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Writing as Creative Design: Constructing Multimodal Arguments in a Multiliteracies Framework

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Abstract

We propose that the perspective of multiliteracies frames writing instruction as the creative construction of meaning across various modalities, and we illustrate how that view might be instantiated instructionally by engaging students in the creative design of multimodal arguments. The background and key elements of the multiliteracies perspective are overviewed, as is relevant research linking it to multimodal writing and creativity. An instructional example of using digital tools to construct multimodal arguments drawn from our work in classrooms is provided. We discuss the challenges writing teachers face in addressing the conventional goals of writing instruction while integrating creatively rich, multimodal digital forms of expression into teaching, and we suggest research that might address those challenges.

Keywords: multiliteracies, creativity, multimodal, composition, argument

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For teachers of writing, the contemporary literacy landscape presents challenges, but also inviting opportunities. The goals for helping students develop proficiency in writing conventional texts remain. The implicit rationale for those goals is to insure academic success, future employment, and national competitiveness in a global economy (e.g., National Commission on Writing, 2003, 2004). Although given less emphasis, though presumably still important, is preparing students to engage in democratic citizenship and dialogue, particularly by constructing and presenting cogent and convincing written arguments. For example, in the United States the Common Core State Standards (CCSS) in the area of writing reinforce attention to conventional genres such as developing informational texts and reasoned argument (Council of Chief State School Officers [CCSSO] & the National Governors Association Center [NGAC], 2010).

However, these traditional genres and their attendant goals exist today within an increasingly post-typographic world where digital forms of communication now predominate (Crockett, Jukes, & Churches, 2011; Jenkins, Clinton, Purushotma, Robison, & Weigel, 2006). Writing in a digital world entails unique tools, forms, and genres of writing, suggesting new skills, strategies, and dispositions for reading and writing. That reality cannot be ignored. Yet, addressing it, especially given a continued commitment to conventional writing, is clearly a challenge. Nonetheless, as we argue here, the diverse affordances of digital tools, the multimodal genres they have birthed, and the expansive audiences they have generated offer engaging new avenues for creative expression that might be seamlessly merged with conventional forms of writing.

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The revolutionary shift of literacy toward the digital is beginning to appear in curriculum development. The CCSS in the area of language arts again provide an example. One of those standards calls for students to gather information from print and digital sources, and another calls for students to collaborate and publish their writing online (CCSSO & NGAC, 2010). Yet, the gap between the literacy being developed inside of school and practiced outside school remains (e.g., Hutchison & Henry, 2010; Lenhart, Arafeh, Smith, & Macgill, 2008). A majority of adolescents are engaged in and adept at using digital media for writing outside of school, although more for social purposes than for developing the reasoned arguments necessary in academic and work settings and in exercising citizenship (Lenhart et al., 2008). Data suggest that they are less adept at associating digital tools with academic tasks (Purcell, Heaps, Buchanan, & Friedrich, 2013). Data also suggest that, although language arts teachers acknowledge a need to integrate new forms of literacy into their instruction and favor doing so, many of them equate integration with simply using digital technologies, rather than creating new instructional activities and adopting new curricular goals (Hutchison & Reinking, 2011).

How do writing teachers contend with the challenges and exploit the opportunities of teaching writing given the current landscape that continues to value traditional goals of writing, while embracing digital forms of expression? We believe that focusing on creative construction of meaning from the standpoint of what has been termed multiliteracies is a useful way forward. Specifically, digital texts enhance creative construction of meaning by providing a wider range of affordances that are increasingly aligned with the literacy that students engage in outside of school and that are likely to move increasingly into the mainstream of written communication. At the same time, writing digital texts offers students creative opportunities to engage in modes of thinking and constructing meaning that develop and reinforce the conventional goals of

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writing instruction, particularly those associated with academic success. In subsequent sections, we elaborate that view, focusing on the creative construction of what we call multimodal arguments. We also share our experiences working with middle-school students engaged in developing multimodal arguments to illustrate how such activities might encourage creative construction of meaning while simultaneously addressing conventional and emerging goals for writing instruction.

Multiliteracies, Multimodal Writing, and Creativity

Viewing all forms of writing as a creative construction of meaning requires a view of literacy that includes, but transcends, the relatively narrow symbol systems and technologies of conventional printed texts. Such a view is well established in the literature about literacy, if not in practice. Most prominently, a group of scholars, referring to themselves as the "New London Group" (NLG) because they met in New London, New Hampshire, outlined a new approach to literacy pedagogy that they called *multiliteracies* (NLG, 1996). Their overarching aim was to broaden existing conceptions of literacy to accommodate increasing social and cultural diversity and to acknowledge a wider range of modes for expressing meaning, focusing particularly on emerging digital technologies. These aims are particularly relevant to conceptualizing writing as the creative construction of meaning and specifically to constructing multimodal arguments. Some of the entailments of the NLG's multiliteracies perspective, which we discuss in the following sections, are particularly relevant to the perspective we are offering here.

Constructing Meaning is Multimodal

The NLG (1996) proposed that a pedagogy based on multiliteracies must be multimodal including, but going beyond, the linguistic elements of conventional literacy. Thus, reading and writing must also acknowledge the visual, auditory, spatial, and gestural modes. The NLG

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(1996) defined modes as a way of discussing meaning in "various realms" (p. 77). Subsequently, other scholars discussing multimodality have described modes as methods for making meaning (Albers, 2006), as genre (Hicks, 2009), and as sets of semiotic resources (Jewitt & Kress, 2010). Modes vary, and meaning is often constructed differently across those modes. Presciently, in light of the then only emerging digital forms, the NLG (1996) argued, "In a profound sense, all meaning making is multimodal. All written text is also visually designed" (p. 81). That view echoed Lanham's (1993) argument that emerging digital forms inspire a visual, not a philosophical rhetoric, in which readers look *at* not *through* the visual representation of a text. Later Kress (2000, 2003), a member of the NLG, argued that the central role of written language may move to the margins as communication becomes increasingly visual and as mainstream communication moves from a page to a screen.

Learners as Designers in a Digital Context

The multiliteracies perspective sees the construction of meaning as being carried out by designers who employ multimodal tools in creating texts in a sociocultural context. Design is seen as "a sufficiently rich concept upon which to found a language curriculum and pedagogy" (NLG, 1996, p. 73). However, according to Cope and Kalantzis (2000) multimodal design "is . . . much more that the sum of linguistic, visual, spatial, gestural and audio modes of meaning. It also involves processes of integration and moving the emphasis backwards and forwards between the various modes" (p. 211). Put another way, design is an inherently creative act. The NLG (1996) recognized the link between design, creativity, and innovation by introducing the term *hybridity* referring to "multifarious combinations of modes of meaning cutting across boundaries of conventions and creating new conventions" (p. 82).

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Digital texts personify the creative act of designing multimodal texts because their inherent affordances entail various linguistic, auditory, and visual media (i.e., they entail multimedia; see Reinking, 2005) that can be blended in infinite ways. However, the design of digital texts today extends beyond what the NLG might have imagined. For example, by 2009 adolescents already engaged with modes of media—music, television, computers, and video games—more than seven hours a day (Rideout, Foehr, & Roberts, 2010). More recent data document that 95% of teenagers are online (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013), and 83% of young adults use online social networking sites (Duggan & Brenner, 2013). Alvermann (2008) argued that these shifts in the use of communication media suggest the need to examine adolescent literacy and how the literacies of students' lives outside of school may not be acknowledged in the world of school, which remains largely print-centric. The theory of multiliteracies directly addresses this disjuncture.

In an increasingly digital world, teaching students to construct meaning using these various media and modes requires helping them understand the purpose of each mode and how to use each one effectively. Hicks (2013) equated teaching students the purpose of modes with creativity: "When we talk and teach thoughtfully about the elements of digital writing—words, images, sounds, videos, links, and other media elements—we are helping them [students] to be purposeful and, in turn, helping them to be creative" (p. 19). It seems clear that inspiring creativity in a literacy landscape saturated with diverse media means embracing multimodal forms of expression for both readers and writers. For example, decisions must be made about digressive or supportive links and options for non-linear pathways that allow readers to participate in constructing textual meaning. Thus, readers are repositioned and must be considered more explicitly in the design of digital texts. A designer must consider what

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assistance to provide readers and how much control over the text is allowed a reader under certain circumstances. Digital texts open up creative potential for blurring the boundaries between reader and writer in ways that personify Barthes' (1975) description of the ideal text as 'writerly,' and in which a reader shares in the construction of meaning. Interestingly, too, digital texts can be designed to read readers (see McEneaney, 2006) and thus to adapt in response to individual readers.

Designing digital texts also involves what might be conceptualized as writing in four dimensions. In addition to the two-dimensional positioning of prose and graphical information on a flat screen, digital texts add a third dimension of depth by simulating layers of visual elements. Time is a fourth dimension because the designer of a digital text must make decisions about when and under what conditions symbolic elements and media appear or are available. In fact, to encounter a digital text that does not use such design affordances leaves the intuitive impression of a flat, inert text inattentive to its symbolic and creative potential.

Importance of Argument

The NLG (1996) saw the need to empower students through literacy to acquire agency in effecting constructive social change, again using the metaphor of design: "Students, as meaning-makers, become Designers of social futures" (p. 65). The perspective of multiliteracies was proposed to challenge conventional views of literacy grounded exclusively in linguistic expression as written prose, but it also drew attention to an established socio-cultural milieu that conventional pedagogy had long served, but that had already begun to change. In the view of the NLG, the world has changed politically, culturally, and economically, and so must its views of literacy pedagogy and the ends it aims to serve. Writing conventional arguments, as a positive rhetorical skill, connects directly to the socio-cultural emphasis of multiliteracies. However,

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argument is enriched with creative opportunity when conceptualized within the affordances of digital texts. For example, arguments and rhetorical moves in digital texts are likely to use visual and auditory elements, often becoming less abstract and philosophical (Lanham, 1993). Further, the NLG (1996) noted, "The new multimedia and hypermedia channels can and sometimes do provide members of subcultures with the opportunity to find their own voices" (pp. 70-71). Online communication can initiate creative civic engagement where students can "creatively extend and apply it [constructive critique]…within old communities and in new ones" (NLG, 1996, p. 87). Thus, engaging students in constructing meaning as argument, for example on the Internet, may be a useful bridge between the goals of conventional literacy and the aspirations of the multiliteracies perspective.

Relevant Research

In this section we provide examples of research that informs how the multiliteracies perspective and the creative opportunities it provides might be practically integrated into curriculum and instruction. Although the available research relevant to this perspective is of relatively limited scope and breadth, it does provide some guidance and suggests avenues for future research.

Writing as Creative Design

Several studies have addressed how the creative design of multimodal texts differs from traditional writing instruction. In these studies, extending writing into the multimodal domain allowed students to see writing as more relevant to their lives, to give them a creative outlet for becoming more engaged in writing, and to find their voice in classrooms. For example, Vasudevan, Schultz, and Bateman (2010) reported case studies of two students from a larger ethnographic study of a fifth-grade classroom in an urban school. The two students in the case

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studies, Michael and Saima, used digital photography and video to write multimodal personal stories in what was called the Buildings Speak project. Michael was described as a student who was typically disengaged in his assignments. However, the project, which allowed Michael to creatively connect his in-school and out-of-school lives, encouraged him to be more engaged in his classwork. Similarly, the project contributed to Saima's movement from a shy girl from Bangladesh, who had only been in the country for a short time, to gain confidence in expressing herself in ways that may not have occurred in conventional writing activities.

Jones (2010) related how technology can be an incentive to writing. She reflected on a college course in which she encouraged students to use podcasts to discuss a topic they planned to write about. Students collaborated in pairs to write a script and then produce a five-minute podcast. She concluded that, "Podcasting differs from written and visual methods of invention...because it requires students to articulate their topic aloud, but more importantly, it is a public performance not solely for the writer and instructor's eyes" (Jones, 2010, p. 79). She noted the performative aspect of the podcast led students to take risks and hone their appeals to audience in ways that surpassed what they might have done on a more traditional, less public, less inherently collaborative, writing task.

In both of these studies, the themes of creativity and risk taking are connected to the multimodal creation of meaning. The multimodal projects allowed the students in the Vasudevan et al. (2010) study to connect their learning to both in- and out-of-school contexts. The creativity these students found in their multimodal projects helped them become more engaged in their learning. In the Jones (2010) study, students were creative in constructing their digital text to be appealing to an audience of their peers. Similarly, students in both studies had to take risks when working with new modes. For example, in the Vasudevan et al. (2010) study,

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Michael had to risk connecting his school and home lives. That risk was beneficial as Michael began to move away from his identity as a disengaged student and to develop an identity as a literate, creative designer of meaningful texts. Saima was able to risk baring her personal voice in this multimodal project in ways that she had previously been unable to do. Jones (2010) discussed that the multimodality of podcasting allowed her students to take risks in writing that they had been reluctant to take in more traditional writing assignments. Whether it was digital photography, multimedia projects, or podcasts, the technology of these multimodal compositions allowed students to grow as writers, connecting contexts for their writing and expanding their audience.

Multiple Modes of Meaning

Multimodal writing is based on the idea that multiple modes may be synergistic in the creative construction of meaning (Albers, 2006; Selfe & Selfe, 2008). Teachers need not limit writing to words on a page. Similarly, the point of multimodal writing is not to assign students to work in a particular mode, but to include as Selfe and Selfe (2008) argued, "a *both this and that* [italics in original] culture" (p. 85) of writing. For example, Rowsell and Decoste (2012) conducted a two-year ethnographic study of adopting a design-based approach to creating multimodal texts within an eleventh-grade English class in Toronto. They discussed that students did not initially have the ability to connect multimodal learning with the concept of writing. Thus, they emphasized that literacy instruction needed to include teaching students the potential means of expression that the affordances of multimodal writing allowed. In a multi-case study of high school chemistry students, McDermott and Hand (2013) found that multimodal composition was beneficial to science learning. However, they discussed that constructing meaning with multiple modes of expression is not simply a layering of independent

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modes; instead, students need to understand how different modes interact if multimodal texts were to eventually contribute to student learning.

Tools for Implementation

Like any form of writing, multimodal compositions must employ technological tools that enable the construction of meaning. Word processing emerged as the first digital tool that bridged the writing of conventional printed texts and the new affordances of digital expression. Today, many more expansive multimodal tools may be found on the Internet ranging, for example, from video-editing software to multimedia slideshows. However, research suggests that many literacy teachers are not tapping into the creative potential of such tools. Instead, the evidence suggests that digital technologies are viewed in terms of conventional goals of instruction rather than as a stimulus to adopt new curricular goals that might engage students in new ways to creatively construct meaning (Hutchison & Reinking, 2011). Despite the relatively little use of innovative technologies that go beyond word processing in classrooms (Edwards-Groves, 2011), there is research suggesting that using a wider range of technology may encourage creativity. For example, in an advanced placement class, Jocius (2013) conducted a qualitative study of eight multimodal student projects in response to the novel *The Kite Runner* in which students developed "multimodal retellings with literary devices" (p. 313). She found that the choice of a technological tool affected which modes the students used in their projects. For example, students who used PowerPoint for their presentations relied upon text and stationary images. However, those students who used digital video technology, such as iMovie (https://www.apple.com/mac/imovie) or Movie Maker (http://windows.microsoft.com/en-us/windows-live/movie-maker#t1=overview), refrained from using text and instead used multiple modes, including voiceovers, moving images, and music. Thus, teachers and students

may need to be aware of the affordances and limitations of the technological tools they choose because each tool may shape the creative space for design.

Similarly, Johnson and Smagorinsky (2013), in a case study of Mara, a student in a class of pre-service writing teachers creating multimodal projects, found that the technological tool made available affected the quality of the multimodal composition and the variety of modes used. Specifically, the majority of the teachers in Mara's class used Animoto (http://animoto.com/) to create multimodal poems rather than Windows Movie Maker (http://windows.microsoft.com/en-us/windows-live/movie-maker#t1=overview). The researchers discussed that those pre-service teachers using Animoto, a video editing tool, had more scripted options for their publication and were limited in their choice. However, using Movie Maker, an alternative tool for video editing, allowed Mara, the subject of the case study, to retain control and freedom in her design of modes for the project. Thus, this study too suggests that the technological tools available may affect the exercise of creativity.

Implementing Multiliteracies with Multimodal Arguments

Drawing on our own work with a teacher in middle-school writing classrooms, we share here a brief example of how the perspective of multiliteracies and the creative construction of meaning might be integrated with the conventional goal of helping students write effective arguments. Specifically, our goal was to engage students in writing arguments as a process of creative design, using multiple modes of expression. In this example, we used an online application called Glogster EDU (edu.glogster.com) that allows students to create a digital poster using music, video, text, and images. In other words, it enables students to engage in construction of an argument as a process of design incorporating digital literacy practices commonly practiced outside of school. Another practical advantage of Glogster EDU is that it

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has settings allowing teachers to control with whom students are allowed to share their posters, thus addressing common concerns about public access, although such access can be allowed when warranted. We had eighth-grade students use Glogster EDU during three consecutive days to construct what was effectively a storyboard of the arguments they would use as the basis for a larger project involving the production of a Windows Movie Maker (http://windows.microsoft.com/en-us/windows-live/movie-maker#t1=overview) video to convey an argument. However, the Glogster EDU portion of the project might have easily stood alone or have been adapted to fit other pedagogical frames.

On the first day, we reviewed the terms often associated with teaching students how to write good arguments (claims, evidence, and warrants), using Smith, Wilhelm, and Fredricksen's (2012) definitions. We also introduced them to Glogster EDU and its technological features by modeling a poster for the students using and explaining these terms of arguments and providing examples of these terms within an argument. Smith et al. (2012) recommended introducing students to the concept of evidence by using popular advertisements. Incorporating a suggested advertisement from Smith et al. (2012), we used a YouTube video of a commercial in which Derrick Rose, a well-known professional basketball player, endorsed a leading brand of basketball shoes, engaging students in analyzing its content focusing on claims, evidence, and warrants (http://youtu.be/ukW66uXM_8Q).

After a discussion of commercial advertisements as a form of argument, we reviewed and analyzed how the elements of argument were represented in multimodal design, particularly the blending of traditional written texts with the various digital media available in Glogster EDU. We pointed out to students how the conventional elements of argument could be embedded in a multimodal construction that provided a more complex, but creatively rich, set of decisions such

as where to place a claim, what music may set the tone for their argument, and what other visuals might appropriately and effectively reach an intended audience, thus introducing the concept of writing in four dimensions.

