this request, a Commission on Language Learning was formed, comprised of 18 members ranging from university professors and administrators to representatives from different organizations and associations

(e.g., Modern Language Association, Foreign Service Institute). The commission completed its charge over a two-year period, collecting a range of data including expert consultation and testimony (pp. v–vi).

Findings

Findings are organized into three sections: a summary of the frames and scales in the AAAS report, detailed analyses of select frames and scales and their interrelationships, and an analysis of these findings in relation to other texts.

Summative Analysis

The AAAS report contained multiple frames of language and technology. Most prominently, both language and technology were positioned by a competition frame (41 instances). In addition, technology was positioned as a national priority (5 instances), an omnipresent reality (6 instances), and as key to improving language competencies (13 instances), specifically as a medium (1 instance), as a tutor (7 instances), and as a tool for access and motivation (7 instances). Language was additionally positioned by several frames, including cognitive benefits (10 instances), national security (14 instances), cultural enrichment (14 instances), equity (7 instances), and heritage (26 instances).

These frames were produced at multiple scale levels. A national scale was the most prominent spatial scale produced across the report (87 instances), followed by an international scale (50 instances). Local/state and individual scales were less frequently referenced (35 and 25 instances respectively). Present and future timescales were most prominently produced (74 and 71 instances, respectively), with less frequent emphasis on past timescales (34 instances). Overall, then, the report was largely forward-looking, aiming to improve on current conditions by way of the recommendations offered, and nationally-focused, looking from the nation outward to international peers.

Detailed Analysis

Competition

Across the report, the most dominant frame for both language and technology was one of competition (41 instances). This frame manifested in three ways. First, the competition frame was invoked in relation to language and business (25 instances): Non-English language capacities were framed as “critical for success in business” (Commission on Language Learning, 2017, p. viii) and the current “linguistic deficit” was cited as responsible for multiple “missed opportunities” in this sector (p. 1).

Second, competition manifested in relationship to technology: The United States’ linguistic deficit was seen to “impede progress” in science and technology research (6 instances). More specifically, without the ability to engage with

non-English scholarship and researchers, the United States stood at a competitive disadvantage in terms of science and technological innovation and research. Conversely, then, bolstering national language competencies would improve national competitiveness in these areas (Commission on Language Learning, 2017, p. 2).

Third, competition manifested more generally in relation to national deficits or loss (9 instances). For instance, one of the report's central findings was that the United States "lags behind" the rest of the world's nations, specifically Europe and China, in its language capacities (p. viii). Moreover, the projected consequences of this lag were "being left out of any conversation that does not take place in English" (Commission on Language Learning, 2017, p. 8) in the future.

In terms of scales, the competition frame mirrored the larger trends of the report. For instance, the competition frame most often co-occurred with national and international scales (30 and 26 co-occurrences, respectively). This co-occurrence points to the fact that the competition threaded throughout the report put the nation in competition with international entities. Moreover, the loss subframe highlights concerns about the outcome of that competition: losing to global peers. In addition, the competition frame most often co-occurred with present and future scales (26 and 17 co-occurrences, respectively), with less reference to the past (9 co-occurrences).

Technology as a Priority

In addition to being positioned as one of the reasons why the United States needed to bolster its language competencies via a competition frame, technology, as a part of STEM, was also positioned as a valued priority. Co-occurring most frequently with a national scale level (5 instances), this priority status for technology was largely national in scope. Moreover, this priority frame overlapped almost entirely with a competition frame (4 co-occurrences), indicating that the national value ascribed to technology was tightly connected to the nation's competitive status. In addition, the report underscored that technology's national priority status had had detrimental effects on language education: STEM had dominated American curricula for the past ten years and competed with language education for funding, time, and recognition (Commission on Language Learning, 2017, p. 9). Ironically, then, the priority status of technology had contributed to a linguistic deficit that was now impeding technological research and innovation.

Technology as Key to Improving Language Learning

Technology was also seen as a key way to improve language learning in the United States (13 instances). This role took on three forms:

