

From I.A Richards to Web 3.0: Preparing Our Students for Tomorrow's World

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Abstract—This paper offers suggestions for educators at all levels about how to better prepare our students for the future, by building on the past. The discussion begins with a summary of changes in the World Wide Web, especially as the term Web 3.0 is being heard. The bulk of the discussion is retrospective and concerned with an overview of traditional teaching and research approaches as they evolved during the 20th century beginning with those grounded in the Cartesian reality of IA Richards' (1929) *Practical Criticism*. The paper concludes with a proposal of five strategies which incorporate timeless elements from the past as well as cutting-edge elements from today, in order to better prepare our students for the future.

Keywords—Web 3.0, Web 2.0 IA Richards, literacy education, new literacies, technology, paradigm shifts

I. INTRODUCTION

WE are moving so quickly in literacy education that it often seems as though the past is not only forgotten but lost. What do IA Richards and the Cartesian reality have to do with current technological developments such as Web 3.0 and preparing our students for the future? Is there any connection at all or have we merely transported to a new reality with no evolution or traces of the past? This paper will first address the concept of Web 3.0 and how it differs from Web 1.0 and 2.0. Then the discussion will turn from the world to the classroom and reading education. Definitions of literacy will be followed by a description of shifts in literacy education and literacy research. These will be compared to the evolution of web 1.0 to 2.0 to 3.0. The paper will conclude with thoughts on current developments in education and proposals as to specific strategies and areas of emphasis which would better prepare today's students for the future.

II. WEB 1.0 TO THE EMERGING 3.0

Joseph Strickland [1] cites Tim O'Reilly's distinction amongst Web 1.0, 2.0 and 3.0:

Web 1.0 was the content Web. The information flow was one way: from the web to the consumer or reader. It was not interactive and was characterized by computer illiteracy and slow internet connections. Indeed, it was the "not-for-profit, information age." It started in the early nineties and continues today.

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Web 2.0 is generally regarded as the social Web. It is the Internet of user interaction and contribution as well as communication. It is best known for its social nature including Web services like: Wikipedia, Facebook, Flickr, YouTube, Skype, and online banking. Content such as blogs, podcasts and opportunities to distribute text, photos, audio and video and even screen sharing to a world-wide audience evolved during this era. Murmurs of Web 3.0 appear late in 2008 and early 2009. How does it differ from Web 2.0?

Web 3.0 is considered to include previous incarnations but adds location-aware and moment-relevant Internet.

Steve Spalding [2] describes Web 3.0 as:
Highly specialized information silos, moderated by a cult of personality, validated by the community, and put into context with the inclusion of meta-data through widgets.

Wikipedia [3] considers Web 3.0 to be synonymous with the semantic web: "The Semantic Web is an evolving extension of the World Wide Web in which the semantics of information and services on the web is defined, making it possible for the web to understand and satisfy the requests of people and machines to use the web content. It derives from World Wide Web Consortium director Sir Tim Berners-Lee's vision of the Web as a universal medium for data, information, and knowledge exchange."

Jason Calacanis [4] proposes that "Web 3.0 is defined as the creation of high-quality content and services produced by gifted individuals using Web 2.0 technology as an enabling platform."

These three somewhat different definitions have in common the suggestion of a building on or emergence from the past.

Google CEO Eric Schmidt [5], at the Seoul Digital Forum was asked to define Web 3.0 by an audience member. After first joking that Web 2.0 is "a marketing term", Schmidt launched into a great definition of Web 3.0. He said that while Web 2.0 was based on Ajax, Web 3.0 will be "applications that are pieced together" - with the characteristics that the apps are relatively small, the data is in the cloud, the apps can run on any device (PC or mobile), the apps are very fast and very customizable, and are distributed virally (social networks, email, etc):

<http://video.google.ca/videosearch?q=eric+schmidt&hl=en&emb=0&aq=f#q=eric+schmidt+web+3.0&hl=en&emb=0> [5]

What does this new reality have to do with education and preparing our students for the future? Schooling has traditionally been concerned with literacy and helping our students communicate and be successful in the world after they graduate. But how can they communicate and be successful in the world when they are asked to take paper and pencil standardized tests, read canonical literature and use—not primarily the technology of the world but technologies of the past such as paper and pen and textbooks? How exactly is this preparing them for the future?