When we began this project, students had formed groups and chosen a debatable topic of interest to research. Then the groups chose a position on their topic to argue for their final project, which was a video arguing their position. The Glogster EDU activity helped the students plan these videos by composing images, text, and sounds that would best convey their argument. Just as students typically write an outline to plan a conventional essay, this activity was aimed at helping students think of their argument as a multimodal design process consistent with the multiliteracies framework (NLG, 1996). The Glogster EDU poster helped them to focus on including not just text in their final project, but also images and sounds and to think about how these individual elements could be combined to enhance their argument. A pedagogical limitation of Glogster EDU is that although each student can easily make a poster independently, there is no specific provision for simultaneous collaboration as is possible with other online applications such as Google Documents (http://www.google.com/docs/about/). Nonetheless, it is possible to engage students collaboratively, in our case by having students divide their group argument among individual Glogster EDU posters that each represented some portion of the overall content. Some groups divided the parts of the argument among each group member: one member working on the claim while the other members worked on evidence and warrants. Other groups divided the overall argument by scenes that would make up their final project, the video of their argument. Thus, each member was assigned a scene and worked on the claims, evidence, and warrants of that scene. Students collaborated with the other members of their group even as they each worked on individual posters. Group members were encouraged to sit next to one

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another to discuss elements of their argument as they worked on their individual posters. Such collaboration in the creative construction of meaning is essential, not only because research has shown that collaborative writing is an effective element of writing instruction (Graham & Perin, 2007a, 2007b), but also because creating meaning from a multiliteracies perspective is inherently social and dependent on the context of its creation: According to the NLG (1996), "…Human knowledge is initially developed not as 'general and abstract,' but as embedded in social, cultural, and material contexts. Further, human knowledge is initially developed as part and parcel of collaborative interactions with others…" (p. 82). Thus, the multiliteracies frame encouraged us to consider how to include collaboration in the creative construction of meaning, even when the technology is not designed for collaborative writing, as was the case with Glogster EDU. Collaboration is likely to stimulate the interactions that help students generate ideas, creativity, and meaning, as we found to be the case, although this assumption, too, would benefit from systematic investigation.

Before students began creating their Glogster EDU posters, we provided a short lesson highlighting some principles that might be used in designing a multimodal argument. For example, we emphasized how posters must convey a claim supported with evidence in their argument, but also how a multimodal argument uses text, images, and audio to express the elements of a valid and convincing argument. The class discussed how these elements worked together, the decisions needed to make these multimodal components flow seamlessly, what an effective final product might look like, and what criteria might be used to evaluate it. We found such discussion to be useful in highlighting the elements of good arguments presented as conventional texts and how multimodal arguments using tools such as Glogster EDU might be used effectively with expanded affordances for creative expression.

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We found it helpful to demonstrate to students some of the creative possibilities for designing an online poster that would present a multimodal argument. In that regard, Glogster EDU was useful because it includes many examples of online posters developed by students using this tool. Students can view these examples in a section of the Glogster EDU website called Glogpedia (http://edu.glogster.com/glogpedia/). That section offers access to student samples, but it is also searchable by subject area, so students can easily locate examples of multimodal posters in language arts, social studies, science, and other subjects of interest.

The discussion of the Glogster EDU models is an opportune time for students to consider criteria for designing multimodal arguments, comparing them to the development of arguments through more conventional texts, and considering how creativity might be exercised more broadly through multimodal design. To emphasize the differences between conventional and multimodal arguments, we discussed with students a rubric (Hicks, 2009) for evaluating the final version of their Glogster EDU products and how this rubric may differ from those evaluating conventional written arguments. Such specific criteria may help students to be more analytical and reflective in their construction of meaning and offsets a possible tendency to equate creativity with appealing, though superficial, elements in constructing multimodal arguments. Nonetheless, in our experience we tried to balance being too general, thus inviting weak or incomplete arguments, and being too specific with the risk of undermining creativity.

On the final day, the students finished their drafts and provided feedback on each other's arguments. Glogster EDU enables such sharing and also allows a teacher to view students' feedback, although we shared with students that we had this prerogative to review their comments. Although the students had some difficulty sharing their posters due to the limitations of the wireless connection in the computer lab, they were able to send and receive feedback on

each other's writing. That feature instantiates the fundamentally social aspect of the multiliteracies perspective, as explained by the NLG (1996): "A pedagogy of multiliteracies, by contrast, focuses on modes of representation much broader than language alone. These differ according to culture and context, and have specific cognitive, cultural, and social effects" (p. 64). In our experience, Glogster EDU is an application illustrative of how tools for creating multimodal arguments might function in the domain of social media, thus connecting with students' literacy outside of school. In that vein, it facilitated the creative construction of multimodal meaning helping students develop arguments that are social as well as cognitive artifacts. Thus, the social, multimodal dimensions of this tool are not only consistent with a multiliteracies pedagogical framework, but they also address the CCSS requiring that students "use technology, including the Internet, to produce and publish writing and to interact and collaborate with others" (CCSSO & NGAC, 2010, p. 41). Further, this three-lesson activity illustrates how framing writing as creative design accommodates current curricular standards that retain conventional goals such as constructing effective arguments, but that also include goals that acknowledge the spectrum of options for digital communication.

Assessment

It may be intuitively appealing, as well as consistent with increasingly digital forms of literacy, to conceptualize writing as a creative construction of meaning through a process of design. However, such an approach, especially in a political context that demands accountability, suggests the need for valid forms of assessment, ideally that overlap with writing conventional arguments grounded in printed forms. Hicks (2009) addressed that issue, arguing that assessment of digital forms of writing is unlikely to be strictly quantitative and, of necessity, must be somewhat holistic:

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> What are we assessing, exactly? The number of slides? Fonts? Colors used? Instead, we need to assess the quality of information on those slides as well as the ways in which the entire slide show is designed, thus leading to an overall aesthetic effect. (p. 104)

Whatever the final product designed, the perspective of multiliteracies suggests that it is the overall communicative effect that should be evaluated. However, it also suggests that the process of designing communication, such as creating multimodal arguments, might itself be an object of evaluation, as much as the finished product. Consistent with the multiliteracies perspective, it may be appropriate to consider evaluating both the process and product to include subjective dimensions of creativity. We considered these possibilities in our efforts to integrate assessment into our three-lesson exploration of Glogster EDU as a means to engage students in developing multimodal arguments. Our efforts revealed multiple dimensions of assessment and potential challenges and opportunities for instruction and further research.

To evaluate and understand process, we integrated formative assessment including the students completion of a notecard with a 3-2-1 activity (Wilhelm, Smith, & Fredricksen, 2012), asking each student to generate three words to describe Glogster EDU, two statements describing what they learned from the day, and one question they had regarding the introduction to writing multimodal arguments. The initial feedback suggested that Glogster EDU was interesting and motivating to most students. Of 32 students, 17 used the word *creative*, 13 used the word *fun*, and 10 used the word *interesting*, which is consistent with Jocius' (2013) finding that most students become positively engaged in multimodal composition. However, formative assessment of students revealed that they did not understand how to segment the assignment among the members of their groups and that they were not making the connection between how making storyboards with Glogster EDU would serve their final project. Their questions during the

lessons suggested that they were unclear about how to merge multimodal writing into a more conventional frame for engaging in academic writing.

For example, the students would often ask questions such as, "What does Glogster have to do with our video?" The students did not understand that just as they often write an outline or some form of prewriting before writing a more traditional essay, that their Glogster EDU posters were a means to help them organize not only the text of their arguments, but also the sounds and images they would combine in the design of their final project. Our experience is consistent with Rowsell and Decoste's (2012) conclusion that it may be necessary to explicitly teach students how digital forms of communication connect to more traditional writing. Further, survey studies suggest an additional challenge. Teachers and students alike do not consider writing in digital genres such as blogging to be on par with more conventional academic genres (Lenhart et al., 2008; Purcell et al., 2013). These perceptions and beliefs are likely to inhibit efforts, not only to integrate digital forms of communication into writing instruction, but also efforts to develop assessments, especially when those assessments entail more subjective, process-oriented approaches.

We believe that such beliefs and perceptions, in which assessment plays a key role, intensifies tensions between teaching conventional writing as an individual technical exercise and teaching writing as a creative, often collaborative, construction of meaning that entails a process of design from a multiliteracies perspective. However, digital tools such as Glogster EDU, which inspire the creative use of multimodal digital constructions, may mitigate those tensions by shifting attention to evaluating the process of writing in a more collaborative domain. Further, we believe research is needed to reveal deep pedagogical understandings about how that alignment might be accomplished in authentic instructional contexts through innovative

interventions and valid, authentic assessments. Methodological approaches such as design-based research and formative experiments (Reinking & Bradley, 2008) are well suited to that task.

The students also provided feedback through what Wilhelm et al. (2012) referred to as composing to transfer, an activity that prompts students to consider how they will use what they have learned and how they will transfer their learning to other areas of their lives and education. For instance, on the final day of this project, we asked students the following question: "What is one thing you learned, and how could you use it in another class?" Students discussed using multiple modes of representation, learning new digital literacy skills, and understanding how to better organize their ideas. Discussing transfer is one way to encourage students to consider how they can use relevant digital skills, aspects of multimodal design, and the skills of making arguments not only in their other subjects, but also in diverse areas of their self-expression, particularly those related to participatory citizenship. Such discussion also connects creatively designing multimodal arguments to the CCSS in the language arts that cross over to history, social studies, science, and technical subjects (CCSSO & NGAC, 2010), thus extending the concept of multiliteracies across disciplines.

To evaluate students' completed Glogster EDU online poster, we adapted Hicks' (2009) rubric for multimodal projects, which is based upon a six-traits model of writing (see Northwest Regional Educational Laboratory, 2014), to apply to the genre of argument, the tool of Glogster EDU, and the following five categories: ideas and organization; voice; word choice, sentence fluency, and conventions; collaboration; and publication (see Table 1). In each of these categories, the rubric not only assessed the students' ability to develop an argument, but also assessed aspects of a multimodal design, including sounds, images, and/or video, to support an established claim. This rubric encapsulates the conventionally valued goal of assessing the

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richness of the writing, rather than focusing exclusively on specific conventions. However, it also reflects modifications of conventional forms of assessment to assess multimodal writing. For example, the categories of the rubric connect to the traits of writing (Northwest Regional Educational Laboratory, 2014), which are often used to assess conventional writing. However, within each of these traditional categories, the students are asked to specifically use different modes, including sounds, text, images, and video, to establish each of the traits. In addition, the students are asked to establish a variety in their design that appeals to a viewer rather than a reader, implying this design is meant to be highly visual as well as text based.

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Table 1

Rubric for Glogster EDU Poster (Adapted from Hicks, 2009, pp. 115-116)

Grading Criteria	**Excellent / 4**	**Good / 3**	**Fair / 2**	**Needs Improvement / 1**
Ideas and Organization:	Through sounds, texts, images, and/or video, the storyboard establishes a cohesive, organized argument.	The sounds, texts, images, and/or video establish a claim, but the evidence and/or organization could have been stronger.	The sounds, texts, images, and/or video establish an unclear claim and/or the evidence is not sufficient to support the claim.	The sounds, texts, images, and/or video do not establish or support a claim
Voice:	The sounds, texts, images, and/or video work together to convey the claim in a way that is appropriate and consistent for the audience.	Voice is appropriate for the audience.	Voice is somewhat appropriate for the audience.	Voice shows little attention to the audience.
Word choice, sentence fluency, and conventions:	The sounds, text, images, and/or video combine to form a variety that keeps the viewer engaged.	The sounds, text, images, and/or video are present but may need more variety.	Sounds, text, images, and/or video are lacking and do not show a variety.	There is little to no variety of the sounds, text, images, and/or video.
Collaboration:	Students provide each other with both comments about what works well as well as suggestions for further development.	Feedback is provided, but could have been deeper.	Feedback is provided, but some part is missing.	Feedback is limited or missing.
Publication:	As a whole the Glogster poster uses all of the images, text, sounds, and/or video used to support a consistent,	As a whole the Glogster poster uses all of the images, text, sounds, and/or video to	As a whole the Glogster establishes a claim, but could have used a greater variety of sounds, text, images, and/or	As a whole the Glogster does not develop a claim.

	well-established claim.	establish a claim.	video to support the claim.	

Students' ideas and organization in this project illustrated innovation and creativity in their final product. Further, the arrangement of the components of argument and the use of multimodal elements in each student's poster varied considerably. For example, as shown in Figure 1, some students started with a claim at the top of the poster and proceeded to use both images and text as evidence in a more traditional, linear progression. Yet, other students, as shown in Figure 2, seemed to organize their poster according to mode, putting the text of their claims first, followed by hyperlinks and pictures that helped justify those claims. Students' voice (i.e., the distinctive individuality of their writing, Spandel, 2005) was also reflected in each poster not only through text, but also through the varying color schemes, frames chosen, placement of images, and so forth.

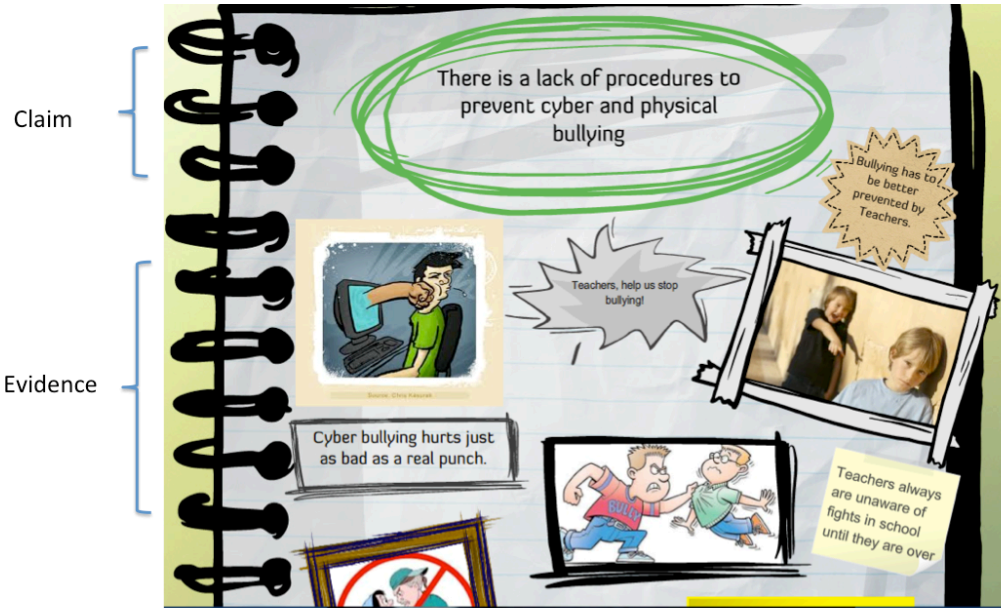

Figure 1. Example of linear progression from claim to evidence.

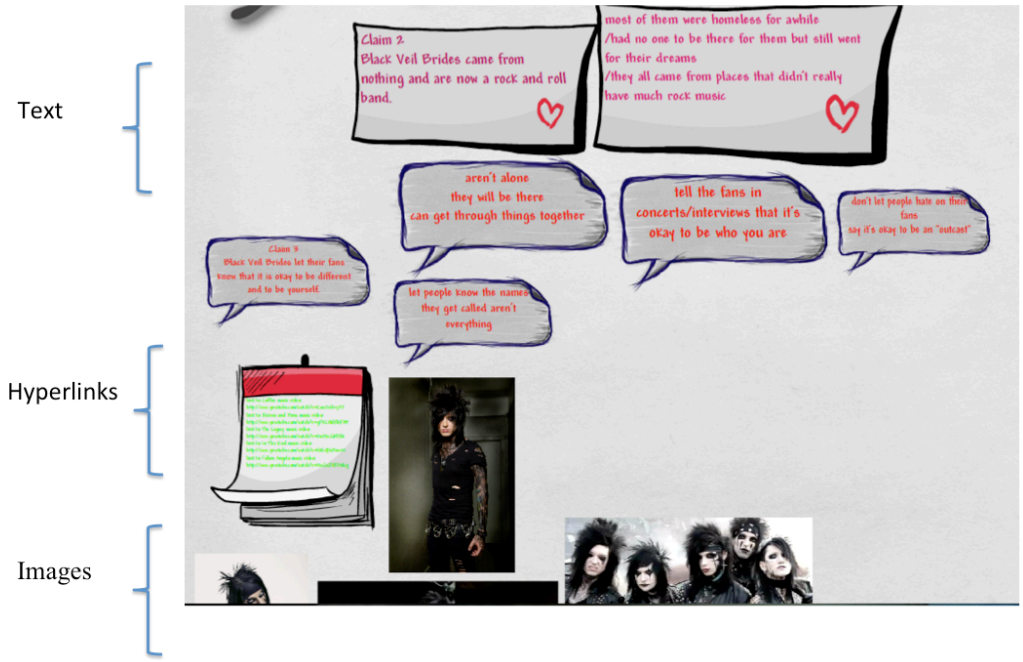

Figure 2. Example of organization by mode from text to hyperlinks to images.

A Final Word

Creating multimodal arguments with Glogster EDU offers an example of how conventional goals of writing instruction can be merged with new goals associated with emerging digital forms of literacy. It also illustrates how the perspective of multiliteracies might guide new approaches to writing instruction that enhance engagement and creativity. However, it also reveals challenges for students and for their teachers. For example, in our experience, although students appeared engaged with Glogster EDU and readily collaborated with their peers, they often had difficulty connecting the broader affordances for digital writing with the traditional writing process, often asking a telling question such as, "What does this have to do with our argument?" Although students were presumably engaged in digital forms of writing

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outside of school, they did not readily adapt to using images, music, sounds, and video clips to an academic task such as developing a well-developed argument. Students may need guided practice to link the expanded affordances of digital forms of writing, new opportunities to express creativity, and fundamental standards for effective communication, such as constructing sound arguments.

Exploring how explicit guidance and practice, embedded in specific instructional activities and interventions might bridge old and new forms for writing arguments may be, as we have noted, a fruitful area of research. For example, MacArthur (2006), in his review of the impact of technology upon writing, discussed that composing digitally can be beneficial to students' thinking: "The case studies and experimental studies together show that composing hypermedia requires high-level cognitive processes and can help to develop those processes" (p. 258). However, he concludes his review by stating that there is limited research on these new forms of writing and that more research on the interventions concerning technology and student writing are needed.

