

Harvesting Hope in Students with Learning Disabilities Online
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HARVESTING HOPE IN STUDENTS WITH LEARNING DISABILITIES ONLINE

Harvesting Hope in Students with Learning Disabilities Online

The United Nations claims that the lack of access to assistive technology (AT) inhibits "people with disabilities from access to education, employment and full participation" in society (Clinton, 2015, p. 9). Article 24 section 3 of the United Nations Convention on the Rights of Persons with Disabilities (CRPD) expects all countries to ensure that people with disabilities experience all human rights and fundamental freedoms (2011, p. 4). According to the World Health Organization (WHO): "Disability is the umbrella term for impairments, activity limitations and participation restrictions, [related] to negative aspects of the interaction between a person with a disability and his/her environmental factors" (2011, p. 4). Learning Disabilities are developmental disorders that cause children to have "special" difficulties in writing, reading, spelling and mathematics and may include speech disorders or visual disturbances (Siouli & Makris, et.al. 2018, p. 1). Most people with learning disabilities have large differences in their academic competence and performance (p. 1). Teachers who lack training in teaching students with learning disabilities (LD) may contribute to their students' cognitive overload because they are using teaching methods based on Math and spelling test drills. As a result, students with LD may suffer psychologically with a reduced learning potential because their brains are cognitively overloaded in the learning process (Zhang & Zhang, et. al., 2016, p. 2851).

For many people with disabilities, assistive technology (AT) gives them the chance to communicate with people locally or globally with endless possibilities. "For

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most people, technology makes things easier. For people with disabilities, technology makes things *possible*” (Mary Pat Radabaugh, as cited in Borg, & Berman-Bieler, et. al. 2015, p. 8). Assistive technology (AT) are the devices and services that are used to increase, maintain, or improve the capabilities of people with a disabilities (Dell, & Newton, et. al, 2012). AT includes mobility devices such as walkers, wheelchairs, assistive communication systems, specialized computer keyboards, mice, computer hardware, software, and enhancements that assist people with disabilities in using computers (Johnson, 2008, para. 2). Assistive technology that helps students with learning disabilities includes computer programs and tablet applications that provide text-to-speech (e.g., Kurzweil 3000), speech-to-text (e.g., Dragon Naturally Speaking), word prediction capabilities (e.g., WordQ), and graphic organizers (e.g., Inspiration) (Dell, & Newton, et. al, 2012).

For the purpose of this paper, the focus will be on online learning environments for people with learning disabilities (LD). Lev Semionovich Vygotsky was a Soviet psychologist(1896-1934) who found links between sociocultural processes taking place in society and mental processes taking place in the individual (Hall, 2007) which informs learning disabilities with the benefits of online learning. Vygotsky’s theory focuses on how people’s mental abilities are developed through communicating with each other. Children’s mental abilities can achieve higher levels through structured activities with a teacher or a peer who has stronger skills (Berk, & Winsler, 1995). The difference between what a learner can do without help and what he or she can do with help is what Vygotsky defined as the zone of proximal development (Berk & Winsler, 1995, pp. 24-29).

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This paper will prove how online learning can elevate the zone of proximal development of students with learning disabilities and foster hope for them to achieve their goals. First, the theoretical framework of Vygotsky's zone of proximal development will be examined in relation to children with learning disabilities (LD). Second, Vygotsky's theories and learning disabilities will be related to the role of technology in online learning through case studies. Third, these theories, technologies and case studies will be synthesized into a pedagogical paradigm to support online learning and the development of hope. Fourth, this pedagogical paradigm will be used as a lens to view implications for future teaching practice in online environments to meet the dynamic learning needs of students with learning disabilities (LD).

Theoretical Framework

Many students with LD score very low on IQ tests which lowers their self-esteem and hope for achieving high grades (Zhang & Zhang, et. al., 2016, p. 2851). Vygotsky's zone of proximal development reveals how some students can achieve beyond what IQ tests indicate through assisted learning from their teacher and peers as they raise their zone of proximal development which can be facilitated in online learning (Bozhovich, 2009). Vygotsky argued that testing students' knowledge only quantifies their current intelligence level and does not reveal their potential to learn. He argued that educators and school psychologists should observe children's ability to solve problems independently, with an adult's help and with the help of their peers who have mastered the skill (Bozhovich, 2009). Vygotsky also concluded that just because two children perform the same on a test, this does not mean that their levels of development are the