III. LITERACY

To begin with fundamentals, what is literacy? In Victorian England literacy meant no more than ...As recently as 1950, UNESCO [6] defined literacy as no more than “the ability to read and write one’s own name”. In 2004[7], it was updated to “the ability to identify, understand, interpret, create, communicate, compute and use printed and written materials associated with varying contexts. Literacy involves a continuum of learning to enable an individual to achieve his or her goals, to develop his or her knowledge and potential, and to participate fully in the wider society”—thus considerably more complex and expanded to embrace the challenges of a changing world.

In modern times—and few would disagree—Wikipedia [8] or group knowledge concedes that “illiteracy is seen as a social problem to be solved through education.” Again from Wikipedia[8], “Literacy comprises a number of subskills, including phonological awareness, decoding, fluency, comprehension, and vocabulary. Mastering each of these subskills is necessary for students to become proficient readers.

This paper will focus on one aspect of the definition of literacy previously cited, that it “refers to reading and writing at a level adequate for communication”. Above all, educators want students to be able to communicate in the world and this necessitates speaking, reading writing and in today’s world, a working knowledge of the Web—certainly we want them to read critically and thus go beyond Web 1.0 competency and certainly we want them to be able to communicate and thus have some Web 2.0 competency and be moving with the crowd toward Web 3.0 whether it exists now or in the future. But the discussion is getting ahead of itself. First a brief summary of approaches to literacy through the century will be provided. The attempt is not to be reductionist although due to space and time that is an inevitable pitfall but nonetheless it is worth the attempt. This summary will be based on several sources: first, an analysis of the century’s research on adult reader response to literature [9]; P. David Pearson’s “Reading in the 20th century” [10] perhaps the most comprehensive and recognized work on the history of reading instruction; Allington and McGill-Frazen’s. “Looking back, looking forward: a conversation about teaching reading in the 21st century”[11]; and Alexander and Fox’s “A historical perspective on reading research and practice”[12] three other retrospective overviews of the century’s reading instruction [] and, for good measure, Wikipedia’s “History of reading instruction in the United States”[13].

IV. APPROACHES TO LITERACY 1900-1935

P. David Pearson [10], perhaps the most prominent expert in reading education, uses dominant pedagogical practices to describe the shifts in emphasis. He proposes three major periods: from 1900-1935, 1935-70 and 1970-2000. He adds that the two extreme periods were characterized by “enormous intellectual and curricular activity” whereas the middle period was “relatively quiet”.

Pearson describes the role of student and teacher in this early period as follows: “the role of the learner in this period was to receive the curriculum provided by the teacher and dutifully complete the drills provided. The role of the teacher was to provide the proper kinds of drill and practise. In this period being able to read meant being able to pronounce the words on the page accurately.”(p 2). He cites developments such as the following as being characteristic of this early period: early reading reforms such as words to letters, words to reading, and a potpourri of specialized programs. Other influential developments mentioned by Pearson include testing and the scientific movement; test difficulty and readability; readiness, reading skills; and remediation. Importantly, despite these general tendencies, Pearson notes that there was little consensus except in light of later periods.

The analysis of the he century’s research on response to literature [9] is based on six bibliographies of research [14-19]. The phrase, ‘response to literature’ refers to any response to the reading of a text characterized as literature ie written, oral, or other expression in response to the text. As defined by Purves and Beach [14] research on response to literature begins with research studies which focus on the text as artifact itself [20] [21]. This supports what has been noted above by Pearson and general consensus. This first third of the century was an exciting period as it marked the birth of psychology as an area distinct from philosophy and much of this early research conveys the excitement of working with “real readers”.