1. **Technology-as-Tool: Access and Motivation.** One of technology's largest assigned roles in improving language learning was as a tool (Kern, 2011), specifically in terms of enhanced access to and motivation for language learning (7 instances). For example, technology was seen "as a means for providing educational opportunities to more students across the nation" (Commission on Language Learning, 2017, p. ix) and as a way to encourage "more people to learn more languages" (p. 13).
2. **Technology-as-Tutor:** Technology was also positioned as fulfilling some of the functions of the teacher (7 instances) (Kern, 2011). For example, in the report's central recommendations, blended learning models "through which students receive some part of their curriculum digitally—often through practice exercises, video, or interactive games" (Commission on Language Learning, 2017, p. 11) were noted to be especially useful in addressing the nation's current teacher shortage. In addition, the report cited a range of applications and programs (e.g., Memrise, Duolingo) that were "introducing world languages to students on their own time" (Commission on Language Learning, 2017, p. 12).
3. **Technology-as-Medium:** Digital technology was finally positioned in the report in relation to connection (Kern, 2011)—as a way "to explore other countries without having to travel" through social media (e.g., Facebook and Instagram) and telecollaboration platforms (e.g., Skype) (Commission on Language Learning, 2017, p. 12). This frame was unique in several ways: Unlike the other frames, this frame was only produced once in the report, and it was not evoked in the central findings or recommendations. Moreover, this was the only frame of technology in language learning to index an international scale.

For all three specific ways in which technology was seen to support language learning, there was no co-occurrence with frames of language. On the one hand, this finding could suggest that technology in language learning was seen to implicitly support the different roles ascribed to language in the report. On the other, however, this generic focus could also suggest a larger quantitative argument: technology as a way to increase the number of Americans exposed to and learning non-English languages with less clarity on what exactly students would be learning and to what ends. In either case, it would be the discourses of language and technology that motivate the use of technology for language learning, making understanding these discourses even more essential.

In terms of scales, while these frames matched the report's larger temporal scale trends, they diverged in terms of spatial scales: Excepting the

technology-as-medium frame, the technology in language learning frames co-occurred most frequently with individual, local/state, and national scales (8, 4, and 3 co-occurrences, respectively) and did not co-occur with international scales; This suggests that while technology in language learning was positioned as a key way to mediate the country's linguistic deficit, itself in relation to international competition, the specific use of technology was imagined domestically, without global connections.

National Security

Language in the report was additionally ascribed a role in national security (14 instances): National defense and diplomacy were seen to depend on “our ability to understand our adversaries as well as our friends” and, by extension, on non-English language capabilities (Commission on Language Learning, 2017, p. 4). Spatially, this frame most frequently co-occurred with both national and international spatial scales (10 and 12 co-occurrences, respectively), indexing the traditional nation-to-international relationship embedded in national security. Temporally, this frame co-occurred most frequently with past and present scales (5 and 6 co-occurrences, respectively), drawing on past and present examples to illustrate the need to improve language learning competences.

Culture, Equity, and Heritage

Language was also ascribed the role of cultural enrichment (14 instances): teaching students about culture and providing cultural experiences. Cultural enrichment co-occurred most frequently with international and local/state spatial scales (7 and 6 co-occurrences, respectively), indicating that the cultural enrichment targeted was in relation to both local/state and international communities. Cultural enrichment also co-occurred frequently with a competition frame (8 co-occurrences); this overlap points to a close relationship between these two frames and the leveraging of culture toward competitive ends.

Language was also seen to be a component of national equity (7 instances) and heritage (26 instances): Improving the United States' language capacity was linked to the need “to provide social and legal services for a changing population” and to the diversity of family and heritage backgrounds in the United States (Commission on Language Learning, 2017, p. viii). This multilingual background of the United States, captured in the heritage frame, was often painted as an asset or resource that could drive the nation's future language and competitive stance (12 co-occurrences).

In line with the larger report, the cultural enrichment, equity, and heritage frames less frequently co-occurred with a past timescale (1, 1, 4 co-occurrences, respectively). While the report should be commended for efforts

to promote heritage languages and for brief nods to the challenges experienced by non-English speakers (e.g., p. 25), this insufficient attention to history, particularly in relation to equity and heritage frames, does not adequately acknowledge the past (or present) marginalization experienced by linguistic minorities in the United States (García, 2009; Watzke, 2003). Without enough attention paid to this history, the re-framing of these multilingual individuals as “assets” becomes particularly problematic.

Intertextual Analysis

Several of these frames, scales, and interrelationships can be linked to the texts that led to the production and publication of the AAAS report. Looking to its immediate source of production, the bi-partisan congressional request specifically referenced language in relation to national security (“cultural diplomacy”) and competition frames (“economic growth” and “research”) (Commission on Language Learning, 2017, p. 40). In other words, the AAAS report’s justification of language learning in terms of national competition as well as other frames stem in part from the Congressional request that prompted it.

The AAAS report also indexed its more distant predecessors. For instance, the justification of both language and technology in relationship to national competition in the AAAS report reproduced elements of both the 2005 reports on STEM (*Tapping America’s Potential* and *Rising Above the Gathering Storm*) and the 2013 report on the humanities (*The Heart of the Matter*), all three of which framed portions of their arguments in such terms. For instance, fostering national competitiveness was a part of the second major goal of *The Heart of the Matter* (p. 11), in step with AAAS report. In addition, the fear of “falling behind” in relation to global peers in the AAAS report echoed concerns in *Rising Above the Gathering Storm* about the “eroding” status of the United States in comparison to other nations (National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 2007, p. 3).