Although multiple studies show that strategy instruction is a critical element of writing instruction and improving students' writing (Graham, 2006; Graham & Perin, 2007a, 2007b), these studies are largely silent on how such research applies to technology and writing. Graham and Perin (2007b) acknowledged the overall absence of research on technology and writing: "The findings of this meta-analysis do not provide clear direction for the use of technological tools other than word processing…" (p. 26). The authors explained that the reason for this absence was "gaps in the current state of research on writing instruction" (Graham & Perin, 2007b, p. 26). Thus, whereas research exists to support the benefits of strategy instruction for students' writing (Graham, 2006; Graham & Perin, 2007a, 2007b), questions remain about how

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these strategies affect digital writing, whether traditional strategy instruction is applicable in a digital domain, and what new strategies may be needed for the writing possible in an age of multimedia. Existing research on this topic focuses upon how technology can support traditional writing (Graham, 2008; Graham & Perin, 2007b) rather than the strategies needed to guide students in creating multimodal compositions. And, we would argue, research that can usefully inform practitioners must reveal how perspectives such as multiliteracies and viewing writing as a creative construction of meaning in digital environments can be practically implemented. Such research would focus on effectiveness in achieving conventional and newer instructional goals along with how they might be integrated and the tensions they may generate. It would focus equally on the appeal and efficiency of instructional activities while acknowledging teachers' and students' beliefs and perceptions.

In our brief exploration of Glogster EDU as a tool for engaging in writing multimodal arguments, students seemed surprised in this classroom application of the multiliteracies framework that digital tools could be applied to conventional academic purposes, such as writing arguments. This disconnect is supported by research suggesting that students do not connect the digital writing they do outside of school with their academic writing (Lenhart et al., 2008; Purcell et al., 2013). It suggests that schools in general and language arts teachers in particular may need to strategically address students' inappropriate perceptions that the literacies they engage in outside of school, which naturally invite creative construction of meaning, have no expression inside of school. Research is needed to address how the literacy practices that engage students outside of school may be affecting the literacy practices of students and, for example, their way of perceiving argument inside of school. However, care may be needed in appropriating those out-of-school literacies, particularly those involving social media, for use in

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academic contexts. The need for care in that regard goes beyond the often-cited concerns about students' safety and privacy. Students may see some out-of-school literate practices as an inviolable cultural space for self-expression (e.g., Lewis & Fabos, 2005) and even a way to challenge the dominant culture represented by formal schooling (Guzzetti & Gamboa, 2004).

Despite these caveats, students seem to bring a wealth of creative experience from their immersion in aspects of literacy firmly embedded in digital environments outside of school. They possess a reservoir of technical skills and creative energy from their digital lives that may form a solid foundation for seeking better alignment between conventional writing instruction and broadened perspectives such as multiliteracies. For example, they have considerable technical knowhow and mastery of functions such as uploading and downloading files, cutting and pasting digital graphics, creating and manipulating audio and video clips, and engaging in a wide array of social networking activities. What they do not seem to know is how to channel technical competency and a familiarity with the new cultures of digital communication outside of school into service of academic tasks and the larger goals of thoughtful citizenship. They need to exercise creativity offered by multimodal tools, but tempered, for example, by standards of evidence and a disposition to strategically search for and critically evaluate information in an increasingly diverse and dense landscape of digital information. They need to understand, evaluate, and creatively blend various media into multimodal constructions of meaning, judging the purposes and contents of relevant sources. They need to decide whether information can serve as evidence for their own claims and produce and publish cogent arguments using digital tools. The needed skills, strategies, and dispositions associated with the creative construction of meaning with digital tools come no more naturally, we believe, than they do with the more narrowly focused and less complex conventional forms of writing. In fact, the multifaceted

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affordances of digital media suggest that writers today face increasingly complex and subjective decisions freed from well-specified, if not formulaic, approaches. Therein lies the challenge for them and for their teachers, but it is a challenge surrounded by stimulating opportunities for creative expression.

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Dialect: Integrating Technology and Reading Assessment to Diagnose Spanish Reading Difficulties

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Abstract

The current study describes the development of an Ipad-based assessment tool to identify Spanish reading difficulties of Kindergarten through third-grade students. The tool follows a whole-to-part approach to reading diagnosis, and provides valuable information about reading development from the perspective of each subprocess. The tool was validated in a sample of 1378 Chilean students from Kindergarten to third grade. Results from this pilot study revealed that 79% of first graders are lagging behind in their reading development, that phonological and phonemic instruction in the assessed kindergarten classrooms is almost non-existent, and that 25% of students beyond first grade have reading difficulties in at least one subprocess. The use of an Ipad-based assessment is an efficient way to diagnose early reading difficulties and provide intervention strategies to overcome those difficulties in a timely manner, particularly in a large classroom context where teachers lack knowledge about how to diagnose reading ability.

Key words

Reading assessment, technology-based assessment, reading diagnosis

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Introduction

Functional literacy is a key skill for school success and an essential condition for access to both professional and higher education opportunities. The OECD defines a person as functionally literate if he or she "…can engage in all those activities in which literacy is required for effective functioning of his group and community and also for enabling him to continue to use reading, writing and calculation for his own and the community's development" (United Nations, 1984, para. 15.62). According to the World Literacy Forum, lacking basic literacy skills may have an economic impact on the lives of individuals, which may translate in incomes that can be up to 40% lower than those of people who are competent readers and writers (Martínez & Fernández, 2010). For most Latin American countries, the acquisition of more advanced reading and writing skills still remains a challenge and an impediment to economic growth and development (Hanushek & Woessmann, 2009). In this context, Chile has increased its literacy achievement levels compared to other countries in the region. However, these levels of achievement are still not enough for its young people to acquire the knowledge and skills necessary to function in an information-based society (UNESCO, 2008).

Although Chile's population is almost entirely literate, children and adolescents' performance on reading assessments both nationally and internationally falls below what is needed to function in an information-based cultural context (Villalón, 2008; Mineduc, 2011). An even more complicated issue is the enormous difference in the performance levels of students from more and less advantaged socioeconomic backgrounds in our country. Students attending private schools (about 7% of the school population) typically perform two or three levels above their peers who attend public schools and who come from low socioeconomic homes. This gap widens as children progress through grade levels (Mineduc, 2011; Villalón, Föster, Cox, Rojas-

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Barahona, Valencia & Volante, 2011; Bravo, Villalón & Orellana, 2004). Similarly, the performance gap among students somehow mirrors the differences in quality of instruction in both types of schools (Author & Author, 2014 a fact that contributes to the high levels of inequity in the Chilean educational system (Valenzuela, Bellei, & de los Ríos, 2014).

One of the greatest challenges for the Chilean educational system is, precisely, narrowing that gap, by improving the quality of instruction and having reliable modes to monitor student progress and guide instruction. While there are many obstacles that hinder the acquisition of the desired levels of quality, there are three that clearly affect literacy development, particularly at the elementary level. The first one has to do with the lack of preparation teachers have in order to adequately assess, monitor and provide intervention in children's literacy development (Strasser & Lissi, 2009). The second barrier is the large size of average Chilean public school's classrooms that can have as many as 47 children per room with one teacher; this prevents most teachers from devoting more individual time and support to students when they are learning to read (Mizala, Romaguera & Farren, 2002). Finally, the lack of valid and reliable measures, and lack of literacy specialists in the early elementary grades have contributed to the fact that prompt and in-depth diagnosis of individual reading abilities has been historically neglected in our country (Sotomayor, Parodi, Coloma, Ibáñez & Cavada, 2011).

One way to address the need for timely diagnosis and instructional support is to provide teachers, parents, and administrators with accurate information about each student's reading development to help students attain higher comprehension levels, and as a result, give those from more disadvantaged backgrounds a real opportunity to access higher education and more cultural capital. The purpose of this study was to examine the application of a reading assessment tool in a Spanish-speaking context, which can provide parents and administrators with valuable

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information of children's reading abilities. The research question we aimed to address is: what can we learn of children's Spanish language abilities thorough the application of a tablet based reading assessment?

With this idea in mind, and in order to provide Chilean teachers with valid and reliable diagnostic tools we created Dialect, an iPad-based assessment system that is almost entirely self-administered and of free access to all Chilean population. Dialect consists of two screening assessments that target the different components of reading. In the first assessment (Dialect I) is a screening of reading comprehension in which students are required to read several increasingly more complex reading passages and click on the correct answer on the screen (i.e., the word that best completes one of the sentences in each item). Students' scores are presented in terms of Lexile ® measures, a well-known and established scale that matches children with text according to their reading abilities. The Lexiles were used to determine specific cut point scores for each grade level. In case a student's total score falls below the established cut point, the screen tells the evaluator that further testing is needed. Those students requiring further testing then go through a second tool (Dialect II) that assesses knowledge of print, phonological awareness, letter knowledge, word recognition, and vocabulary. A full description of the assessments and their flow chart is provided later in this paper.

Approaches to early reading diagnosis

For many years, reading difficulties were addressed from a medical perspective in which this condition was mainly attributed to neurological factors (Stahl, Kuhn, & Pickle, 1999; Kibby, 1985; Barr, Blachowicz, Katz, & Kaufman, 2002). Eventually, the shift towards a more scientific approach to the study of reading provided sufficient background and evidence to look at reading

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difficulties from a cognitive perspective in order to understand the origins and nature of many reading problems, and find adequate (research-based) interventions to help struggling readers overcome these difficulties. Several models of reading provided sufficient theoretical underpinnings that helped understand the complex processes and components involved in reading and meaning construction. Gough & Tumner's (1986) simple view of reading defined reading as the interaction of two components: decoding and language comprehension, and the extent to which these two components interacted determined the existence of a reading difficulty such as dyslexia or hyperlexia (Stahl et al, 1999). However, practical evidence both from clinical work and classroom experience have shown that reading comprehension difficulties are more complex than it was initially though. The findings from the National Reading Panel (2000) ratified the relevance of five key reading subprocesses in terms of reading achievement, and somehow directed attention to ways to diagnose specific subprocess difficulties and target intervention in each particular area. The simple view, although helpful in providing a simplified view of reading was therefore unable to explain many more situations in which the interplay of aspects of reading beyond decoding and language comprehension affected understanding of written texts.

Several cognitive models (e.g. the component model, Aaron, Malateshar Joshi, Gooden & Bentum, 2008) provided more detailed explanations that took into account the importance of phonological and phonemic awareness, letter knowledge, and access and knowledge of print, vocabulary, and word identification and their interrelationships. One example is the Cognitive Model of reading assessment (McKenna & Stahl, 2003), which has been considered a useful framework for assessment. This model places reading comprehension as the goal of reading, and offers a flow for decision-making in the assessment of reading where to reach the goal of reading

comprehension the reader must succeed at three main components: automatic word recognition, language comprehension, and strategic knowledge. Each of these components comprises other subcomponents. A difficulty in any of these components may result in an impediment for achieving reading comprehension. Automatic word recognition builds on fluency, decoding and phonological awareness, and concepts of print. Language comprehension is achieved through background knowledge, vocabulary knowledge, and text and structure knowledge. Strategic knowledge refers to knowledge of general and specific strategies for reading depending on the purpose of the reader. All these components and subcomponents interact to achieve reading comprehension.

Similarly, evidence about successful reading instruction in the early grades has also provided insights as to how children became proficient readers, pointing to the key role of evidence-based classroom instruction that considers all subprocesses in reading. Key in determining the relevant skills involved in reading was the work of Snow and colleagues (1998) *Preventing Reading Difficulties in Young Children*, which conceptualized reading by determining the sets of skills that predict reading success, based on empirical evidence, and provided a series of recommendation for the instruction of reading in English. Whilst the study of skills involved in reading is well developed in English, much is still to be studied for Spanish language in Spanish-speaking contexts.

Reading development among Chilean students

Studies about Chilean beginning readers have focused on the importance of phonological and code-related abilities for comprehension (Kim & Pallante, 2012; Bravo, Villalón & Orellana, 2006). Much of the research conducted to date has focused on predictors of reading ability, which have shown to vary across grade levels. For example, Bravo and colleagues (2006) found that letter knowledge and phonological awareness predicted first grade reading, whereas fourth

grade reading comprehension predictors were letter knowledge, word recognition and text structure. It has also been observed that students who show low levels of silent reading comprehension in first, second, and third grade, also perform poorly on phonological and word decoding tasks (Author, Author & Fitzgerald, 2014). On the other hand, large-scale standardized measurements of reading comprehension ability (e.g., SIMCE or PISA) at higher-grade levels show that the majority of Chilean students perform within the lowest comprehension levels compared to similar developing countries. Since no systematic screening or diagnosis procedures take place in the early elementary years, it seems plausible that those students whose needs for early intervention in phonological and word-decoding abilities are not met at an early stage, will lag behind in comprehension tasks as well.

In most Chilean schools the only screening procedures that take place focus on reading rate (words per minute) and/or silent reading comprehension, but there are no assessments that inform teachers about a student's reading level, because such levels have not yet been established, and the differences between independent, instructional and frustration levels is not taken into account when it comes to reading instruction (Trepton, Burns, & McComas, 2007). Consequently, assessment information is seldom used to inform instructional practices or differentiate instruction at a stage in which it is crucial for learners to acquire code-related skills to facilitate comprehension of increasingly more complex texts. Knowledge about which reading subprocesses can predict reading comprehension is critical to facilitate the identification of readers who may need additional support and instructional intervention and become independent readers.

Dialect, an online tool to assess beginning Spanish reading ability

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Given that Chilean teachers lack the tools, time, and more technical knowledge to diagnose reading difficulties in the elementary grades, we devised a tool that could help teachers carry out this task with minimum cost in terms of time, materials, and experience. We thought that because classrooms are usually quite large (40 to 45 students per class) and schools don't have reading specialists, having a tool that could assess individual students in a more automatized way, with assessments that are reliable and valid, could provide teachers with timely and accurate information about every student in their class, so as to plan individualized support to those students who require additional assistance in a specific reading area.

The theoretical model underlying Dialect is a whole-to-part approach to reading diagnosis (Cunningham, 1993), where silent reading comprehension is the main long-term goal of reading and, to achieve comprehension, students must demonstrate proficiency in word identification, language comprehension, and print processing abilities (Roberts, Christo, & Shefelbine, 2011; Cunningham, Schmidt, Nathan, & Raher, 2011; Adams, 1990). Within word identification, Cunningham and colleagues distinguish two word-reading abilities: automaticity (e.g., reading a printed word in no more than .25 seconds), and mediated or decoded reading (e.g., reading a printed word using other more conscious strategies such as decoding or structural analysis). In the scope of language comprehension two kinds of knowledge are required: knowledge of text structure and knowledge of the world, which translates into lexical, background, experiential, and schema knowledge. Finally, the third aspect included in the model is whole-print processing; in other words, factors that determine reading fluency. Included in this component are eye movements, print-to-meaning links, inner speech, prosody, and the ability to carry out all these tasks concurrently (Spadorcia & Erickson, 2002).

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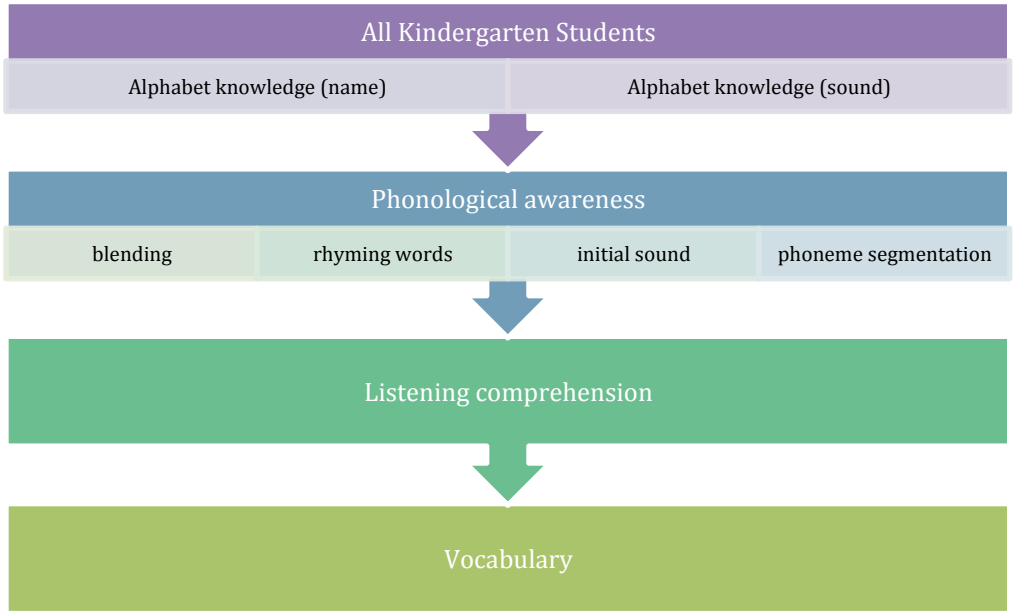
One of the advantages of the whole-to-part models is the possibility of establishing paths along which the diagnostician can screen more specific reading difficulties with comprehension as a starting point. Besides looking at word identification and language comprehension, Cunningham asserts that examining print processing beyond word identification can help determine a reader's print processing level based on the performance scores of the three whole components. Thus, the whole-to-part model takes into account important aspects of print processing, which are tightly linked to comprehension, such as making print-to-meaning connections, eye movements, prosody, silent reading, and parallel processing. These aspects of print processing are not explicitly assessed in our tool, but have important implications in terms of a reader's strengths and weaknesses as well as in the decisions a teacher makes when it comes to providing more individualized assistance.

Our assessment facilitates teacher diagnosis in that it establishes two decision trees, one for grades K and other for 1st to third grade, which are consistent with the whole-to part model including the potential areas of difficulty that students may encounter when comprehending texts at each level of development. The sequence is rooted on theoretical and empirical knowledge about the way reading subprocesses unfold and the most effective assessment strategies (Torgesen & Hayes, 2005). Figure 1 depicts the steps included in the diagnostic assessment for Kindergarten students who, on average, have not yet acquired silent reading comprehension abilities by the end of the school year. Assessment begins with knowledge of letter names and sounds, followed by phonological awareness tasks such as blending, identifying rhymes, initial sounds and segmenting phonemes. Of these four tasks, phoneme segmentation appears to be the hardest for Kindergartners, which in fact is harder than segmenting syllables, an activity that

most preschool classroom teachers in Chile do on a daily basis, whereas phoneme segmentation is rarely part of phonological instruction.

Following phonological tasks there is a listening comprehension assessment where students listen to a brief story and are asked to answer a few questions focused on story plot and character traits. Students mark their responses by clicking on the correct icon on the screen (i.e., the picture that best represents the correct answer). Finally, receptive vocabulary is assessed using TEVI, a Chilean validated version of the Peabody Vocabulary Test (Dunn & Dunn, 2007). The child listens to a word and then clicks on the image that represents the word. This assessment uses both basal and ceiling parameters for each child, so scoring procedures are the same as the ones employed by the PPVT test and the paper-and-pencil version of TEVI. Student responses are delivered wirelessly and recorded on an excel spreadsheet which teachers can access through the project's website using an individual password and/or request statistical analysis which are provided via a written report within 15-20 days after test taking.