In these early studies during the first third of the century, in line with the predominant Cartesian philosophy of the time, there was only one best interpretation of a poem. “A beautiful poem is beautiful in all contexts and a poor poem never redeems itself, no matter who does the reading or under what conditions...because both the idiosyncratic nature of personalities as well as varying contextual constraints are completely disregarded, this could be considered a mechanistic view of the reading process, the ‘one right interpretation’ approach ” [20, p. 275]. Indeed, I A Richards; famous study *Practical criticism* [22] is typical of the perspective of this period. Richards was concerned about the quality of Cambridge undergraduate education which emphasized the value of critics opinions rather than direct reading of poetry. Thus he gave these students, “the best and brightest readers” (p. 310), a mixed bag of poetry and asked them to “comment freely upon them “ (p. 4). He comments on the deplorable lack of even simple reading ability, or ability to understand the poem as a statement or expression, as well as no fewer than nine other deficiencies such as lack of ability to understand images; doctrinal adhesions; giving stock responses; and being sentimental (p. 13-17).

His dismay suggests he was expecting something better. However, his frustration is not only over the deficiencies of these few readers. It is a failure he sees in all readers. "Candidly," he points out, "how many of us are convinced that we would have made a better showing ourselves" (p. 310). Thus the reader in this early period is just learning about text and text is the revered element in the dynamic. As another early researcher Carroll [23] comments: "appreciation rests upon discrimination—upon the ability to differentiate the good from the less good and the less good from the very bad. The man who does not recognize good prose when he sees it can hardly be said to possess marked appreciative ability". Similarly, at the advent of Web 1.0, generally conceived to be 1991, the reader or consumer was passive in relation to the new technology.

Toronto Mike in his blog [24] describes the excitement and pure joy of the early days of the world wide web or Web 1.0: "I was just thinking of how far we've come with regards to the way we use the Internet...Nothing was more exciting than logging on to see you had a few messages from a few friends. It was so new and so instant. By the way, at this time, all messages were sent and received in plain text without attachments. I was excited about words!...The world wide web was awesome..."

As with the emphasis in school and in research in attempting to understand text and literature, there was excitement at this new development and endlessly patient and yet exasperated by our learning curve. The "text" the world wide web loomed larger than life in front of us, dwarfing us by comparison, just as IA Richards students were dwarfed by the greatness of the poems in front of them. However, far from being dismayed at this giant, we were truly enthralled at the possibilities of the world wide web.

V. APPROACHES TO LITERACY 1935-1970

Pearson [10] describes the period 1935-65 as a time in literacy education during which "we engaged in fine-tuning and elaboration of instructional models that were born in the first third of the century . . . Students were still recipients and teachers still the mediators. . . when all is said and done, the underlying model of reading in the 1960s was still a pretty straightforward perceptual process; the simple view—that comprehension is the product of decoding and listening comprehension—still prevailed" (p. 6). That was the emphasis in the schools.

In the research however, this period is marked by an increasing focus on the reader rather than the text. Researchers examined how the reader used the text, how the reader interpreted the text and the effect of the reader's personality on his or her interpretation of the text. As well, or perhaps mirroring this emphasis, there is during this middle period of the century's research, the greatest diversity of works considered "text" or literature. Researchers use not only poems and narratives [25, 26, 27, 28] but newspaper articles [29], magazine articles [30] library books [31] and oral stories [32]. They examine such issues as the relationship between political behavior and texts read, social and

recreational aspects of reading, and response as an indication of personality of the reader. Similar to the marked characteristic of Web 2.0, Waples, Berelson and Bradshaw [33], researchers of this middle decade, state "reading is a social process" (p. 30) and they emphasize that 'reading for fun' or 'just reading' is not spectacular; but it is the predominant type of reading" (p. 123). Nonetheless, Hunt [34] describes the feeling in many college classrooms of the 1950s: "there was a common language, a very deep and widely shared set of common assumptions about how the world worked . . . When there were disagreements—and there were lots of them, heated ones – they took place within a set of boundaries that we can now see . . . were remarkably narrow and clearly defined. Everyone, at bottom, was a New Critic." (p. 98). Thus, even though there was much change or 'evolution', past views remained firmly embedded underneath it all.