Moreover, the AAAS report indexed the perceived crisis in STEM, called out in *Tapping America’s Potential* and *Rising Above the Gathering Storm*, in two other ways. First, the AAAS report underscored the priority status of technology over the past decade, itself a result of the prioritization of STEM that followed the 2005 reports. Second, the justification of language learning in terms of science and technology research also referenced this perceived STEM crisis, using an established national concern as one of the ways to promote language learning.

In many ways, then, the concerns that preceded the publication of the AAAS report—concerns over a decline in America’s national competitiveness and the drive to arrest that decline—were subsequently reproduced in the AAAS report as a way to promote language learning.

Discussion: Broader Understandings of Language and Technology

The frames and scales in the AAAS report suggest several things about language and technology in the United States. First, the analysis done here highlights a multiplicity of roles ascribed to language and technology across scale levels. This multiplicity speaks to the complex terrain that surrounds language, technology, and CALL as well as the competing and overlapping understandings of these components in macro-level discussions.

Second, the frames and scales in the AAAS report also give insight into the larger positioning of language and technology in the United States. For instance, technology is seen as a highly valued commodity on national playing fields. More specifically, technology, as a part of STEM, is seen as critical to national prosperity, competition, and dominance in the global world order. Conversely, the report indexes the fact that non-English languages have not been valued in the United States despite a multilingual history and present (García, 2009; Watzke, 2003).

Third, the multi-faceted prominence of competition in the AAAS report—as well as in the reports that led to its publication—suggests the presence and prominence of a neoliberal discourse in American society and the use of this discourse to position both language and technology. Under neoliberalism, the principles of competition and the free market are seen as natural ways to order society. As we have seen, these neoliberal principles were used to position both language and technology across the AAAS report: Technology was defined in terms of its national market value as well as its role in advancing national competitiveness in the future and in relation to international others, while language was repositioned as serving national competitiveness, including in technological research and innovation. Moreover, while the inclusion of frames that index more humanistic discourses of language (e.g., culture, equity, and heritage) is important to note, the ultimate framing of culture and multilingual heritage in the AAAS report further suggests a neoliberal discourse, as both culture and heritage speakers were re-positioned and leveraged toward national competition with insufficient acknowledgement of past injustices.

In addition, the fear of “falling behind” within the competition frame indexes a neoliberal discourse in another way. Central to the AAAS report and its origins is an emphasis on cultivating human capital: It is increasingly the intellectual capacities of a nation, rather than its natural resources, that drive its economy and place in the global order (Powell & Snellman, 2004, p. 201; Teitelbaum, 2014). Itself a component of neoliberalization, this shift has resulted in consequences for individuals, who are now responsible for demonstrating a readiness to comply with constantly-shifting market demands.

While scholars in applied linguistics have highlighted these anxious acrobatics on the individual level (Bae & Park, 2016; Park, 2015), the AAAS report represents a national-level manifestation of the anxiety that comes with a volatile neoliberal world.

When driven by a neoliberal discourse, the proposed use of digital tools in language learning in the AAAS report falls into the service of making the United States more competitive on a global market: CALL works to rectify the linguistic “lagging behind” in comparison to other countries and to extend the competitive reach of the United States. Moreover, the specific uses of technology for language learning promoted by the report dovetail with larger neoliberal tendencies: a quantitative emphasis on access over what is accessed and little attention paid to cultural understanding and substantial communication.

Implications for CALL and Future Research

As indicated in the premise of this article, macro-level discourses of language and technology have the potential to influence the use of technology for language learning on smaller scale levels. A first implication of this work is that CALL practices are influenced by and reproducing a neoliberal discourse, driven by and promoting market-based mentalities and the inequality that accompanies such mentalities. By extension, CALL could be implicated in the exacerbation of social inequality, as other scholars have previously warned (e.g., Kern, 2014).

That said, more work is needed to understand how exactly the macro-level discourses present in the AAAS report and United States society influence CALL practices. To properly account for the linguistic bias of CDA, for instance, additional triangulation beyond what was done here is needed, namely moving beyond the textual manifestations of discourse and exploring its future trajectory (Blommaert, 2005). By extension, an important area of future research would be to examine how neoliberal and other discourses impact different contexts within CALL ecosystems—how they are appropriated, re-appropriated, and potentially even resisted in different learning environments. For example, understanding how and why students, teachers, and administrators within a particular school use digital tools in language learning in relationship to these discourses of language and technology would help to complete the current analysis.