Figure 1. Decision Tree for Dialect assessments in Kindergarten



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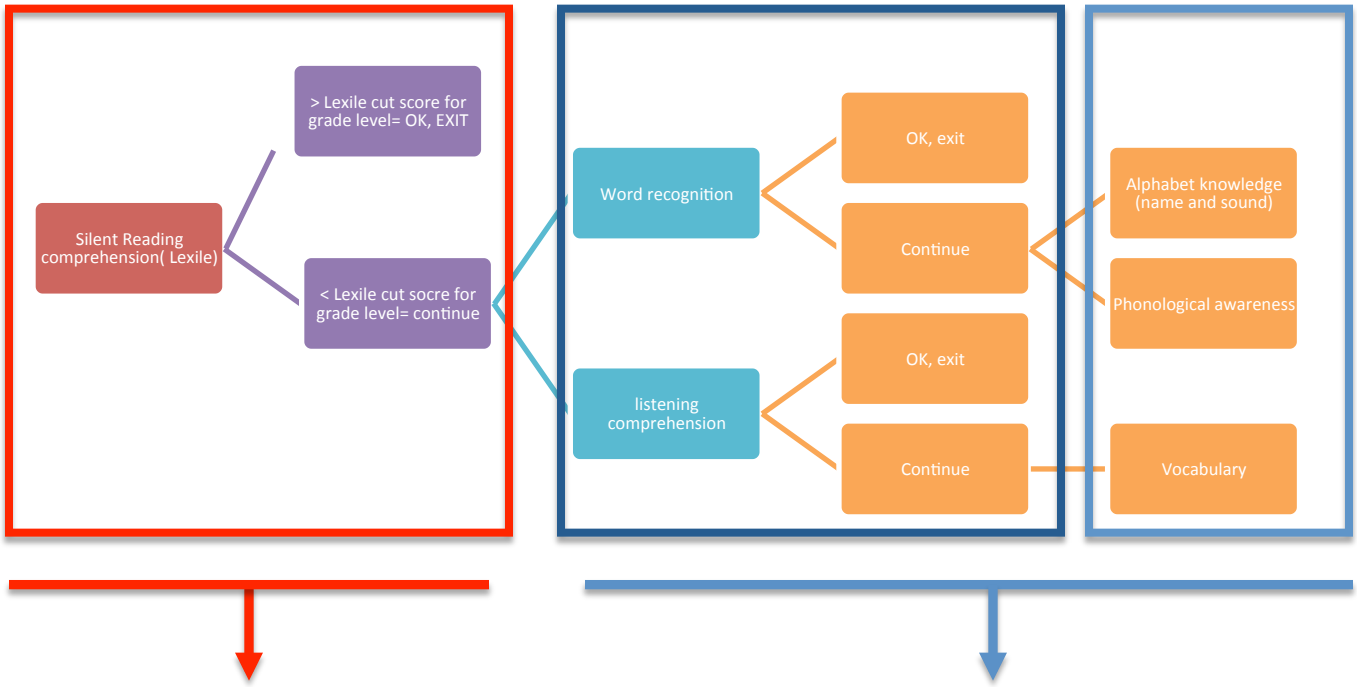
For students in grades first through third, the decision tree is less linear and begins with *silent reading comprehension* as can be observed in Figure 2. This assessment serves as an initial screening to determine which students might need further, more process-specific testing. If first grade students answer 9 or more of 45 items correctly, they are not tested beyond silent reading comprehension because their Lexile ® reading level is within the expected range for his or her age group. The same is true for second grade, where the cut point score is 12, and for third grade, where the cut point is 15 out of 45 items. Students who score below these cut points continue with *word recognition* and *listening comprehension* assessments as shown in the decision tree (see figure 2). Students not meeting the cut points for word recognition are also assessed in *letter knowledge* (name and sound) and *phonological awareness*, which are foundational skill for successful word recognition. In parallel, if students fail to pass the *listening comprehension* assessment, they must take the TEVI vocabulary test, which assesses a necessary skill for successful listening comprehension. An advantage of using a decision tree, is that the assessments a child must go through are only those he or she actually needs, so excessive testing is avoided. The scoring and reporting procedures are the same as the ones described for the Kindergarten students, plus the additional Lexile ® measure reported for each individual child. In the current study we report the results from all assessments with the exception of listening comprehension where reliability levels were lower than those of the other sections.

Figure 2. Decision Tree for Dialect assessments in grades 1-3



For the first assessment of Dialect we used a silent reading comprehension test specifically designed by MetaMetrics® which provides results in Lexiles ®. For the second part of the assessment we adapted items from already existing measures that had been validated independently of each other on a paper-and-pencil version. For example, to assess phonological awareness, knowledge of print, and alphabet knowledge we used the items included in Villalón & Rolla's (2000) *Prueba de Alfabetización Inicial*. To assess vocabulary, we adapted the TEVI-R (*Test de Vocabulario en Imágenes*, revised) by Echeverría, Herrera & Segure (1995). To assess word recognition strategies, we used the format of the Flash and Analysis word test developed by Karen Erickson and James Cunningham (1993). We used Spanish words from a

3,000 list of words students should know by the end of grade 4, compiled by the Chilean Ministry of Education. We randomly selected 300 words and ranked them in order of syllabic complexity. Words were then flashed on the iPad screen for .25 seconds for the children to read them automatically. If a student could not read a word automatically, the word was shown again, but this time the child had 3 to 5 seconds to identify it.

Methods

Design and participants

We conducted a crossectional study among 1378 students in grades Kindergarten through third grade (K= 249, 1st= 401, 2nd= 350, and 3rd=378) using Dialect, to examine students' reading development and identify specific reading difficulties in any of the reading subprocesses. Students came from 9 municipal and subsidized schools from different districts across a large metropolitan area. Municipal schools comprise about 38% of the entire school population in Chile and are fully funded by the government. Subsidized schools, on the other hand, receive some funding from the state and parents pay a very small amount for tuition; they account for about 54% of the school population (Mineduc, 2013). The remaining 8% corresponds to private schools where parents pay full tuition. For demographic purposes, it is important to explain that most students attending municipal schools in Chile come from low socioeconomic homes, whereas students in subsidized schools come from middle-income families (Valenzuela et al, 2014; Mizala, Romagnera, & Farren, 2002). Likewise, and as was previously mentioned, student achievement in reading and mathematics is closely connected with school type, with private schools outperforming subsidized and municipal schools. In the national reading comprehension assessment given to students in second grade in 2012, for example, children from low

socioeconomic homes in municipal schools scored 230 points compared to high socioeconomic level students from private schools that, on average, scored 283 points. The national average was 250 points (Mineduc, 2013).

Data sources

Data consisted of individual scores from 1378 students for each of the assessments based on results obtained by each child on the Dialect I or screening test. For each assessment, raw scores were transformed into percent of correct items, with the exception of vocabulary scores, which were presented as percentiles using the norms that Echeverría et al (1995) had determined for the Chilean population.

Validity and reliability

An initial pilot application in May 2013 to a sample of 150 students allowed us to examine the tool in a school context and establish reliability measures. Large-scale application to all participants took place in October 2013, two months before the end of the school year. Trained evaluators were responsible for overseeing the students as they progressed through the various stages of the assessment and ensured proper transferring of data to the servers for later analysis. In the future the test will be administered by teachers but for purposes of establishing reliability and learning more about the application of the assessments we used trained evaluators. There was no need to calculate inter-rater reliability, since most of the test is self-scored.

Content validity had been previously established for all the assessments except Dialect I (silent reading comprehension). Construct validity for the Silent Reading Comprehension test relies on solid research evidence about text measurement and item construction using the Lexile® Analyzer, as well on the judgment of a panel of experts that advised us during the development. To confirm face validity, we also compared scores across grade levels. Results

showed that students' mean scores increased as the grade level increased; similar to what the national reading assessment (SIMCE) has shown across grade levels. Procedures to establish concurrent and predictive validity for the whole assessment are under development.

Results and Discussion

Table 1 presents the mean scores and standard deviations for each of the subtests across the grade levels. As can be observed from preliminary analyses, 79.1% of first graders (303 students) did not meet the silent reading comprehension cut point for their grade level. The same was true for 26.9% (N=92) of second graders, and 17.9% (N=67) of third graders. For first graders, the mean score obtained on Dialect 1 corresponds to Beginning Reader in the Lexile framework (MetaMetrics, 2006; Williamson, 2006). It can also be observed that there is a significant increase in the mean Lexile ® level of third graders compared to second graders. Analyses of variance confirmed that the students' mean scores across grade levels differed significantly: $F(2, 458)=34.781$, $p=.000$). Because there are no previous studies examining reading performance and/or determining the percentage of Chilean students reading below their corresponding grade level, it is impossible to draw any conclusions from these results, except for the fact that, as expected, the percentage of students not meeting the cut point decreases as grade level increases. These results also indicate that the silent reading comprehension test was able to capture struggling readers in each grade accordingly.

Table 1. Percentage of students (and mean Lexile levels) not making the cut point score (Dialect 1: silent reading comprehension) at each grade level.

Grade*	%	N	M	SD

First	79.1	303	BR	291.41
Second	26.9	91	36.11	227.47
Third	17.9	67	256.48	226.99

*Kindergarten was not assessed on silent reading comprehension as the pilot study indicated that students had not learned to read yet.

Table 2 displays mean scores and standard deviations for Dialect 2 subsets. These results correspond to those students who did not meet the cut point scores in each grade level, and include all Kindergarten students who, for exploratory purposes, were assessed in all areas.

Table 2. Means (percent correct) for each subtest for students who took Dialect 2.

Grade	Alphabet Knowledge M *(SD)*	Print Knowledge M *(SD)*	Vocabulary M *(SD)*	Word Recognition M *(SD)*
Kindergarten (259)	24.5 (22.39)	39.5 (25.59)	23.8 (24.92)	.1 (.79)
First (303)	48.3 (29.02)	54.2 (20.79)	21.8 (30.45)	.9 (2.22)
Second (91)	73.3 (21.25)	69.5 (19.71)	17.5 (26.16)	7.1 (12.58)
Third (67)	85.6 (13.83)	82 (16.46)	9.2 (8.04)	17.7 (20.82)

Grade	Blending	Rhymes	Initial Sound	Segmentation
	M *(SD)*	M *(SD)*	M *(SD)*	M *(SD)*
Kindergarten	45.9 (24.12)	33.4 (26.31)	32.0 (20.72)	15.3 (20.42)
First (303)	55.2 (25.55)	35.8 (27.13)	33.1 (20.78)	30.5 (26.73)
Second (91)	67.8 (26.54)	41.3 (24.77)	35.4 (22.4)	42.7 (33.84)
Third (67)	79.1 (22.06)	57.5 (26.68)	36.4 (26.35)	54 (36.5)

Clearly, for Kindergartners, first, and second-grade students' word recognition ability is the lowest-performing area, which is worrying given that this component has been found to be the strongest predictor of reading comprehension for struggling readers in the early grades (Lesaux, Rupp & Siegel, 2007; Adlof, Catts & Lee, 2010). This finding indicates that a considerable percentage of students are probably at an initial decoding stage; that is, can probably read only a handful of frequently used words automatically, and have trouble decoding a large amount of words they are expected to know by the end of third grade. On the other hand, both Kindergarten and first grade students obtained less than 50% correct items on alphabet letter identification and there was considerable variability in the results as shown by standard deviations, which shows that, on average, not all students can identify all letters, some don't

know any letters, and some know most, if not all. Similarly, certain phonological tasks presented low percentages of achievement. In Kindergarten, for example, phoneme segmentation was the weakest area. The same is true for first grade readers who also appear having difficulty in segmenting phonemes within words. Blending, on the other hand, appears to be the easiest phonological task across all grade levels. This may probably be due to the fact that in the majority of Chilean public schools there is a stronger emphasis placed on syllabic rather than phonological awareness in preschool. Thus, most children are capable of putting sounds together rather than isolating them, and it is not surprising that children are familiar with certain simple syllable combinations (e.g. consonant-vowels, such as "ma," "pa") but cannot manipulate phonemes or identify letter sounds (Coloma, Covarrubias & De Barbieri, 2007; Arancibia, Bizama & Sáez, 2012).

Using analysis of variance we were able to examine significant differences in the development of reading subprocesses across grade levels. ANOVA results showed that there were significant differences for word recognition, one of the subprocesses where students obtained very low scores. Significant differences were also observed for letter knowledge, $F(1, 355)=39.154$, $p=.000$); print concept $F(1,355)=5.896$, $p=.016$; and vocabulary, $F(1,282)= 20.001$, p.000. For phonological tasks, analyses of variance confirmed significant differences between grade levels for phoneme blending, $F (3,719) = 40.47$, $p= 0.000$; rhymes, $F (3, 719)= 15,81$, $p=0.000$; initial sound identification, $F(3,719)= 17.42$, $p=0.000$, and phoneme segmentation, $F(3, 719)= 50.21$, $p= 0.000$. These results confirm that the mean scores obtained by students from each grade level differ significantly from one another in all the variables of interest as expected.

We also correlated scores from the different subtests in Dialect 2 with the scores obtained by the students on the silent reading comprehension test (Dialect 1). Correlational analyses

served two purposes: first, they contributed to the validation of Dialect 1 in terms of construct validity. Second, they allowed us to further explore the relationships between performance on silent reading comprehension and other reading subprocesses for children in all grade levels. Results are displayed on Table 3. The highest positive correlations were observed for vocabulary and word recognition (.655 and .745 respectively), whereas the lowest correlations were found between the silent reading comprehension and phoneme-blending subtest. It is interesting to note that the highest correlations are found between silent reading comprehension and the two reading subprocesses where overall, readers had the lowest performance.

Table 3. Correlations

Subtest	N	Correlation with Silent Reading Comprehension Test
TEVI (Vocabulary)	119	.655**
Knowledge of print	119	.569**
Phoneme segmentation	119	.560**
Phoneme isolation	119	.533**
Rhymes	119	.503**

Phoneme blending	119	.358**
Alphabet knowledge	119	.524**
Word recognition	119	.745**

Discussion

Results from both assessments reveal that, across grade levels, students who have trouble comprehending texts they read on their own have difficulties on very specific areas of reading, such as word recognition, vocabulary, and certain phonological tasks that are necessary for acquiring automaticity and accuracy in word recognition. The current results are consistent with substantial empirical evidence from previous studies about Chilean readers where phonological awareness and comprehension appear to be the main difficulties readers face (Bravo et al, 2003; Arancibia et al, 2012; Coloma et al, 2007). Studies have also confirmed the causal relationship between difficulty in performing phonological tasks, particularly at the syllable-level, and reading delay (Bravo et al, 2006; Márquez & de la Osa, 2003; Herrera & Defior, 2005). In transparent languages, such as Spanish, students must have acquired the alphabetic principle to begin reading, and a minimum level of phonological awareness development can provide sufficient scaffolding for the acquisition of more complex processing. It is therefore necessary to provide systematic phonological instruction as a foundation for further reading development.

Another aspect that raises concern is the low mean percentages of achievement in word recognition items. If we take into account the transparent nature of Spanish orthography, word recognition ought to be a relatively simple task for most Spanish reader; however, and given readers' performance on the phonological tasks, it may be inferred that word recognition difficulties may be caused by insufficient phonological and phonemic instructional exposure and practice. Phonological and phonemic awareness are critical to learning to decode, and learning to decode in first grade is also critical (Juel, 1988). Results from regression analysis showed that, for these students, word recognition is a strong predictor of silent reading comprehension, and phonological awareness—particularly phoneme segmentation (Author et al, 2014). These findings are indicative of needs that must be addressed from an instructional perspective in a timely manner (Vellutino, Tunmer, Jaccard, & Chen, 2007; Stanovich, 1991). Consequently, systematic practice and direct instruction in phonological awareness and letter-sound relationships need to be emphasized more strongly in Chilean preschool classrooms to help students become skilled readers and prevent struggling readers from lagging behind (Torgesen, Wagner & Rashotte, 1994). Along with instruction, it is also recommended that close monitoring of student progress in the areas of phonemic awareness, alphabet knowledge, and word recognition be incorporated in the form of systematic observation and record keeping, particularly for students whose phonemic and decoding abilities are at a lower level.

A major concern that the current findings bring about is the large percentage of first graders who cannot comprehend basic texts, and who may eventually struggle if not given the necessary support in specific reading areas. Silent reading comprehension also remains a major obstacle for one in four students in second and third grade, and this can have important consequences for these students' academic progression as reading tasks and demands become

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increasingly more complex. Results also showed that most Kindergarten and first grade students cannot identify, segment, or blend sounds in words, and that across all grade levels, and that Chilean students struggle with word recognition well into third grade. These findings, which are consistent with prior studies in Chile (e.g., Bravo et al, 2006) support the need to implement large-scale screening and diagnosis procedures to ensure that all students will acquire the reading abilities needed to adequately function in a literate world. Along with reliable diagnosis, teachers need to implement interventions that facilitate students' progression towards accuracy and comprehension so that readers can become independent (Ortlieb, 2012).

Conclusions

The current study described the procedures for the development of Dialect, a tool to carry out reading diagnosis in grades Kindergarten through third among Chilean students. It also provided descriptive and correlational data about Spanish-speaking children in Chile, which reveals that a high percentage of beginning readers in public school classrooms are struggling with reading tasks that are critical for reading success. Among these tasks is phonological awareness, letter knowledge and word recognition, all of which constitute essential building blocks for reading comprehension (Torgesen et al, 1994). Although the study did not include classroom observations, one inference driven from the data that was collected seems to suggest that sound, systematic, and explicit instruction on these components is scarce, so students do not have many opportunities to practice these tasks on a daily basis. It is expected that, with evidence-based intervention programs that target these components students will be able to acquire a solid base for further reading success.

Statistical procedures also showed that Dialect is a valid and reliable tool to identify specific reading difficulties. It would be expected that if whole class diagnoses can be

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implemented in Chilean classrooms in a more systematic way, teachers would be able to assist children who seem to be struggling with specific reading abilities in an effective and timely manner.