The sixties ushered in a new era: the longest economic boom on record, three major figures assassinated: Kennedy (1963), Malcom X (1965) and Martin Luther King (1968). The birth control pill was invented, changing the lives of women forever. The first heart transplant was performed in 1967. Apollo 11 landed the first man on the moon in 1969. All contributed to a faith in scientific solutions to problems and a feeling that 'we can do anything'. Perhaps as a reflection of this or at least moving in consonance with it, the interest in this body of research focused decidedly on the reader. Purves [35] devised his *Elements of writing about a literary work*. "Instead of considering a theory of literature or one of the literary work, we had to consider the person who read the work and wrote about his reading." (p. 2). Bibliotherapy became popular within this research with studies such as Edgar and Hazley's "Validation of poetry therapy as a group therapy technique [36] and "Poetry therapy with schizophrenics"[37], Saper's "Bibliotherapy as an adjunct to group therapy" [38] and Riggs extensive, "Bibliotherapy: an annotated bibliography" [39].

Similarly, Web 2.0 as we know and was/is similarly social just as readers during this research period now used literature, for our their benefit. The novelty of research had disappeared and now readers seemed confident enough to use it as a tool, just as Web 2.0 is considered a tool to use, to play with and to explore.

VI. APPROACHES TO LITERACY 1970-2010

These forty years from 1970 until now are, due to their proximity, more challenging to characterize. Although societal and economic turmoil seems more intense with such events as 9/11 and the current economic crisis, perhaps this is only because we have experienced them firsthand. Pearson [10] describes the climate in reading instruction during this last third of the century: "somewhere during this period—the exact point of departure is hard to fix—we began a journey that would take us through many new twists and turns on the way to different landscapes than we had visited before...Just beyond the horizon lay even more unfamiliar and rockier territory—the conceptual revolutions in cognition, sociolinguistics and philosophy that would have such far-

reaching consequences for reading curriculum and pedagogy of the 1980s and 90s...reading became an ecumenical scholarly commodity; it was embraced by scholars from many different fields of inquiry...It is not altogether clear why reading attracted such interest from scholars in so many other fields. One explanation is that reading is considered by so many to be a key to success in other endeavors in and out of school. This is often revealed in comments like, 'Well, if you don't learn to read, you can't learn other things for yourself'" (p. 11). Some of these areas were linguistics, psycholinguistics, cognitive psychology, sociolinguistics and literary theory, particularly reader response theory. What specifically happened with instructional strategies? Pearson explains the following pedagogical correlates of these new perspectives: 1) comprehension was now on center stage; 2) literature-based reading; 3) process writing and writers workshop; 4) integrated instruction; and 5) whole language. Teachers became facilitators not tellers. "As Jerome Harste put it, the child was now the primary curriculum informant. Students were decision makers involved in choices about the books they read and the stories they write. The materials of reading instruction were the materials of life and living—the books magazines, newspapers and other forms of print that children encounter in everyday life are the materials they encounter in the classroom—no less, no more.... At century's end, whole language, supported by its intellectual cousins (process-writing, literature-based reading, and integrated curriculum) was about to assume conventional wisdom of the field, the movement was seriously challenged. [10, p. 23] The "unintended curricular casualties of whole language, growing dissatisfaction with doctrinaire of any sort and a paradigm swing in the ideology of reading research from qualitative to more quantitative large-scale studies, increasing politicization of reading research and policy agendas well as increasing pressure for accountability" had the effect of causing—if not the demise of whole language—at least a serious reconsideration. The emphasis on ecologically balanced programs with greater emphasis on phonics instruction and testing seems the current trend in classrooms. When we turn to research on response to literature, it seems as though its demise is a fait accompli during these final years. Resarchers continue to refer to the influence of Louise Rosenblatt [40] whose influence extended over 60 years of research on response to literature however it seemed as though the entire phrase had lost its vibrancy a decade earlier.