An additional implication of this work is the importance of situating CALL research and practices within macro-level discourses of both technology and language. For instance, the analysis done here brings to the fore the important yet infrequently discussed connection between the technology we use in our classrooms and the larger, complex, and power-infused agendas that surround digital technology in the United States and internationally. As CALL

researchers and educators, it is important to examine the reasons for using technology in language learning and to interrogate the different and layered agendas that encourage technology's use. Guiding questions to that end might be:

- To what ends is a particular technological tool being used in language learning?
- To what ends is language learning, fostered by that tool, being used?
- How might bigger discourses of technology and language influence this digital tool use?

In relation to the current analysis, these questions might serve to denaturalize and thereby counteract the larger neoliberalization of society and its influence on CALL. Neoliberalism's greatest strength lies in its naturalization, adopted as common sense (Harvey, 2005). By interrogating macro-level discourses of language and technology in relationship to CALL, neoliberalism is more likely to be identified and to be questioned as an organizing principle of society. Rather than reproducing national concerns and discourses, then, CALL can play a role in disrupting them.

Conclusion

The critical discourse analysis of the AAAS report done here revealed an intricate web of frames and scales of language and technology that, taken together, suggest a neoliberal discourse that positioned language, technology, and technology in language learning as tools to enhance national competitiveness on a global marketplace in the United States.

Like many language educators, I am deeply committed to the AAAS report's assertion that Americans should learn more non-English languages. Moreover, I am deeply committed to the continued role of technology in that learning. That said, the analysis done here points to the complexity surrounding technology, language, and technology in language learning in American society today and the need to closely examine macro-level discourses given their potential to influence CALL practices. As a field, we must take it upon ourselves to critically examine the bigger picture in depth and detail to ensure that CALL research and practice is leveraged consciously and responsibly (Motha, 2014, p. xxiii), promoting humans over human capital and meaning over markets.

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Appendix 1

Full List of Frame Codes and Descriptions

Language		
Code	Type	Description
Competition	Deductive	Reference to competition or competitiveness; distinct from national security.
Economic Benefit	Deductive	Reference to economic gains or preparation
Loss/deficit	Inductive	Reference to comparisons, deficits, loss
Advancing STEM	Inductive	Reference to advancing (STEM) research
National Security	Deductive	Reference to national military defense and diplomacy goals
Heritage	Deductive	Reference to multilingual U.S., family/heritage backgrounds
Asset	Inductive	Reference to heritage as an asset or resource
Equity	Deductive	Reference to increasing equal rights among citizens
Cultural Enrichment	Deductive	Reference to cultural learning/experiences or enrichment
Cognitive Benefits	Deductive	Reference to improving cognitive capacities
Technology		
Code	Type	Description
Omnipresence	Inductive	Reference to technology as everywhere
Priority	Inductive	Reference to national priorities
Key to Language Improvement	Inductive	Reference to technology as support for language learning
	Role of technology in LL	
Medium (Kern, 2011)	Deductive	Reference to technology as a way to communicate and connect with individuals around the world
Tutor (Kern, 2011)	Deductive	Reference to technology as taking on the role of the teacher in some way (e.g., practice, feedback)
Tool (Access, motivation) (Kern, 2011)	Deductive/ Inductive	Reference to technology as offering increased opportunities or motivation to learn language

Appendix 2

Examples of Temporal and Spatial Scale Markers in the AAAS report

Temporal Scale Markers		
<i>Past</i>	<i>Present</i>	<i>Future</i>
"Linguistic diversity is deeply embedded in our history" (p. 5)	"While English continues to be the lingua franca for world trade and diplomacy" (p. viii)	"... English is critical but not sufficient to meet the nation's future needs" (p. 6)
"In the past, the United States has only focused on language education in times of great need" (p.30)	"We are a proudly multicultural, polyglot nation" (p. 1)	"Language education will continue to be influenced by advances in technology and research" (p. 12)

Spatial Scale Markers			
<i>Individual</i>	<i>Local/State</i>	<i>National</i>	<i>International</i>
"The study of a second language has been linked to improved learning outcomes" (p. viii)	Language has given me the ability to expand my understanding of my community" (p. 28)	"The share of U.S. adults who report similar knowledge is closer to 20 percent ..." (p. 8)	"... 66 percent of all European adults report having some knowledge of more than one language" (p. 8)
"Technological innovations [will be] ... an aid and reference for people in their everyday lives" (p. ix)	"Blended learning models ... are particularly beneficial in communities with a short supply of language teachers" (p. 11)	"School curricula are already overloaded and, over the past decade, STEM education has been a national priority" (p. 9)	"The United States lags behind most nations of the world" (p. viii)