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Innovative Approaches in English-Language Arts: How Two Teachers Teach High School Students to Use Multimodal Resources for Interpretation of *Romeo and Juliet* and *Macbeth*

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Abstract

The research objective of this study is to explore how two high school English Language Arts (ELA) teachers, after receiving some training in multimodal theory and practice, develop innovative pedagogical approaches that allow students to use different modes, new media, and social contexts of meaning to interpret *Romeo and Juliet* and *Macbeth*. The study draws from the theoretical framework of the social semiotic theories of multimodality that suggests that people integrate all available tools of communication and the broader contexts of social production of meaning to make, remake, and transform meaning. Data for the study were collected over 16 weeks from multiple sources, including classroom videos, interviews, observations, notebook, and teaching and learning artifacts. The findings showed that the ELA teachers implemented a multimodal approach that prepared students to successfully draw upon their own agency, capacity, and social interests as classroom resources for analyzing and interpreting complex cultural texts such as *Romeo and Juliet* and *Macbeth*.

Key words: multimodal approach, new media, social semiotic theories, remix

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High school English-language arts (ELA) teachers are teaching at exciting times of shifts in literacy and literacy practices and learning environments characterized by new media including social networking media and mobile devices that provide youths the ability to manipulate and transform texts and adapt them to new forms (New Media Consortium, 2005). The affordances of new media suggest a need to understand the different ways knowledge is represented in textbooks and digital texts (Jewitt & Kress, 2003). Indeed, the choice of modes and media has become crucial to the epistemological shaping of knowledge as reading digital texts brings new resources for textual interpretations. The shifting literacies of adolescents raise new challenges in ELA classrooms as Kress et al (2005) ask: " 'What is the best way, now, of looking at English? What methodology will do justice to understanding the subject now, in this era?' " (p. x). Kress et al (2005) raise an important issue of how teachers can make ELA meaningful and relevant to students' lives in the contexts of social and cultural diversity in classrooms and the shifting landscape of new media – all important factors that influence and shape students' learning.

Literacy practices are an important part of students' everyday embodied social practices: that is, ways of communicating (Cope & Kalantzis, 2009; Gutiérrez, 2008). Youths are highly motivated and engaged in literacy practices such as sending emails, uploading stories/videos on social networking sites, surfing the Web, blogging, and studying driver's manuals (Jenkins, Clinton, Purushotma, Robinson, & Weigel, 2006). New media literacies have helped youths to expand their creativity and personal expressions, write in multiple formats and genres, widen their audiences, and write more frequently (Purcell, Buchanan, & Friedrich, 2013). Hence, the value for how students engage with and think about literacy practices provides a compelling

argument for schools and policymakers to ask: what students' outside school literacies can ELA teachers extend and build upon to enhance motivation, engagement, and learning?

To connect ELA instruction to new media, the developers of the Common Core State Standards (CCSS) require teachers to help students develop the skills to integrate knowledge from multiple sources such as oral, visual, and new media and use these resources strategically to meet the purposes of communication, context, and task (National Governors Association Center for Best Practices, 2010). The CCSS recognizes Shakespeare's plays as important cultural texts to be taught. However, while Shakespeare's plays have always been multimodal (e.g., integrating words, costume, and movement), ELA instruction tends to emphasize print-based, unimodal, flat textual practice without adequate attention to what digital modalities add to their study.

Even with the potential of multimodal literacies to enhance ELA instruction, "it is rare to find common principles of digital creativity across the subjects in English school curriculum" (Sefton-Green, 2013, p. 26). Indeed, the integration of social media into the classroom remains largely unexplored (Stornaiulo, Higgs, & Hull, 2013). In fact, most high schools "are staunchly [committed to] logocentric, book centered, and essay driven" (Hull & Nelson, 2005, p. 224) texts. There is a disconnect between students' use of new literacies outside the school and official print-based literacy curriculum (Beach, 2012). Hence, while there is increasing demand for transformed practice in ELA instruction, policies and educational standards (tests) continue to be major obstacles to the adoption of digital tools in the classroom (Cope & Kalantzis, 2009).

The research objective of this study is to examine how two high school ELA teachers, after an intervention, develop innovative strategies that value and support students' engagements and thoughts about new literacies as assets for interpreting *Romeo and Juliet* and *Macbeth*. The study is guided by one research question: (a) How do the ELA teachers scaffold and support

students to use new media-based practices and social interests as classroom resources for multimodal interpretation of *Romeo and Juliet* and *Macbeth*?

This study is an important contribution to ELA. Students' outside school literacies are increasingly multiplex, influential, substantive, and highly significant and have strong connections to and implications for the cognitive work and academic literacy practices that learners engage in in schools (Ajayi, in press; Beach, Appleman, Hynds & Wilhelm, 2011). For many students, traditional language-based, pencil-and-paper-bound ELA instruction is boring. If the school intends to prepare functionally literate students — who come to classes with enthusiasm, positive attitudes, and multiple literacies that they view as functional in their lives — teachers need to understand how learners employ new media literacies to interpret and create messages (Schultz & Hull, 2008). Teachers must also use the knowledge to empower students to be both critical thinkers and creative consumers/producers of multimodal messages in/out of school. Students have a better chance of succeeding in the U.S. if instruction validates the situated, authentic, and everyday transnational knowledge and literacy practices they bring into classrooms. In addition, an important role of the school is to develop students' capacity to function in society, including preparing them to participate in "semiotic economy where identities, artifacts, texts, and tokens are exchanged in predictable and unpredictable ways" (Luke 2001, p. xiii). In the semiotic economy, the balance of agency shifts to customers and meaning makers. Hence, the school should build the students' literacy repertoires to participate in the semiotic economy where knowledges are produced and consumed as discourses and where discourses are enacted as new ways of interacting and acting with new semiotic forms such as new genres and new styles (Fairclough, 2002).

Models of Technology Integration in the ELA Classroom

A common approach to ELA instruction in U.S. schools is the Initiate-Response-Evaluation (IRE) model. IRE is a teacher-led, three-part sequence where teachers ask questions, students respond, and teachers evaluate students' responses (Mehan, 1979). However, researchers are beginning to grapple with how instruction can shift from a focus on print-based literacy to more multimodal practices. Leander (2009) describes four models of technology integration in ELA instruction: *resistance*, *replacement*, *return*, and *remediation*. With the *resistance* model, teachers focus on teaching conventional print literacy to prepare all students to pass high-stakes tests. In the *replacement* model, teachers seek to replace print-based literacy with everyday literacies of youth by focusing on the use of the Internet, computer, etc. In the *return* model, teachers integrate both new literacies and print-based literacy for teaching. For example, the teacher asks a student to draw an image and provide a written commentary for interpreting the meaning of the visual image.

In the remediation model, the teacher values both print and new media tools and combines them through parallel pedagogies to teach the ways that meaning and its effects are communicated in texts (Leander, 2009). For example, youths integrate images, videos, and written texts for communication and thus enhance their rhetorical skills for conveying messages (Beach, 2015). Furthermore, students transform the written text from one medium into another while adapting it to their audiences and taking advantage of the affordances of the new medium (Jenkins, 2011). For example, students read stories and create storyboard or graphic novels.

Puentedura (2011) provides another model of technology integration into teaching: The *Substitution*, *Augmentation*, *Modification*, and *Redefinition* (SAMR) model. The *Substitution* level means that students use technology to perform basic functions such as printing out worksheets. Hence, there is no functional change in teaching and learning. The *Augmentation*

level means that teachers teach students to use computers to perform common tasks, including taking online quizzes instead of using a pencil or paper. Here, technology makes a functional improvement in teaching and learning. The *Modification* level refers to how students use technology to accomplish specific learning tasks such as using virtual classrooms or wikis to work collaboratively in small groups. There is a functional change in teaching and learning at this level. At the *Redefinition* level, teachers use technology to create new tasks. For example, students collaborate to use wikis to create products and explain the process of doing so.

Despite several studies over the last 15 years exploring technology-supported methods, classroom practices still lack a clearly articulated pedagogical model based on the literacy practices constituting digital/media production tools that mediate response to literature and serve to go beyond a largely print-based curricula focus (Kalantzis & Cope, 2010). Indeed, limited studies have explored multimodal resources for teaching Shakespeare's plays. Kress et al (2005) examine how teachers in the U.K. use the multimodal resources to help students interpret *Romeo and Juliet* and *Macbeth* and show that the learners can re-textualize *Macbeth* "back from the multimodality of film, image, and performance, to a written commentary" (p. 161). The present research extends these findings by exploring the ways two teachers use a multimodal approach to prepare students to account for how social and political forces influence the production and consumption of meanings and texts. Jewitt (2006) examines the teaching of Shakespeare's plays in high schools in the U.K. and concludes that the teachers use each of the representations of the play as "a play in a book, a film, an animated cartoon and as a series of still images" (p. 55). This present study builds on these findings by providing details of training for the ELA teachers and how they enact lessons to support students' multimodal interpretation of Shakespeare's plays.

Other studies have examined the use of multimodal instruction in ELA classrooms. In an investigation of how teachers teach students multimodal interpretation of Shakespeare's plays, Franks (2003) argues that "dramatization, the bodily enactment of the text in voice, action and interaction" (p.155) add value to students' reading. In this study, I broaden the definition of multimodality to include new media-based practices that the teachers use to explore the broad range of literacy repertoires of high school students. Walsh (2010) examines how 16 educators teach students to read and produce multimodal texts and concludes that "teachers can combine students' print-based literacy learning with digital communications technology effectively" (p. 226). This study builds on the findings by exploring the role of ELA teachers in helping students develop the capacity for multimodal interpretations of Shakespeare's plays.

The present study builds on the current literature to examine ELA teachers' roles in using "safe" approaches that link textual interpretation to students' social interests and agency. Also, this study extends the existing literature by exploring how two ELA teachers assume much more agency in teaching multimodal interpretation of texts and how students increase their agentive selves by drawing upon their own repertoires of literacy practices for multimodal interpretation of Shakespeare's plays. Finally, the study provides insights into the students' motivations, modal preferences, and the modes they value for interpretation of the plays.

A Social Semiotic Multimodal Theory

In this section, two theories are discussed: a theory of social semiotics to multimodality and a theory of multimodal literacy pedagogy. The theory of social semiotics to multimodality will ground the analysis in articulated theories of cultural/media studies' ethnographic perspective that attempts to capture uses and production of texts related to audience uptake within particular cultures (Ito et al, 2008). The theory of multimodal literacy pedagogy will frame explicitly the

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teaching of the multimodal design of texts to help student analyze both print and digital texts. From the perspective of cultural/media studies, there is a shift in the ways youth communicate due partly to the shifting media landscape. Hence, social semiotic theories of multimodality are concerned with innovative approaches to "representation, communication and interaction which looks beyond language to investigate the multitude of ways we communicate: through images, sound and music to gestures, body posture and the use of space" (Jewitt, 2009, p. 1).

Drawing upon Cope and Kalantzis (2009) and New London Group (1996), I expand the definition of social semiotic theories to account for a multimodal approach in which ELA teachers support the pedagogic-semiotic work of students and develop effective pedagogy. In a multimodal approach, teachers teach students how texts are constructed, circulated, and used in everyday life and how assumptions and ideologies are created and sustained in the society (Bazalgette & Buckingham, 2012). The teacher helps students to account for how meaning-making is shaped by multiple factors, including the relationship between text production and audience response, how different audiences interpret and use media texts, and the broader contexts (e.g., commercial and political forces) of the social production of meaning.

From the perspectives of the social semiotic theories of multimodality, integration of all forms of communication are tools for students to make, remake, and transform meaning (Cope & Kalantzis, 2009). For example, students on social networking media use literary remixing as an important mode of composition through which they rewrite stories by adding personal details with photos, videos, and graphics to create richer, multidimensional representations of their lives. Remixing is the manipulation and integration of artifacts to create new media (Gainer & Lapp, 2010). Remixing provides youths the opportunity to engage in exploration, creativity, and writing for authentic audiences (Jenkins et al, 2006).

Social semiotic multimodal theories have epistemological and pedagogical significance for ELA teaching and learning as they recognize the role of students' agency in the meaning-making process and seek to "create a more productive, relevant, innovative, creative and even perhaps emancipatory, pedagogy (Cope & Kalantzis, 2009, p. 175). Hence, the goal of this study is to use the social semiotic multimodal approach to analyze and ground the analysis of what I found working with ELA in this study, particularly how the teachers help their students to:

- use different analytical perspectives such as learners' subjectivities, diversity, and linguistic and cultural repertoires as assets for transforming textual interpretations
- develop critical thinking skills to interrogate their own and others' perspectives and interests and the sociopolitical contexts of production and circulation of texts
- engage in high levels of teamwork and collaboration as learners bring different levels of skills and expertise to complete multimodal projects
- engage in creativity, knowledge-construction, and pursuit of personal passion
- gain access to learning environments where knowledge production includes remixing media content via sampling, appropriation, transformation, and repurposing (Alvermann, 2011; Mayer, 2011; New London Group, 1996).

The Context of the Schools

Freemont High School (all names are pseudonyms) had a student population of 924 students from 9th–12th grades in 2013. The school had 682 (74%) Mexican-American students, 198 (21%) Caucasian, 22 (2%) Asian/Pacific Islander, and 20 (2%) African-American, 469 (52%) female, and 455 (48%) male. Freemont is a title 1 school as it received supplemental funding from the federal government to meet the needs of the 38% low-income students who were eligible for free/reduced lunch. In its mission statement, the school states that it is committed to

providing all students equal access to high-quality education that promotes knowledge, positive values and respect for diversity. The school is well respected in the community for the harmony between the diverse racial groups.

Teachers Smith and Hernandez were selected to participate in this study. Earlier, I sent letters to all high school principals in a county in Southern California (site of the study) to recruit teachers. The principal of Freemont High School invited me to do the study. Four teachers agreed to participate; they were further screened. The criteria that guided the final selection were that the teachers reflected diversity in terms of ethnicity and gender. They were also interested in a multimodal approach to teaching. Smith and Hernandez agreed to participate and signed a consent form. Creswell (2009) describes criteria-based sampling as a purposeful selection "that will best help the researcher understand the problem and research question" (p. 178).

Smith has an M.A degree in English and a California credential to teach ELA. Smith is a Caucasian male teacher between the age of 36 and 40. He has taught ELA in the school for 15 years. He taught 9th grade ELA and served as a team coordinator. His active involvement in professional activities distinguished him from other teachers. Also, his instruction emphasizes teaching students to use diverse resources such as visual images, graphic organizers, and prior knowledge to make meaning from texts. I observed him for this study when teaching *Romeo and Juliet*. Smith had 30 students – 12 males and 18 females. He had one (3.33%) African-American, five (16.67%) Caucasian, and 23 (76.66%) Mexican-American.

Hernandez is a Mexican-American female teacher. She has an M.A. degree in English and a California ELA credential. She is between 45 and 50 years old and has taught ELA for 18 years. She has previously served as chairperson of ELA department. At the time of this study, she taught in the evenings at a local university. Hernandez taught 12th grade ELA and I observed

Macbeth lessons for this study. She had 31 (17 male and 16 female) students. Her records showed that 29 (87.88%) of the students were Mexican while 4 (12.12%) were Caucasian.

An Overview of the ELA Programs

English 9 covers all genres in U.S., British, and world literature while English 12 covers British, American, and world literature (Littell, 1995–2008). English 9 is structured in thematic units covering poetry, fiction, nonfiction, short stories, and drama. The teachers taught topics such as structural features of informational texts, comprehension and analysis of grade-level-appropriate texts, and expository critique of literary texts, including *Romeo and Juliet* and *Macbeth*.

Method

This is a collaborative qualitative study where I provided Smith and Hernandez some training in multimodal theory and practice and then analyzed the resulting teaching. In this study, I take a stance of remediation as an approach to parallel pedagogy in which teachers mesh together print texts and new media to motivate and engage students in interpretation and production of texts (Leander, 2009). The approach allows students to link ELA instruction to their everyday multimodal literacies that are often repertoires of literacy practices they bring from home/community to the school (Schultz & Hull, 2008).

Modeling Critical Interpretation of Texts

For this research, I suggested a training in multimodal theory and practice and the teachers accepted. We met one hour after school (Monday – Thursday) for three weeks. To develop the skills to teach multimodal literacies, teachers must develop an appreciation of the power of images to convey meaning (Beach, 2015; Selfe, 2009). I modeled how the teachers could teach students to be active readers who develop the knowledge to examine, interrogate, and critique

multimodal texts. The teachers were provided a copy of *A pedagogy for liberation: Dialogues on transforming education* (Shor & Freire, 1987) to read and discuss an approach to critical literacy.

We discussed key components of critical reading such as texts (a) should relate to students' lives and life-world (the world as directly experienced in the subjectivity of everyday life by individuals) and (b) are constructions which reflect the experiences, perspectives, beliefs, and values of authors (Shor & Freire, 1987). We also had a discussion of the meta-language (analytical grammar) for interpreting and composing multimodal texts (Kress & van Leeuwen, 2006). I defined terms including audiences/viewers and media/modes and provided a Critical Response Protocol for the teachers to engage students in multimodal analysis (see Figure 1).

Elements of Analysis	Definitions and Examples
Audience/ Viewer	Definition: The audiences/viewers are the potential readers/viewers that the message of a text is meant for. 1. What emotions, feelings, or thoughts do the images or multimodal texts create in the audience? 2. What is the race, ethnicity, gender, age, language, income or religion of the readers? 3. Which audience does the visual image or multimodal text is appealing to? 4. What audience does the visual image alienate? 5. What background knowledge is expected of audiences who will read this text?
Message	Definition: The message is the central idea(s) the author conveys to the audience. 1. What message does the title of the image or multimodal text communicate to readers? 2. What meaning does the image or multimodal text convey to readers? 3. How does the author use elements such as size, layout, angle, shape, icon, links, and hyperlinks to contribute to the construction of meaning in the image or text? 4. What prior knowledge do readers have to draw upon to interpret the message of the image 5. Is the story fair to my gender, race, ethnicity and socioeconomic background?

Media/Modes	Definition: Media are the platform in which meaning is realized: video, image, text, audio, film, painting, website, sculpture, graph, textbook, billboard, poster, song, TV, CD-ROMs, DVD, speech, etc. 1. Which medium or mode is most apt for the meaning/message I want to communicate? 2. What medium/mode is used in the text? 3. Which medium/mode most appeals to my audience? 4. How I am positioning my audience by using a particular medium or mode? 5. How do the media influence your analysis and understanding of the message? 6. What writing style is used? What is the effect?
Design/Composition	Definition: Design refers to the use of different modes and/or media to recontextualize a body of knowledge for a particular audience or readers. 1. How does the design of the multimodal text reflect my prospective on the intended message? 2. What are available resources to convey my message to my intended readers or viewers? 3. What design will be most suitable for my audiences or readers? 4. What will be the impact of design on the message in the visual image or multimodal text? 5. What catches your attention first in the visual image or multimodal text? Why?
Visual Symbols/ Culture	Definition: Visual symbols are representations of ideas that people see and recognize in a given social/cultural community (e.g., "red" signifies danger and "green" represents freshness or lack of experience in some cultures). 1. What is the meaning of the visual symbol in the visual image? 2. What is the motif for using the visual symbol in visual image or multimodal text? 3. How do visual symbols contribute to meaning in the text? 4. How does the visual symbol contribute to the understanding of the reader? 5. What does the visual symbol represent to you? 6. How does the visual image represent social and cultural context of the author?