During the early years of the seventies, "within a few years, entirely new, alternative theories of language—examples include the text grammars of writers like van Dijk (1972), the sociolinguistic approach of a William Labov (1972), and the new interest in the pragmatic or "speech-act" theory of John Austin (1962) – were being generated, theories that attempted to obviate what de Beaugrande calls 'the context-free abstractness' of the older methods, and to take account of the importance of social interaction in language groups." [34, pp 96-7] Hunt says that "it was necessary to consider literary works of art not just in connection with each

other, but with all discourse" [34, p. 101].

Research studies during the seventies through the nineties focused generally on the process of the growing response. However, many studies fit into more than one category and more than one aspect of response. They proliferated in all directions it would seem and exemplified an increased depth and complexity. Svensson [41] observes in 1987 that "all meaning, even the 'most literal', presupposes specific and socially distributed, shared knowledge and strategies" (p.477). And Kintgen [42] adds: "it is never clear whether a particular statement reflects knowledge of the work or conception of the rhetorical situation...a poem may refer to anything past or present or future, real or imaginary, and most good poems exist in a mode that makes these terms seem inadequate." (p. 135).

Nonetheless, underlying this fluid dynamic, Cooper [43] writes that the foremost content analysis scheme of response was that of IA Richards: "IA Richards *Practical criticism* still stands as the classic analysis of the difficulties and stumbling and misreading of practical critics of poetry, in this case college students...(it) is a detailed report on these responses, and it continues to have great influence on studies of interpretation and response and on the teaching of literature in schools and colleges" [43, pp 19-20]. Thus, as with the situation of Web 1.0 and 2.0, the previous emphasis and reality remains embedded to a large extent within the current paradigm—even though the general focus has changed. Hubert [44] notes that although there has been much change in English programs from those twenty years ago, "the thrust of Anglo-Canadian universities is still strongly literary, and many attitudes deriving from the pre-1960 curriculum still remain" [44, pp. 343-4]. Finally Hunt describes the situation as follows: "the current consensus is clearly that because readers act as participants in social circumstances influencing their goals, expectations and strategies, any specific instance of reading – and thus, reading in general – cannot be understood except as part of an entire social situation...reading is as much a function of the social situation of classrooms as of either the structure of the text or the psychological makeup of the individual students" [34, p. 98].

VII. BACK TO CURRENT-DAY SCHOOLS

And thus far, the web has not been an essential part of literacy in schools. This is beginning to change. Don Leu, in his discussion of new literacies observes that, "many graduates started their school career with the literacies of paper, pencil, and book technologies but will finish having encountered the literacies demanded by a wide variety of information and communication technologies (ICTs): Web logs (blogs) word processors, video editors, World Wide Web browsers, web editors, e-mail, spreadsheets, presentation software, instant messaging, plug-ins for web resources, listservs, bulletin boards, avatars, virtual worlds, and many others. These students experienced new literacies at the end of their schooling unimagined at the beginning." [45, p. 1571].

And certainly the change of pace shows no sign of slowing down. He later states that “clearly, definitions of literacy must change to include electronic environments” [45, p. 1584]. The only question I have about Leu’s observation is whether these students learned about these new literacy technologies within the classroom or outside of it. I suspect that it was not within school.

Closer to home, in the US and certainly Canada, school libraries are beginning to see the importance of making internet literacy a priority. In Ontario, there is an exciting new draft document, *Together for learning: transforming school libraries in Ontario* [46] which describes the evolution of technologies as moving from print (before the 70s) to media and microform (during the seventies) to digital networks and multimedia (during the 90s) to interactive constructive and virtual technologies (2010 and beyond). Although the document addresses many issues of learning and education, the incorporation of “interactive constructive virtual technologies” is significant. However the document is still “on hold”.

It is true that schools and classrooms are being wired and upgraded and interestingly, newspaper headlines in June 2009 declare under the heading “paradigm shifts” that Gov Schwarzenegger terminates textbooks: but critics say his cost-cutting shifts to digital classrooms is premature” [47]. Thus, Schwarzenegger plans to replace textbooks with digital technologies. It is true that on close reading this seems to be primarily in science and math and the specific technology is still unannounced ie kindle? Laptops for all? Cellphones? How students will access these digital texts is still not clear but the “writing is on the wall” or more precisely “in the air”: “literacy” as a print-based term will or already does, encompass digital literacy. It has become one of the most important ways of communicating. In the protests in Iran of June 2009, average citizens have taken over for newscasters and photographers to get the truth out via the internet when world press has been severely restricted by the government. A true revolution. Thus we have moved from literacy at a very basic level of being able to write one’s own name to the world as a text. In which we are immersed. The change in research has gone from a focus on the text to the reader’s response and finally to the process of the response itself. In school, we have moved from phonics based programs through whole language back (or forward!) to a balanced ecological approach which includes elements from the past such as phonics in a new key and strong government involvement including a new emphasis on testing. So what will be next? As long ago as 1990, Straw and Bogdan [48] proposed that the “communication model” which has not been seriously questioned “prior to the past twenty years” had recently been replaced by an actualization model, in which “what drives each of the (possible) readings is a need in the reader to fulfil or actualize his or her own purposes” (p. 4). Further, educators such as Hunt [34], Froese [49] and Johnson [50] predict a movement towards holism and collaboration between formerly disparate areas. I have proposed [51, 52] that these suggestions of a new literacy

model are not mere conjecture but that they are supported by the internal logic of the dynamics of change across previous paradigms.

VIII. DYNAMICS OF CHANGE

What have been the dynamics of change in these shifting paradigms in both reading research and literacy education over the past century? Perhaps a closer examination will suggest the seeds of the future. Gersick [53] proposes a punctuated equilibrium paradigm which derives from the thinking of theorists in five areas: adult development [54], group dynamics [55], organizational behavior [56] scientific change [57] and behavior of living organisms [58]. This paradigm suggests that change takes the form of long periods of equilibrium punctuated by overt revolution. Further, as Gersick explains, even though change appears to be almost a virtual gestalt switch as in our shifts, we can see through this current summary that in the areas of reading education and research, there are large areas of overlap between succeeding models as this discussion has also demonstrated. As is explained in *Dynamics of change: speculation on a forthcoming model of response to literature* [51] applying Gersick’s punctuated equilibrium model to the shift in research emphasis from the focus on the text or the poem itself, to the focus on the reader and what he or she is feeling while reading, the obvious difference is the move from external to internal reality. In addition, the focus on the text suggests a context-free environment whereas the focus on the reader takes into consideration the underlying systems of relations between text, reader and context. However, one senses that there must be important similarities or, as Gersick terms them, areas of overlap, as well. Indeed this is the case, as detailed more thoroughly in my dissertation [9]. Both the text and the reader orientations accept the hypotheses that readers actively construct meaning; that response to literature has ethical and moral importance; and that there are better as well as poorer responses. The text-focus emphasis however, proposes that it is the text which “fixes” or stabilizes the response of the reader. The reader-focus proposes on the other hand, that it is the reader who stabilizes the fluid reality of the text. The dynamic of change from the text- to the reader-focus could thus be considered an inversion. “The locus of meaning or point of departure, which is also the endpoint in these models, has merely changed from external to internal reality, from objectivity to subjectivity, from the text to the reader” [51].