Figure 1: Critical Response Protocol for Analyzing/Composing Images and Multimodal Texts

For practice, the teachers read a copy of a Magazine ad: "got milk", with an image of musician Sheryl Crow and used the Critical Response Protocol to interpret the story. We discussed how modal resources such as the bedroom setting, ripped jeans, slender body build, Brazilian Blowout hairstyle, guitar case, glass of milk, posture, physical appearance, the logo

"got milk", written text "Rock hard", and spatiality contributed to the message in the ad. Also, the teachers responded to the following prompts: (a) What values are expressed in the ad? (b) What techniques are used to persuade readers? (c) What is assumed and what is omitted in the ad? Finally, the teachers created a counter ad based on their experience and value.

Modeling the Use of YouTube Videos

We watched YouTube videos of modern versions of Shakespeare' plays. We discussed the techniques the producers used to re-imagine and reinterpret the plays to make them culturally and aesthetically appealing. They watched *Julius Caesar School Project — Modern Version — YouTube* (https://www.youtube.com/watch?v=ULYRHfUIWZU) and *Romeo and Juliet Modern Version — YouTube* (https://www.youtube.com/watch?v=1DCktMMzV3Q). The teachers identified modal resources such as modern English, rock songs, fashion, and media in the interpretation of the plays. The teachers responded to these prompts: (a) How do new media influence the reinterpretation of the plays? (b) How does the producer of the video make the play relevant and meaningful to youth viewers? Furthermore, we analyzed and reflected on Lamb (2007): "Dr. Mashup, or why educator should learn to stop worrying and love the remix" (https://net.educause.edu/ir/library/pdf/erm0740.pdf).

Modeling the Use of Web-Based Digital tools

An important affordance of new media is the web-based digital tools including Glogster (http://edu.glogster.com/?ref=com) and Webspiration (http://www.mywebspiration.com/) which allow teachers to creatively blend and manipulate videos, audios, visuals, and print texts for creating multimodal posters (Castek, Dalton, & Grisham, 2012). We installed the apps in the class computers and the teachers used them to combine graphic, written text, video, audio, and

images to create posters. Also, I provided them a hyperlink to read *Resources for Teachers* (Beach, n. d. at http://tinyurl.com/yhub7y8).

Data Collection

Data for the study were collected through multiple sources over 16 weeks. The approach allowed for triangulation of findings (Creswell, 2009). The data sources included:

(a) *Direct Observation*: During the first three weeks of January 2012, my assistant and I attended the teachers' classes on Tuesdays to familiarize ourselves with the students. Smith and Hernandez taught first and third periods, respectively. Each period lasted 51 minutes.

In February through April, each teacher was observed 11 times. The assistant (who had been trained) and I combined note-taking with a qualitative coding process for observation (Alvermann, O'Brien & Dillon, 1990). We observed activities such as: (i) sketches of teaching/learning events, (ii) comments of the students/teachers, and (iii) summary of students' collaborative group work. Using the observation categories, we wrote comments to provide narrative descriptions of the teachers and students' use of multimodality. The observations allowed us to capture the multimodal approach that drove the data collection and analysis.

(b) *Classroom Videotaping*: During the 11th to 14th week, eight lessons (four per teacher) were videotaped to capture the audio/visual aspects of the instruction that direct observation could not. The videotaping is important for this study because multimodal analysis requires multimodal data (Norris, 2004). However, in classroom-based research, researchers face ethical issues regarding anonymity of participants as videos display the identity of teachers and students. To gain informed consent, I provided the teachers a Video Recording Release Consent Form, which students brought back with their parents' signatures in the first week of this study. The

assistant and I sat at the back of the class during the instruction to minimize any obtrusion. In all, 408 minutes of instruction were videotaped.

(c) *Interviews***:** The teachers and some students participated in interviews during week 15 and 16. The framing of the interview questions was guided by theoretical framework that ELA teachers should develop innovative pedagogical approaches that draw upon students' agency (Ajayi, in press; Mayer, 2011). The teachers participated in a tape-recorded, one-on-one, and face-to-face semi-structured focused interview for approximately 30 minutes (see Appendix A). The interviews took place in the teachers' classroom during lunchtime when students were not present.

Twenty students responded to semi-structured interview questions (see Appendix B). The students were selected because they were available for a follow-up interview and agreed to submit their class work for analysis. The participants consisted of eight females and seven males. The students represented 31.74% of the 63 students in the two classes. Hence, the interview participants were representative of the two classes. The students were interviewed in small groups during lunchtime in the teachers' classrooms. The small group size and setting (without teachers) allowed research participants to feel at ease to express their viewpoints (Creswell, 2009). The interviews were later transcribed word for word by the research assistant.

(d) *Research notebook*: I recorded my reflexive thoughts and comments about the data I was collecting during direct observations, videotaping sessions, and interviews in the research notebook. I wrote comments, including how the students brought multimodal knowledge to bear on interpretation of the plays and how their interpretations sometimes reflected the disconnect between official construct of school literacy and students' out-of-school literacies (Beach, 2015).

(e) *Teaching/learning artifacts*: The teachers provided students' multimodal posters and modern texts (modern texts are translations of *Romeo and Juliet* and *Macbeth* from Elizabethan English into contemporary – plain – English). The artifacts were analyzed to understand how the students engage in multimodal interpretations of the plays.

Transcription of Classroom Videos

I uploaded the videos to a desktop and viewed them several times before transcribing the data. The transcription was guided by the methodological framework for multimodal interactional analysis, an analytic method concerned with describing "what individuals express and react to in specific situations, in which the ongoing interaction is always co-constructed" (Norris, 2006, p. 4). Multimodal transcription involves translating the audio and visual aspects into a printable format. To transcribe the videos, I used the images to describe specific events. Each mode in a context gave some insights into the interactional meaning.

The steps in the video transcription include, first, one interaction was uploaded as one clip and each clip was logged. Second, I transcribed the spoken utterances of the students in order to organize the classroom discourse. To capture a specific event, I took a series of images that represented the event in the video and pasted it on a Word document. Descriptive notes on each event such as what the students said and multimodal resources they used were overlaid on the transcript. The video transcripts and observation records provided an analytic description of the classroom data. Multimodal transcription has the potential to reshape the presentation of academic discourse and accounts of social interaction (Bezemer & Mavers, 2011).

Data Analysis

Data were analyzed using a social semiotic multimodal approach, an analytical method which extends the social interpretation of language and meaning to the multiplicity of modes and media

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and situate textual interpretation within the broader social production of meaning (Ajayi, 2009, 2012; Bazalgette & Buckingham, 2012). The approach emphasizes the need for data analysts to pay attention to how students convey messages in print and digital texts, and how they use multimodal ensembles and their understandings of social contexts to interpret and construct texts (Leander, 2009).

To analyze how the teachers taught new media activities and how the students engaged with them, I took a series of screen pictures that represented specific events in the video and pasted them into a Word document. Descriptive notes of each event were then overlaid on the transcript, including the students' dialogues, interactions, and use of multimodal resources. I transcribed the students' spoken utterances to organize the classroom discourse with particular attention to how they contested or interrogated meanings, drew an image that depicted new meanings, or situated the meaning of the plays in modern contexts to transform meaning.

The research assistant and I read carefully several times the visual images with particular attention to how they related to the students' social lives. In analyzing each image, we focused on students' choice, interest, agency, and principles guiding their textual interpretation (Bezemer & Mavers, 2011). Also, we independently read all the transcripts line-by-line several times to identify themes pertinent to the research questions. From the phrases, sentences and themes, we induced categories (conceptual elements arising from recurring patterns across data) and their properties (smaller, definable properties of categories). We then coded and categorized the data according to the teachers' teaching activities: YouTube, Glogster, and Webspiration. The approach allowed us to code the activities into categories with names that simultaneously summarized and accounted for each piece of the data (Creswell, 2009).

To increase the validity of the study, findings from one source were triangulated with

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multiple sources such as the direct observation, classroom video, and researcher notebook. When researchers corroborate evidence from multiple and different sources to support a theme, they "are triangulating information and providing validity to their findings" (Creswell, 2013, p. 251). For reliability, we used intercoder agreement which allows analysts to use multiple coders to analyze transcript data. The researcher assistant and I established an 80% agreement of coding between themes as recommended by Creswell (2013). We independently read the transcripts several times and coded the three different kinds of activities used by the teachers: YouTube, Glogster, and Webspiration. After coding each activity (theme), we met in my office to examine and compare the texts that were coded. Furthermore, the coded data were sent to the teachers for vetting and they agreed with the themes and the narrative descriptions.

Findings

The research objective of this study is to examine how two teachers employ innovative approaches that draw upon students' social and cultural interests as classroom resources for multimodal interpretations of *Romeo and Juliet* and *Macbeth*. Vignettes from classrooms and quotations from interviews are provided to support specific findings.

YouTube Videos

An important role of ELA teachers is to use innovative approaches to connect instruction to students' everyday literacy practices. Fundamental to the design of innovative instruction is that teachers use new media to link students' learning to their social interests.

Smith

Smith asked his class to watch YouTube videos of modern versions of Act 1, Scene 1 of *Romeo and Juliet* at http://www.youtube.com/watch?v=RYbzkEGG13I. The students also watched another clip of the play at http://www.youtube.com/watch?v=_F5lDqavwQY. The teacher asked

the students to pay attention to the plot structure of the online version of the play. As the students watched the video clips, they hyperlinked to other websites to watch related videos and read texts and visual images. The students discussed in small groups and jotted down ideas from the videos. In the 10th week, Smith assigned students to re-write the plot structure of *Macbeth*. Smith defined plot structure as how the sequence of major events unfolded so that all the events related to one another in a specific pattern to present the theme of a play. Smith provided the following prompts to guide students' work: (a) What message does the plot convey to you? (b) How do new media influence your reinterpretation of the play? (c) Rewrite the plot to provide a modern interpretation of *Macbeth*. The teacher asked the students to post their work to their weblog accounts.

Americanizing Romeo and Juliet

Natasha, an African American student, described herself as an avid user of new media. Natasha liked reading online materials such as YouTube videos. The teacher noted that Natasha was "very smart" and "doing well in English-language arts." She had a Google Nexus 5 phone with which she took photos and videos and surfed the Internet and websites. In her weblog posting, Natasha made *Romeo and Juliet* accessible to her classmates by modernizing and connecting the plot structure to contemporary American history by writing a plot structure with literary elements such as exposition, conflict, climax, and conflict resolution. She introduced readers to two families (one white and one African-American) who were rich and powerful in Los Angeles (exposition). Deandra (an African American and son of the leader of the National Association for the Advancement of Colored People – NAACP) fell in love with Jessica, a daughter of the leader of the Aryan Nations, a white supremacist neo-Nazi group (conflict). Because Deandra and Jessica knew their families would not approve their marriage, they had a secret wedding in Las

Vegas (complication). CNN showed the wedding on the evening news. A street riot broke out in Los Angeles (climax). The government called in the National Guard to restore law and order. The two families decided to end hostilities (resolution).

Literary Creativity

Smith suggested that YouTube afforded him the opportunity to use hands-on approaches that helped students to learn through investigating and discovering. Natasha stated the websites allowed her to recreate *Romeo and Juliet* in social and historical context of the American society. As a member of Generation X that Pew Research[1] describes as more liberal (than older generations) on social issues, including greater acceptance of interracial dating and homosexuality, Natasha based her plot on a biracial marriage. She noted that the websites allowed her to read print texts, images, and photos that were related to *Romeo and Juliet.* She argued that "the different websites broaden my understanding of plot structure in the play." Natasha argued that the websites allow her to "combine ideas from different websites to create the plot structure." For example, her story was set in Los Angeles, the characters were White and African-American, and the story ended in racial harmony. Natasha strategically used new media to re-create *Romeo and Juliet* by bringing it into the American culture.

Hernandez

Hernandez instructed her students to log onto to the website and read *Macbeth* at https://www.google.com/#q=modern+version+of+macbeth. The students hyperlinked to related websites to read about *Macbeth*. The students noted that the online versions of the play were accessible because they were written in modern English and reflected modern culture. The

[1] See Pew Research (2012). The Generation Gap and the 2012 Election.

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teacher assigned the following prompts: (a) How do websites in this study enhance your interpretation of *Macbeth*? (b) In what ways do relating *Macbeth* to modern society helps you to interpret the play? (c) Rewrite the plot structure of *Macbeth* to show a modern interpretation.

Modernizing Macbeth

Esperanza, a Mexican-American, described herself as a "tech geek." She spent her after-school hours surfing websites and chatting online. Esperanza had an Apple iPhone 5s and iPad which she carried with her all the time. She had Facebook and Twister accounts. She surf the web and read her email, Facebook and Twitter accounts between classes. Esperanza rewrote the play and shared her work with the class. In her narration of the plot development, she used cultural materials and business accessories to suggest the social status of the Macbeths.

Esperanza wrote: "Macbeth was the Vice President of a multinational company – Casa Blanca Oil. According to Esperanza, Macbeth was rich, drove Lamborghini, dressed in Gucci-made business suits, and carried a laptop, iPhone, and iPad [exposition]. Esperanza connected Lady Macbeth to modern fashion and social status of chief executive officers in the U.S. companies: "Lady Macbeth wore a Versace-designed gown, Dior wrist watch, a Fendi handbag, and 6-inches Stuart Weitzman diamond dream stiletto, and Cartier jewelries." Esperanza linked her interpretation to pop culture. She wrote: "Macbeth consulted three psychic readers on her iPhone, who forecasted that the company president (Duncan) would die in a plane crash and that Macbeth would become the president of the oil company. Lady Macbeth persuaded Macbeth to frame Duncan by implicating him in a ponzi scheme [conflict]." Situating the plot structure in the American legal system, Esperanza wrote: "Duncan was tried and convicted for fraudulent investment by the Office of the Attorney General of the U.S. [complication]." She concluded by

saying that the shareholders found out that Macbeth framed the president in order to take his position (climax) and that Macbeth was tried and sentenced to 150 years (resolution).

Popular Cultural Materials

Hernandez, during a follow-up interview, noted that the YouTube videos provided opportunities to use innovative approaches to teach her students to experiment with *Macbeth*. She explained that websites allowed the students to expand their understanding of the play. Esperanza stated: "as I read across different websites I acquire more knowledge about *Macbeth*." The student noted that through reading multiple websites she learned how to use new approaches for writing the plot structure of the play. To Americanize the play, the student linked the interpretation to popular cultural materials such as Lamborghini to symbolize the social status of Macbeths. She selected and organized events such as consultation with psychic readers to make the plot structure come to live in an American classroom.

Esperanza could easily relate to the social and cultural meanings of "psychic readers" and "forecasts" rather than "witches" and "prophecies" in *Macbeth*. Esperanza transported the plot structure of *Macbeth* into the 21st American society and made them relevant and appealing to a high school audience by providing dystopian representations of the ills of the corporate world such as cultural conflicts, greed, inordinate ambition, and ruthlessness. The analysis shows that ELA teachers can help students provide more culturally relevant interpretations of *Macbeth* by connecting instruction to contemporary forms of symbolic manipulation of new media tools.

Glogster

Glogster allows teachers to tap into the wide-ranging new media literacies that students acquire through outside school to creatively manipulate and manipulate ideas from multiple sources.

Smith

Smith defined multimodal composition as when an author integrated modal resources in a text. He introduced the class to Glogster (http://edu.glogster.com/?ref=com). Using a handout from the Internet (Glogster poster tutorial), Smith explained and modeled how the students could use the web app to create multimodal posters. Smith assigned the students to read *Romeo and Juliet*, watch video clips, and "read" visual images on websites. For a culminating task, the teacher asked students to: (a) choose specific web-based tools for your work, (b) design a poster to represent a multimodal interpretation of a scene in *Romeo and Juliet*, (c) how does the design impact your interpretation, and (d) how does the web-based tools influence your interpretation?

A Multimodal Poster

Group A worked on how to create a multimodal poster of Act IV, Scene 1 (where Friar Lawrence presented a plan to give Juliet a distilling liquor). While some students interpreted Friar Lawrence's plan as too hasty and irrational, others saw Juliet as courageous and brave.

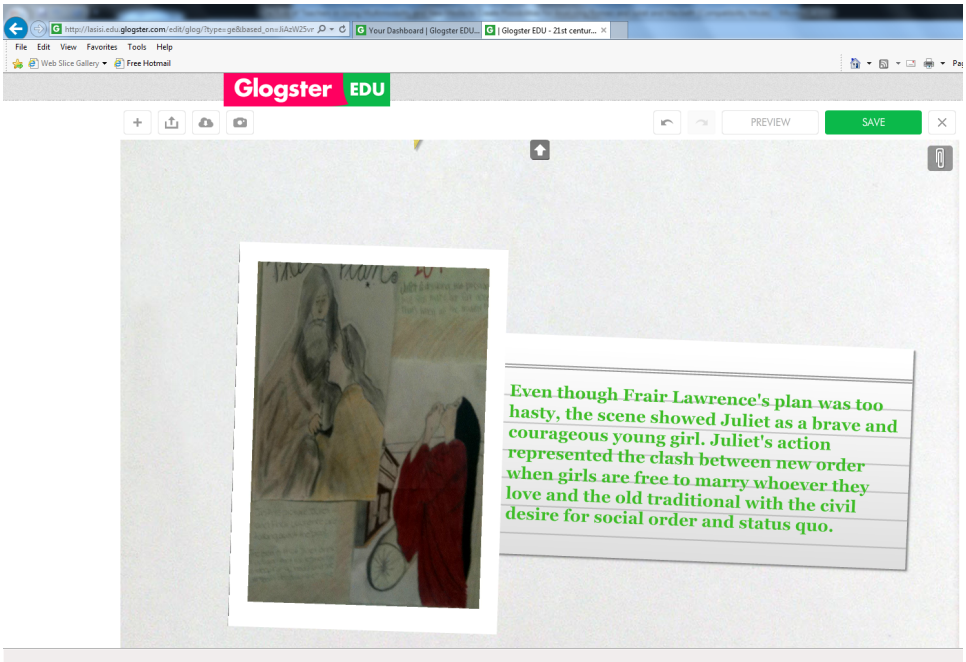

Figure 2: Friar Lawrence Plan: is it hasty or shows Juliet as Courageous?

The group explained that Figure 2 started the events that led to a reconciliation between the feuding families in the play. Silvia, Mexican-American, belongs to the App Generation; that is, a new generation of young people who have moved the issues of self-representation, creativity, social interaction, and identity construction into the world of digital apps (Gardner & Davis, 2013). Silvia is an ardent user of apps; she downloaded many apps into her iPhone and laptop, including iTune, Facebook, YouTube, and flickr for socialization. The student stated that Juliet's action represented the clash between the young protagonists who acted bravely and the old tradition with the civil desire for social order and status quo. The student noted that Glogster allowed students to select a scene, brainstorm and generate ideas to explain the scene, compose a written text, log on to Glogster, click on draw tab to draw, click on text tab to add title, click on text tab to add a written text, and click on save or publish tab to save or publish their posters. Rather than only describing her interpretation, Silvia used Glogster to add an image to the verbal text to illustrate her interpretation to her classmates.

Remix

Silvia explained that her group used Glogster to draw Friar Lawrence as an elderly priest in a long robe. A look at Figure 2 indicated that the students "remixed" ideas from multiple sources, including the original texts, modern texts, video clips, audio books, group discussions, and cultural knowledge. Figure 2 showed Friar Lawrence with a long, white beard like many orthodox Catholic priests, a view of priests the students might have developed from home and TV, as the community members are mostly Catholics. They also drew an image of Juliet with a long, brunette hairstyle and related her to their own sense of fashion. Silvia noted that she consciously blended her personal narratives with other materials from other sources to draw Figure 2 and create a link between her Mexican-American background and *Romeo and Juliet*.

Hernandez

Hernandez taught her students to use Glogster to create multimodal posters. The teacher defined "characterization" as details about a character's traits that an author provides, including his/her appearance and personality that make the character comes alive for readers. The teacher noted that playwrights usually indicated the weaknesses in a character to make him/her more humane so that the audience can relate or identify with the character. The teacher assigned the students to (a) decide on an interpretation that will appeal to an audience, (b) select the most apt medium or mode for the interpretation, and (c) represent the character of Macbeth in a poster.

Blending Words with Images

The students worked in groups to design multimodal posters of the charater of Macbeth. The students identified particular scenes, conflicts, actions, thoughts, and motivations that contributed to the development of Macbeth's character. They wrote the character traits they wanted to reflect in the multimodal poster: brave soldier, powerful, ambition, bravery, and great physical appearance. The students decided on the combination of modes that would be apt for the poster. The group used Glogster to write a text. The students upload a visual image (Figure 3) to illustrate their interpretation so as to make it clear to their classmates.

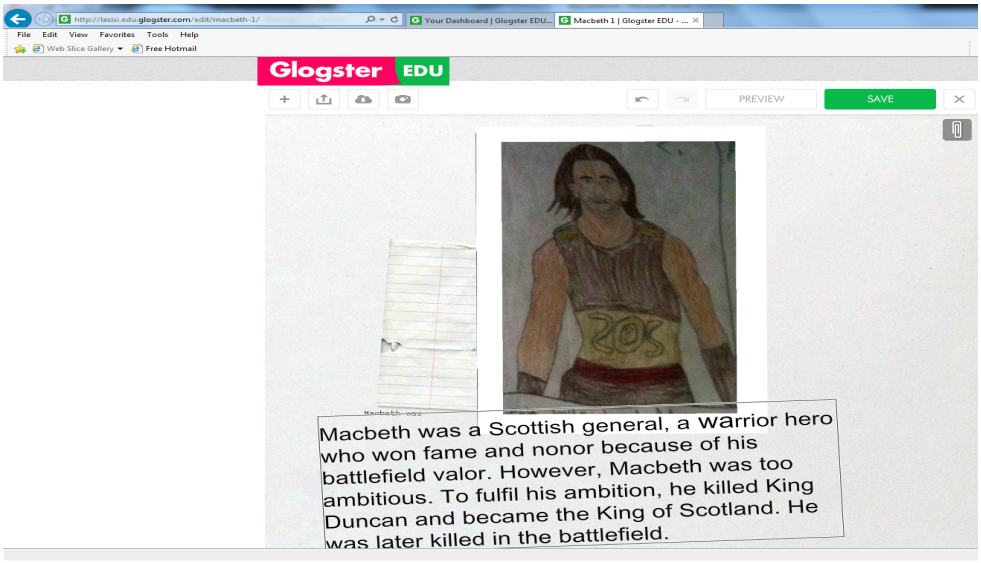

Figure 3: A Multimodal Poster of the Charater of *Macbeth*

During an interview, the students explained that Glogster allowed them to integrate written texts and images to present their interpretation of Macbeth. Julio, an ardent reader of action hero movies, said he liked to read entertainments which portray action and adventure. The student argued that action heroes usually show toughness, strength, and bravery. He noted that such people are always very likeable to the audience. The blend of language and visual image in Figure 3 shows that the students have a complex interpretation of the character of Macbeth. The student connected Macbeth to his ethnic identity to draw a Mexican-American-looking man (rather than Caucasian, the racial identity of Shakespeare's Macbeth).

Figure 3 showed Macbeth's masculinity, broad shoulders, big biceps, big muscle, and tattoos (physical characteristics that were not present in the video clips of the play) to suggest physical power and ruggedness associated with heroic characters in Hollywood action hero movies. The students embedded such physical character traits to create an inspiriational figure like Hollywood's action characters. The student connected his representation to Hollywood action characters which fulfill cultural functions by affirming and maintaining the conventions of

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social construction of identity, fashion, gender, and economic/social status in American society. Using Glogster to create multimodal posters shows that the literary interpretation of texts can ensure that high school students have access to the literacy knowledge and skills required to make considered decisions in designing meaning. Hence, ELA teachers can encourage students to draw upon their multimodal literacies that allow them to integrate different communication modes to make meaning, separately and together.

Webspiration[i]

The affordances of Webspiration allow teachers and students to combine language and apps to interpret Shakespeare plays. Webspiration provides multimedia opportunities for students to analyze, interpret, and extend discussions of literary texts. The web app allows students to organize their interpretations and provide visual illustration of written commentaries.

Hernandez

Hernandez introduced his students to Webspiration. Smith created a graphic organizer template that the students could modify to suit what they were doing. The teacher explained that students must integrate at least two modes such as visual images, written texts, video, and/or hyperlink. The teacher assigned the students to (a) design a story web to explain *Macbeth*, (b) present one or two key moments in the play, and (c) recreate the play in modern times and use contemporary language.

Multimodal Story Web

Student worked in small groups to create a story web. They brainstormed, identified and summarizes two key moments in the play. They discussed how to represent *Macbeth* in a modern setting, identified important characters to use in their narrative, and the best way to organize their story. The students shared a multimodal story web (Figure 4) with the class.

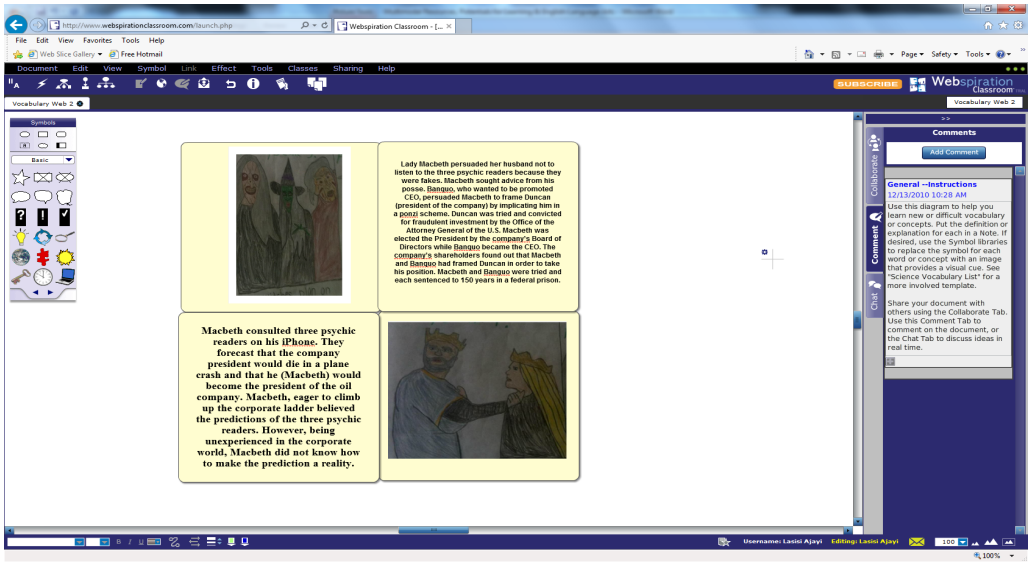

Figure 4: A Multimodal Story Web of Two Key Moments in *Macbeth*

A group of students drew Figure 4 to show a summary of two important events in *Macbeth*. The image in the first box showed three women wearing blonde, black or red dress, and red lipstick while one woman had a hat and a Polaroid glasses. In words below the image, the students provided a verbal explanation: the moment the three psychic readers made their prediction. In the second box on top, the students explained the second important event. Below the box, the students drew an image of two men as a visual illustration of the moment Macbeth and Banquo hatched a plan to implicate Duncan in a ponzi scheme.

Michelle (Caucasian) presented her group's work to the class. She had an iPhone that she carried with her all the time. She had downloaded and installed multiple apps into her iPhone including WhatsApp, Instagram, and Twitter. Michelle explained that she enjoyed using the Webspiration because it had visual thinking and learning tools that helped her to be creative and imaginative in summarizing the important events in *Macbeth*. She also argued that the web app allowed her to combine language and visuals to make her presentation appealing to her

classmates. Michelle further noted: "I am happy that I get to use apps. I can bring what I like to do in my free time to the classroom for learning."

Discussion

The results show that the ELA teachers use innovative approaches to create possibilities for the students to assume much more agency in using multimodal resources for interpretation of the plays. The two ELA teachers become designers of innovative approaches that draw on a variety of digitally accessible information to link multimodal and media interpretation to the students' social interests, capabilities and proclivities. Hence, a crucial role of ELA teachers is to "function as designers of precisely tailored learning environments, each shaping the learner's path to an epistemological proximity to the curriculum of the school through the teacher-designer's understanding of the learner's principles" (Kress, 2013, p. 126).

ELA teachers can create opportunities for students to access texts using YouTube videos and distributed forms of knowledge. YouTube videos have the potential to show students how to look at edgy, contemporary social approaches to teaching and representing Shakespeare's plays. For example, in their modern adaptation of the plays, the participants move the characters from supernatural world of the medieval period to the 21st century. The students modernize and Americanize the plays to reflect the features of sociopolitical landscape of the U.S.: African-American, Mexican-American, NAACP, CNN, biracialism, psychic readers, designer wears, and vice president. The modern adaptation transports the central theme, plot, and characters in *Macbeth* into the 21st American society and makes them appealing to a youthful audience by providing dystopian representations of the ills of the corporate world such as the cultural conflicts, including greed, inordinate ambition, and ruthlessness.

By using a culturally significant tool such as YouTube, the teachers empower the students to incorporate new elements into Shakespeare' plays for repurposing and making remixes aesthetically appealing to their classmates. New media appeal to youth because they encourage experimentations, identities, and textual interpretations (Alvermann, 2011; Mayer, 2011). Learning from online videos requires the students to acquire the skills to choose appropriate search engines, locate relevant sites, hyperlink to relevant sites, and synthesize information from multiple sources to produce new knowledge. Hence, it is important that teachers teach students how to "read" online cultural texts or videos and understand the sociocultural and political contexts in which they are produced. Indeed, students' knowledge and abilities to network are now a core social skill and cultural competency that ELA teachers can leverage for student learning (Jenkins et al, 2006; Mayer, 2011).

A crucial aspect of the ELA teachers' innovative approaches is the recognition of literary tools that new media such as apps afford students. Glogster offers important literary practices such as multimodality, publishing, and knowledge-sharing with classmates. Hence, ELA teachers "need to pay attention to, and come to value, the multiple ways in which students compose and communicate meaning, the exciting hybrid, multimodal texts they create – in both nondigital and digital environmnets – to meet their own needs in a changing world" (Selfe, 2009, p. 642). The students used Glogster to provide written comments and upload visual images to further illustrate their interpretation the plays to an authentic audience (Castek, Dalton, & Grisham, 2012).

The affordances of Glogster in ELA suggest that as teachers think about multiple ways to use technology to transform student learning, they "must also consider how these apps mediate students' self-perceptions and sense of agency" (Castek & Beach, 2013, p. 555). The findings in this study show that the students's new media literacy skills are being devloped not just within

the classroom, but in their real-lives/Third Spaces, too. "Third Spaces" is the combination of worlds that students inhabit, including outside school (first space) and in-school (second space) that are blended to create a third space in which their repertoires of practice from the first and second spaces inform each other to extend their learning (Gutiérrez, 2008). Rather than marginalizing students' outside school literacy knowledge and proclivities, ELA teachers should embrace them as resources for teaching and learning.

Implications and Conclusion

The findings indicate that the role of ELA teachers in a contemporary classroom is to recognize high school students' agency that they use for literacy practices. The findings suggest that after the teachers received some training in multimodal theory and practice, they taught students to use new media and modern social approaches to interpret *Romeo and Juliet* and *Macbeth*. The teachers increase their agency by using a multimodal approach to help students interpret the plays. The findings have important implications for policymakers, schools, teachers, and researchers.

Policymakers

The findings in this study shows that a multimodal pedagogy allows teachers to help students use multiple interpretative perspectives and different modalities for reading complex texts such as Shakespeare's plays. The findings suggest that one-size-fits-all approach to ELA instruction has become obsolete and irrelevant to the knowledge and skills that students need to participate in today's global knowledge economy, education, and everyday literacy practices (Jewitt, 2013). Hence, policymakers may have to rethink policies and educational standards (e.g., tests) that prioritize the traditional vertical, print-centric, hierarchical top-down approaches to ELA instruction. What will be beneficial to students is the policy that recognizes the shifting world

where knowledge is disperse, horizontal, more open, and participatory and allow teachers to incorporate multimodal approaches that provide exposure to "the cosmopolitan experience of cultural epistemological differences so integral to the contemporary world" (Cope & Kalantzis, 2009, p. 188). A multimodal approach takes as the starting point for learning the students' value for how they engage with and think about their own literacies and promotes alternative forms of engagement with their literacy worlds, interests, experiences, motivations, and identities.

High Schools

There is a need for schools to provide continuing professional development (similar to the intervention in this study) to help ELA teachers acquire the knowledge and skills to teach multimodal theories and practices. In addition, schools should ensure that ELA teachers and students have access to networked computers and websites that show contemporary approaches to textual interpretation such as Shakespeare steampunk, and Fanfiction and subscribe to relevant web apps such as Glogster, Webspiration, Visio for the PC, Phoster, Pinterest, Quark DesignPad, iFontmaker, Postcrosing, LivingSocial, etc.

ELA Teachers

ELA teachers may need to learn more about new media knowledge that students bring to the classroom. Gardner and Davis (2013) argue, "There can be little doubt that apps and digital media technologies have altered the landscape of imaginative expression. They've affected virtually every facet of the creative process, encompassing who can be a creator, what can be created, and how creations come into being and find an audience" (p. 122). Teachers can leverage students' new media literacies to provide "safe" approaches that bridge the gap between learners' interests and the traditional, standards-based curricula of market-oriented economy.

ELA Researchers

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The field of multimodal theories and practices is still developing (Jewitt, 2013). Hence, there is a need for more research to understand students' motivations for using different modes and media for literacy practices in ways that their agency – proclivity, repertoires of practice and resources – is at the center of instruction. Also, there is a need for more research on how the affordances of specific apps can be integrated into ELA classrooms in ways that can best enhance students' learning.

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Appendix A: Interview Questions for the Teachers

1. In what ways, if any, do the websites provide you innovative approaches to teach in this class?
2. How do the websites equip you, if any, to help your students expand their interpretation of the play?
3. How do the approaches in this course help you, if any, link instruction to your students' interests and resources?
4. In what ways, if any, do the approaches help you draw upon literacies that students bring from home/community?
5. How do the approaches, if any, allow you to capture students' enthusiasm and motivation?
6. What are the advantages (if any) of teaching students to integrate modes/media to interpret Shakespeare's plays?
7. What constraints do you face in using multimodal and media resources to teach in this course?
8. What professional development/training do you like the school to provide to help you integrate modal/media resources into ELA instruction?
9. Comment on any aspects of the approaches you use in this course.

Appendix B: Interview Questions for the Students

1. In what ways, if any, do the websites help you recreate the play?
2. In what ways, if any, do the websites you visited contribute to your interpretation of the play?
3. How do approaches in this course help you, if any, connect interpretation of Shakespeare's play into your interests?
4. Why did you draw this poster? What is the message of it?
5. In what ways, if any, do the approaches make literary interpretation interesting for you?
6. How do the approaches in this course, if any, enhance your creativity and imagination?
7. What kind of literary skills and knowledge, if any, do the apps help you acquire?
8. How do the apps, if any, help you present your interpretation of the play to your classmates?
9. Comment on any aspects of instruction in this class.

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The Invention of Reading and the Evolution of Text

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Abstract: While societal interpretation of reading has evolved over millennia, the functions of reading appear to transcend time and place; reading provides individual access to accumulated cultural experiences, knowledge and information. Historically, numerous innovations have increased access to text and such increased access is both the cause and the consequence of continually increasing societal expectation that individuals can and will read. Although a relatively recent innovation, digital technology has had a profound effect on the production and decoding of written text. Digital technology devices, it is argued, contribute to the evolution of text thereby ensuring increased use of the invention of reading.

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Reading is a general term used to refer to the processes of deriving meaning from abstraction or symbolic representation. Reading English text, for example, requires deriving meaning from 26 symbols (i.e., the alphabet) presented in seemingly infinite combinations (e.g., sentences and paragraphs) and organised with 14 other print symbols (i.e., punctuation marks) and several text conventions (e.g., space between words and paragraph indents). Although reading is not possible without a system of writing, Fischer (2003) described writing as the antithesis of reading. Writing is a skill; reading is a faculty. Writing is expression; reading is impression. Writing is public; reading is personal. "Writing was originally elaborated and thereafter deliberately adapted; reading has evolved in tandem with humanity's deeper understanding of the written word's latent capabilities" (p. 8).