Further, it would seem logical that once both orientations had attained successive preeminence in the research, some sort of synthesis between them might follow. Indeed, the focus on the process of response in the later period of research after the seventies, does acknowledge the importance of features such as qualitative differences in response, the ethical and moral importance of reading and the reader’s active construction of meaning. This new emphasis on the response process itself unites the text and reader emphases in its insistence on both

the reality of the external world of the text as well as the internal world of the reader in the creation of meaning. Further, this new emphasis takes an additional step in positing a new point of emphasis outside the bounds of the previous models. It is neither the external reality of the text nor the internal reality of the reader but instead, the dynamic space between the text and the reader which becomes pre-eminent. Since the dynamics of this conceptual change seem to involve synthesis, inversion and a new point of emphasis outside the boundary of the previous emphasis, it would follow that the forthcoming emphasis or model would be an inversion of the emphasis on the response process. But what could this inversion possibly look like? Following the example of several prominent response theorists [59, 60, 61], it seems sensible to turn, as they do, to the area of theoretical physics for possible clues.

IX. A NEW METAPHOR?

The theory of *holonomy*, proposed by theoretical physicist Bohm [62, 63] provides some ideas of what such an inversion would look like. This theory has a long conceptual history of course, beginning with Leipzig's proposal in 1714 that a metaphysical reality generates the material universe and that space, time, mass and motion are intellectual constructs [64]. In 1969, Pribram's research provided evidence for Lashley's suggestion that "the information (in the brain) is enfolded over the whole" [63, p. 198] This phenomenon is analogous to the functioning of an optical hologram which was first constructed using Leibniz's calculus in 1965. Any piece of a hologram has the ability to reconstruct an entire view of the original image. In 1971, Bohm proposed that the organization of the universe may be holographic.

For the purposes of the present discussion, the meaning of the term *holonomy* (and there are many which emphasize different aspects of the concept), is derived from Ravn's definition for the social sciences and is described as "the general principles of dynamic orders whose parts contain information about the whole" [65, p. 5]. Thus the holonomic model or metaphor of literacy would emphasize the underlying unity of seemingly disparate elements. Unlike the preceding metaphors the holonomic metaphor of literacy would emphasize deep rather than surface structure. Wholeness, and not fluidity between separate entities (as in the response-based model in research) is thus the original state. The previous response based emphasis conceives of the reader and the text as two distinct entities which come together in a dynamic union. The holonomic way of looking at the situation would posit that the reader and the text are inherently united elements which take form only as they disengage, one appearing to be the reader and the other the text, whether on paper or onscreen.

It is important to understand that, consistent with dynamics of change across previous metaphors, the holonomic metaphor is the larger circle with in which the preceding metaphors are successively nested. The holonomic metaphor merely expands the circle of perception and in doing so, acknowledges the unique usefulness of each of the previous metaphors. Further, the holonomic metaphor, unlike the organic, does not

prioritize the visible at the expense of the invisible. It conceives of space not as empty but as a plenitude of possibilities.

When we apply this metaphor to literacy through the century as well as this specific point in time, it considers them as a whole. However, in looking back over our changing emphasis in literacy education and schooling especially the movement from phonics to whole language, it focuses not only on the current emphasis but on its apparent gaps and silences as well. Sample research explorations deriving from the holonomic model are as follows: first as concerns the text, the use of hypertext which blurs the distinctions between reader (s), author (s) and text (s) [66]; consideration of the world as text and response as critical thinking both inside and out of school. Second, as concerns individual readers this metaphor would propose physiological as well as emotional and intellectual evidences of response; the facilitative role of humor as well as effort in the process of responding; the variety of different possible perspectives adopted by the same reader in different contexts; the interchangeable role of reader-author; teacher-student and researcher-subject. Third, as concerns groups of readers, this metaphor suggests: collaborative as well as individual responses. Developmental gender, and reader-writer similarities as well as differences; cross-cultural research which focuses on oral as well as written skills in communicating response, thus bridging the gap between oral and literate cultures. And finally, this metaphor proposes perhaps going beyond language and using images to convey responses or to which to respond. It should be noted that many of these directions are already in progress and thus can be considered to fall within the area of overlap between the previous and current model.