A reciprocal and spiralling relationship exists between personal reading opportunities, reading requirements and reading abilities. That is, the more that text is available, the greater the social expectation that individuals will read (Hellinga, 2009). Simultaneously, the more that reading is required, the more attention placed on reading, the greater the level of literacy in the general population and the greater the concern for those who cannot read. Historical analysis of the human activity of reading demonstrates continuous progress or, according to Fischer (2003), "successive stages of social maturation" (p. 8). While once the domain of a privileged few (Finkelstein & McCleery, 2005), individual ability to read and access text are currently considered fundamental to personal and social progress (Organization for Economic Co-operation and Development, 2013).

A Brief History of Reading and Writing

Spoken language is a natural evolutionary human phenomena; written language is a human invention (Pinker & Bloom, 1990). According to Aristotle (384-322 BC), spoken words are the

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symbols of mental experiences; written words are the symbols of spoken words (Modrak, 2001). Although reading and writing are distinct processes, the invention of a system of written symbols was prerequisite to the invention of reading. Some 6000 years ago, "the world's first active readers sighted only a bare skeleton of text (name, commodity, amount), the control of which served to empower an oligarchy" (Fischer, 2003, p. 17). In 2000 BC, the Phoenicians developed the first alphabet consisting entirely of consonants. One thousand years later, the Greeks added vowels to the alphabet (Daniels, 1996). Punctuation marks appeared as early as the 2nd Century BC. In 900 AD, the insertion of spaces between words facilitated the ease with which text could be read (Houston, 2013). While obvious from a contemporary perspective, spaces between words constituted a major innovation because considerably less effort and training were required to decode written text thereby rendering reading processes more personally accessible. Currently, consonants, vowels, punctuation and spacing remain the basic conventions from which meaning is derived when reading English text (Powell, 2009).

In addition to the evolution of written symbols and conventions which made reading increasingly accessible, social expectations and assumptions about reading correspondingly evolved (Finkelstein & McCleery, 2005). Ancient historians note that "all early 'reading' involved very simple code recognition, and was invariably task-oriented" (Fischer, 2003, p. 17). In this regard, those individuals who could read simple records (e.g., name, commodity and amount) held considerable economic and social importance. An element of trust, if not prestige, was necessarily associated with those who could read. Similarly and over time, increasingly complex written text permitted public oration of narratives and accounts that were once entirely dependent on human memory and corresponding recitation (Moorhead, 2011). For example, popular access to biblical stories was once limited to public recitation from clergy memory.

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Increased reading ability among the general population increasingly negated the once essential skill of extensive memorization while simultaneously increasing public demand for text and individuals who could read that text.

Historically, the mechanisms by which written symbols were transcribed had a reciprocal and spiralling impact on the evolution of text. For example, innovations in writing material made texts more available and reading more common. In the 4th millennium BC, small clay tablets were used for record keeping but quickly increased in size to allow for more inscriptions, decreased in weight for ease of handling and improved in terms of writing properties for ease and permanence of inscription (Robson, 2009). By 2900 BC in ancient Egypt, the papyrus plant was processed to produce rolls of a paper-like material that were relatively amenable to enduring inscription, transportation and storage (Roemer, 2009). As early as the 9th Century BC, the Romans crafted reusable wax-covered wooden tablets for record-keeping and ethereal writings (Fischer, 2003). By the 2nd Century BC, the ancient Greeks read from parchments made of animal skins, expensive but highly portable and durable (Finkelstein & McCleery, 2005). Paper was invented in China during the 1st Century AD and text was printed on that paper by woodblock primarily to diffuse Buddhist teachings (Edgren, 2009). In the 15th Century AD, the printing press accelerated the production of reading material and thereby accelerated the extent to which individuals read (Hellinga, 2009). Nonetheless, despite the continually increasing availability of reading material and the associated increased levels of literacy in many societies, the functions of reading have remained relatively constant throughout history and, indeed, into the present.

The Functions of Reading

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The evolution of complex oral language increased human survival because it improved food supply which contributed to increased brain size (Dunbar, 2003). Increased brain size allowed for increased oral language and increasingly complex social organization. The Neolithic agricultural or farming revolution resulted in the trade, storage and distribution of food which required increasingly complex record-keeping, -- the first form of reading in the modern sense (Fischer, 2003). Further, the agricultural revolution improved food supply which allowed for decreased focus on survival and increased focus on creative and recreational activities such as story-telling (Steckel & Wallis, 2011). Large dense brains, relatively stable food supplies, oral language abilities and opportunities for creative activities resulted in increasingly complex cultures among human groups which included shared understanding and experiences of, for example, religion and history (Shackelford & Liddle, 2014). Those who could read text were at a survival advantage because they had access to a record of accumulated human experiences, interpretations and understandings (Finkelstein & McCleery, 2005). Historically, social repression has been achieved and maintained by denying groups of individuals the right to learn to read. For example, legislation in 1830 in the United States of America stated:

> Be it enacted by the General Assembly of the State of North Carolina, and it is hereby enacted by the authority of the same, that any free person who shall hereafter teach or attempt to teach any slave within this State to read or write, the use of figures excepted, shall be liable to indictment in any court of record in the State having jurisdiction thereof, and upon conviction shall at the discretion of the court if a white man or woman be fined not less than one hundred dollars nor more than two hundred dollars or imprisoned (North Carolina Digital History, 2009).

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Increased individual access to the invention of reading represented increased individual access to cultural knowledge and associated power. Nickerson (2005) suggested that human inventions, ‘‘as amplifiers of human capabilities’’ (p. 3), are meaningfully organized as increasing motor capability (e.g., moving large object), sensory capacity (e.g., viewing astronomical phenomena), or cognitive ability (e.g., storing information). For example, Johnson (2008a) concluded that the invention of internet search engines (e.g., Google) represents an extension of human cognitive ability. In her large sample, “students who reported frequently using search engines scored significantly higher on the measure of metacognition (i.e., planning) than students who infrequently used the same cultural artefact” (p. 2104). Tsai (2004) described search engines as metacognitive tools that help individuals ‘‘select and filter information’’ (p. 526). With regard to this, a specific internet application (i.e., search engines) may be conceptualized as amplifying a specific metacognitive function (i.e., locating relevant information). From such a perspective, the continually increasing complexity of human inventions or cultural tools reflects continual improvement in human cognitive sophistication (Maynard, Subrahmanyam, & Greenfield, 2005). Denying a group of people access to a popular cognitive tool (e.g., reading and search engines) is equivalent to denying that group to opportunities to grow intellectually.

Reading extends human oral communication and, since language is a cognitive function, extends human intellectual capacities. Historically and currently, humans read text for the same reasons that humans listen to others speak, -- that is, to access information and participate in culture. Restated, people communicate (i.e., write-read, speak-listen, gesture-view) to benefit from connection with others (directly or indirectly). In general, to access information and participate in culture is to learn; to access information and participate in culture is the essence of

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social connection, a seemingly fundamental human motivation essential to individual survival and social development (Shackelford & Liddle, 2014). Historians note that ancient text was "recognized to be an invaluable tool for accumulating and storing information" (Fischer, 2003, p. 17). Digital tools (e.g., computer hard drives) currently have the same function, but to a much greater degree (Johnson, 2008b). "The Internet has become a primary form of external or transactive memory, where information is stored collectively outside ourselves" (Sparrow, Lui, & Wegner, 2011, p. 776).

Human communication, which includes literacy, is a cultural tool in continued use and, as such, it continues to evolve. To illustrate, telescopes and microscopes continually increase their capacity to see objects that are further or smaller; airplanes continually increase their capacity to move more passengers and cargo faster; computers continually increase their capacity to hold more data and provide more functions while continually decreasing in size; but hand powered farming tools stopped improving as they became increasingly obsolete. As with the evolution of all human inventions or cultural tools, extremely crude and rudimentary forms of reading and writing were invented and continuously evolved to improve communication. It is naive to assume that existing writing conventions such as vowels, punctuation marks and spacing between words and paragraphs are the point at which evolutionary processes will cease. Evolution ceases as species move toward extinction or, in the case of cultural tools such as reading, with disuse. The only condition under which the processes of reading would not change is if an improved alternative was invented.

Reading is a communication tool that appears to be increasing, not decreasing, in use because it is increasingly required to survive and thrive in an increasing number of human contexts (e.g., personal, occupational and financial). The capacity to read increasingly complex

text with increasing speed and fluency also appears to be continually increasing (Johnson, 2008b). Adults in literate societies are expected to quickly and effortlessly derive complex meaning from huge numbers of printed symbols (e.g., 500,000 letters of the alphabet in a single novel). According to the Organization for Economic Co-operation and Development (2013), between 4.9% and 27.7% of adults in literate countries demonstrate extremely limited reading abilities and these individuals are typically at extreme social and cultural disadvantage (Dinicola, 2007). Fortunately, there is mounting evidence that mobile phone technology supports the development of literacy among disadvantaged groups (Johnson, 2013a). According to Johnson and Oliver (2013), "in rural and remote Indigenous communities, mobile technology is actually encouraging writing among those previously disenfranchised by traditional forms of literacy" (p. 1275).

Since the invention of reading in ancient times, two evolutionary patterns are apparent: 1) the conventions and mechanisms of reading have changed to improve physical and cognitive access to text and 2) such changes have corresponded with increased social demand for and personal motivation to read. Indeed, in ancient Greece there were no scribal class. "Men of some means and better breeding placed their sons under a paidagogos to see they learned the abcedarium and the secrets of decoding poetic texts kept on papyrus and folding wax tablets" (Powell, 2009, p. 251). As with the emergence and evolution of printing press in the 15th century (Hellinga, 2009), the digital revolution has functioned as a catalyst for change to the conventions of text and the mechanisms of text distribution (Johnson, 2012b). The digital revolution has contributed to increased reading with use of new information and communication tools (Goldman & Scardamalia, 2013) and is contributing to the evolution of reading (Johnson, 2013c).

Reading in the Digital Age

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The *digital age* (also referred to as the *digital revolution* and *information age*) describes the era of digital technology devices (Baron, 2009) and the associated decreased use of analogue technology devices. Analogue and digital technologies capture human sensory experiences using different mechanisms. Essentially, analogue technologies capture actual atmospheric waves with a range of devices. For example, invented by Thomas Edison in 1877, the phonograph was the first mechanical device to capture analogue sound waves (Katz, 2012). Analogue technology evolved and, until very recently, was used in a range of communication and cultural tools such as radio, television and telephone. Digital technology constituted a major breakthrough because the analogue wave was converted to a number (i.e., digit) which could be transmitted and stored much more efficiently than an analogue wave (Wheen, 2011). Digital technology rapidly transformed all communication and information transmission devices such as mobile phones and video and audio recordings. Perhaps most importantly, digital technology led directly to the development and popularization of personal computers and the internet (Johnson, 2013b).

The popularization of digital technology devices, particularly personal computers and mobile phones, gave rise to changes in written language conventions primarily due to the limitations of communicating with written text in real-time (Kent & Johnson, 2012). For the first time in history and rather abruptly, personal digital devices (e.g., computers and mobile phones) provided individuals with the capacity to receive typed messages less than one second after they were sent (Johnson, 2012b). Text messaging (also referred to as short messaging services or SMS, instant messaging and computer mediated communication) created a communication scenario in which a reader waits to receive a message while the sender types, historically using a small awkward keypad. Indeed, at the beginning of the current century, mobile phone technology was restricted to the alphanumeric keypad where one button was pressed up to four times to

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select a specific character, for example, the number seven key was pressed four times to input the letter *s* (Taylor & Vincent, 2005). Despite such limitations, text-based real-time digital devices facilitated human communication and quickly became enormously popular for that very reason (Skierkowski & Wood, 2012). Humans want and need to communicate with others quickly, easily and personally. Kinzer (2010) argued "that literacy is being redefined as a result of the use of digital media" (p. 51).

The practice of text messaging in the context of keypad limitations and a waiting reader birthed a written language form referred to as *textese* (Johnson, 2012a). With unique "grammatical, lexical, stylistic and visual features" (Taylor, 2009, p. 33), textese includes "abbreviations, acronyms, emoticons, misspellings and omission of vowels, subject pronouns and punctuation" (Ling & Baron, 2007, p. 292). Turner (2010) described this language form as *digitalk* whereby language is re-formed for the purpose of communicating a message that reflects the "voice of the speaker" (p. 43). Several studies (Crystal 2008, Kemp, 2011; Kemp & Bushnell, 2011; Plester, Wood & Joshi, 2009) concur with this notion, describing textese as a linguistic creativity or playfulness where users draw on their existing language knowledge to produce written texts that are variants on Standard English forms (Powell & Dixon, 2011). Textese or digitalk, to illustrate, includes initials for common phrases (e.g., lol for laughing out loud), homophones (e.g., gr8 for great), abbreviations (cuz for because), symbols for emotions, and the omission of words, vowels, punctuation, and capitalization (Drouin, 2011). Thurlow and Poff (2013) provide a detailed and comprehension classification of text messaging conventions.

Toner (2011) highlights the fact that "punctuation rules, rather than being historically absolute, evolve and change over time" (p. 10). Furthermore, conventions are influenced by changes in technology - "shifts in media impact upon punctuation and how punctuation is

responsive to, and articulates those very changes" (p. 17). This is demonstrated in the considerable creativity of punctuation and capitalization usage in text messages (Turner, 2010). Baron and Ling (2011) examined punctuation choices in text messages made by American college students and found purposeful and ordered usage. They found numerous occurrences where traditional punctuation had been repurposed (p. 61) to suit the needs of the text message creator and recipient, for instance, where ellipses and smileys were used instead of periods. Reportedly, capitalization is commonly omitted in text messages (Ling & Baron, 2007; Taylor, 2009). This aligns with Watt's (2010, p. 143) idea that existing language and literacy skills are being adapted as users craft text messages.

Anecdotes from teachers, widely reported in the media, describe textisms "as having an adverse effect on children's written language production" (Powell & Dixon, 2011, p. 58). Turner (2010), however, argued that the abbreviated language conventions used in digital communication are not deficient but, rather, "just a different language used in special contexts" (p. 41). Wood, Jackson, Hart, Plester, and Wilde (2011) studied 9- and 10-year-olds who had not previously owned a mobile phone. Children were randomly assigned to a control condition (i.e., not given a mobile phone) or a treatment condition (i.e., given a mobile phone only enabled for text messaging). Their results demonstrated that "text messaging does not adversely affect the development of literacy skills within this age group, and that the children's use of textisms when text messaging is positively related to improvement in literacy skills, especially spelling" (p. 28). Durkin , Conti-Ramsdent, and Walker (2011) found positive relationships between textism density, number of types of textism , and measures of adolescent literacy. Kemp and Bushnell (2011) reported that better literacy skills were associated with greater textese reading speed and accuracy among l0- to 12-year-old children and concluded that there was

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"growing evidence for a positive relationship between texting proficiency and traditional literacy skills" (p. 18). Neurologically, language centres in the brain are stimulated regardless of communication format or device (Johnson, 2012c). Johnson (2012a) reduced confounds by asking children to respond to traditional reading test items and define common textisms in equivalent formats under identical conditions. Ninety-one children in grades 3 through 6 translated five common abbreviations used in text messaging and, under identical conditions, completed two measures of Standard English literacy. Without exception, children who correctly defined textisms demonstrated superior skills in reading fluency and sentence comprehension (i.e., reading speed and response indicating comprehension) than children unable to define the common texting terms. “Such results add to the growing number of studies that conclude a positive association, if not effect, between digitalk and traditional literacy across the life span” (p. 1).

Statistics on global mobile phone usage report that 7.8 trillion text messages were sent in 2011 (Portio Research, 2012). It is forecasted that text-messaging traffic will continue to grow, reaching 9.4 trillion messages by 2016 (Informa Telecoms and Media, 2012). Analysis of American and Australian youth mobile phone usage found that ownership had increased for 15-18 year olds, from 56% in 2004 to 85% in 2009 (Australian Communications and Media Authority, 2010). The study also compared talk to text ratios in mobile phone usage and found that American 15-18 year olds used their mobile phones to text 72% of the time and Australian youth spent 71% of total mobile phone usage on texting. Generally, voice communication levels appear to be dropping. For example, consumers in the UK reportedly favor text messaging and other internet-based communication forms available on smartphones over voice calls (Ofcom, 2012).

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The Evolution or Extinction of Reading?

Everything, including human inventions and all living species, ultimately becomes extinct. The increasing popularity of video transmission of information is apparent, for example, YouTube home repair instructions, online cooking demonstrations and exercise videos on medical websites. Voice and video transmissions are increasingly faster, possible on progressively smaller and more personalised devices and with increasingly sophisticated archiving and sharing functionality. Nonetheless, it seems likely that audio and video will continue to complement rather than replace reading. It is difficult to envision a shopping list of images as more efficient that a written shopping list (e.g., amount), although some furniture assembly instructions rely entirely on simple images (e.g., IKEA). The benefit of image over text is that it may be more universally understood that a specific written language such as English.

Digitalization, as it continues to evolve, has increased the speed with which people communicate and access information. The good old days of savouring real experiences are long gone, in part because reading created a synthetic experience (e.g., novels and travel books). While speed as a criterion of human progress is easily critiqued, the fact remains that contemporary culture strives toward progressive faster processes, for example and to mention but a few, transportation, medical procedures and information retrieval. With regard to this, it might reasonably be expected that the nature of written text would evolve to facilitate speed and ease of reading (as was the case with introduction of the convention of space between words; Houston, 2013). Such evolution is upon us with the meaningful use of icons in websites (e.g., @ indicating mail). Indeed, many written languages do not rely entirely on a sound-symbol correspondence (e.g., Chinese characters). Increased communication reliance on images and icons may signify

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the evolving nature of the invention of reading and the production of text, particularly in the context of international communication.

As the human species continues to evolve, human communication continues to evolve. Human communication involves all forms of interpreting symbolic information (e.g., 'reading' the audience). Human communication includes visual cues, smells, auditory input and touch. Human communication is facilitated by human tools and technologies and, most recently, by digital technology. While all forms of reading should be celebrated for the marvellous human invention that increases access to accumulated information and facilitates communication with others, perhaps the greatest celebration might be for devices that require and thereby promote reading. With regard to this, the evolution of text (e.g., written formats and materials) is the very evidence of the continued utility and joy of the human invention of decoding text (i.e., reading :-). Reading, in the most general sense, and all those involved in facilitating, understanding and using the processes of reading, might maintain open-mindedness by situating reading in an historical and evolutionary context. Literacy is and has always been intertwined with technology.

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