The proposed holonomic metaphor is not only internally consistent with the previous dynamics of change, it is as well congruent with predictions concerning future directions which emphasize collaboration and self-actualization [48-50]. However, its focus on underlying wholeness provides a link between self-actualization and collaboration among readers, the two seemingly-unrelated predictions of Straw and Bogdan [48]. The holonomic model provides the explanation that self-actualization is achieved only through collaboration. Finally, a major strength of the proposed metaphor is its external utility in the belief that wholeness is inherent, natural and inevitable. It thus facilitates acceptance and understanding rather than fear and judgment of other individuals, nationalities and values. Its weaknesses are that it could be considered idealistic and too abstract to be practical. Finally, this discussion will take a look at some of the implications of this model for schooling.

X. CONCLUSION

This discussion began with a consideration of Web 1.0, 2.0 and the emerging 3.0 each of which builds on the previous version and expands its possibilities just as in literacy research and reading education, the periods of the twentieth century have built on the previous knowledge. Today, literacy, as taught in schools, can no longer exclude Web technologies. We cannot assume that working with textbooks will transpose

easily to reading onscreen and that it is the best way to prepare our students for the future [67]. Leu [45] proposes of the relation between internet, technology and literacy that:

1. The internet and other ICTs are central technologies for literacy within the global community in an information age.
2. The Internet and other ICTs require new literacies to fully access their potential.
3. New literacies are deictic (context dependent).
4. The relationship between literacy and technology is transactional.
5. New literacies are multiple in nature.
6. Critical literacies are central to new literacies.
7. New forms of strategic knowledge are central to the new literacies.
8. Speed counts in important ways within the new literacies.
9. Learning often is socially constructed within new literacies.
10. Teachers become more important, though their role changes, within the new literacy classroom. [45, p. 1589]

So what can we learn from this overview? In a practical sense, what areas and skills are most essential for students of today. Five strategies or areas to consider seem crucial:

1. *Students and teachers need to become fluent in different registers for reading writing and communicating, multiple worlds.* They need to learn not just how to write an essay or a job application but how to text, how to speak to teachers and how that is different from speaking to friends. In both oral and written work, they need to stretch their horizons and become more versatile.
2. *Students and teachers need to become fluent in switching or multitasking.* Handling or seeming to handle multiple tasks such as texting one's friends, listening to music and studying is a skill that will become more and more important. For those who don't believe the brain can multitask, think of it as quickly 'switching' one's attention back and forth amongst various technologies and tasks.
3. *Students and teachers need to build on the transferable knowledge of the past* There is much valuable to be learned from history and the way things were done in the past. Memorizing poetry and reading "great books" will always be important. We need to be aware that the present always contains traces of the past and as well, foreshadows of the future. Phonemic awareness, word recognition, inferential reading and being able to write correctly will always be important foundational skills.

4. *Students and teachers need to create and collaborate. Constantly.* Humans are social beings and this is our strongest power. Teachers can collaborate with other classes and people around the world--people in positions of power and people in remote areas. Teachers can tap into great experiments and we can make the world our classroom.
5. *Students and teachers need to conceive of work and play as seamless.* Teachers and students have known for a long time that learning is most effective when it is fun. When it is immersive. Work must always be a form of play. If it isn't, then something is wrong and the learning will be less effective.
6. *Finally as this paper demonstrates, our students and teachers need to be able to ride the wave of change and see possibilities in what is new—as we will continually be faced with something new.*

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