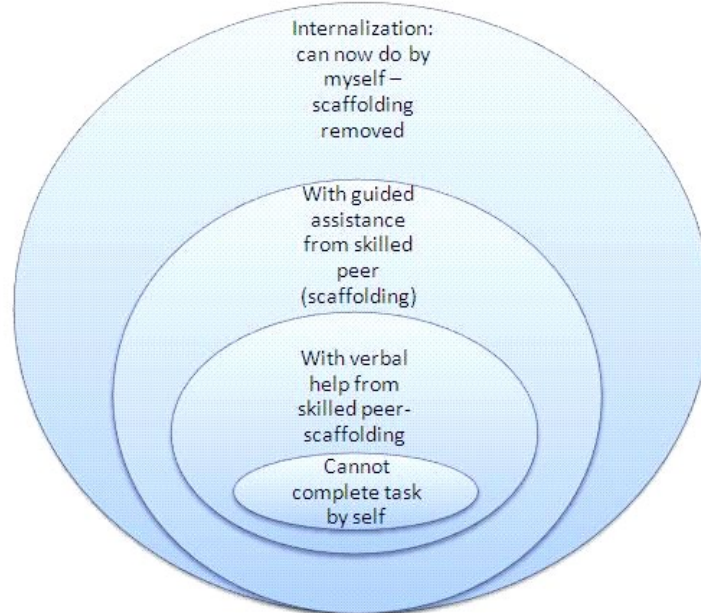
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same (Böttcher, 2019).

I had low scores on my IQ tests when I returned to high school as an adult student and a single mother. The education psychologist at Alberta Vocational College told me that I would never make it to university and I would be lucky if I finished grade 12. He encouraged me to take my Grade 12 Equivalency Exam (GED) and get an entry level job. However, my English teacher had much higher hopes for me and placed me in the second half of grade 10 English Language Arts. My grade 12 English 30 teacher encouraged me to apply for university after I wrote my diploma exams. I believe that my love of reading and reflecting on literature with my classmates overpowered my learning challenges as we worked in Vygotsky's zone of proximal development. I had difficulty with my Math and Science courses and was diagnosed with a learning disability just a year before I wrote my Chemistry 30 and Biology 30 diploma exams. I wrote my exams in a tiny supervised room so I could read my exam out loud as I was diagnosed as an auditory learner. My desire to help my classmates (who were also single mothers) and become a teacher was stronger than the fear of failure imposed by discouraging elementary teachers and prophesized by my low IQ tests. The following diagram, figure 1 illustrates Vygotsky's zone of proximal development.

Figure 1 Vygotsky's Zone of Proximal Development (ZPD)

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Rutland, A. F., & Campbell, R. N. (1996). The relevance of Vygotsky's theory of the "zone of proximal development" to the assessment of children with intellectual disabilities." *Journal Of Intellectual Disability Research: JIDR*, 40 (Pt 2), 151–158.

The concentric circles reveal Vygotsky's zone of proximal development (ZPD) indicating that by carefully observing what the child is capable of doing cooperatively with guided instruction first with the teacher and then with his/her peers, that teachers can predict the progression of the child's ability (Vygotsky, 1998, p. 202, as cited in Edyburn, & Edyburn, 2015, p. 140).

Vygotsky's Theories Related to Learning Disabilities and Online Learning

In Vygotsky's theoretical work titled *Defectology* he describes the psychological development of children with disabilities to occur from children's social situation of development shaped by the cultural-historical development of society (Bøttcher, & Dammeyer, 2012, p. 435). As Bøttcher states:

Vygotsky understood disability as an incongruence between the individual's psychological structure and the structure of cultural forms. The incongruence describes a *dialectical relation* between the person with a disability and the surrounding society. Thus, a disability is never stable, but changes over time as a function of both individual development and the shape of the supportive activities and assistive technologies in the person's activity settings.

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(Bottcher, 2019, p. 434, italics added)

The dialectical relationships I shared with my instructor and lab partners in my chemistry and biology courses catalyzed my learning to develop beyond the imposed prophecy of my IQ tests into a transforming learner. The scaffolding of support from a teacher and students in computer mediated instruction or online learning environments can encompass students with learning disabilities into a concentrated “flow [into] a state of mind striking a balance between the challenge of the task and the skill” of the students (Csikszentmihalyi, 1990, 1998, as cited in Edyburn & Edyburn, 2015, p. 140). Online learning provides animated videos, recorded live classes, discussions that personalize the learning experience for students with disabilities in a safe cyber-space where intrinsic motivation is nurtured through the reciprocal focus shared between students online. The learning shared between students is illustrated in the following diagram on horizontal learning.

Figure 2 Horizontal and Vertical Relations in Online Learning and Development (Engeström)

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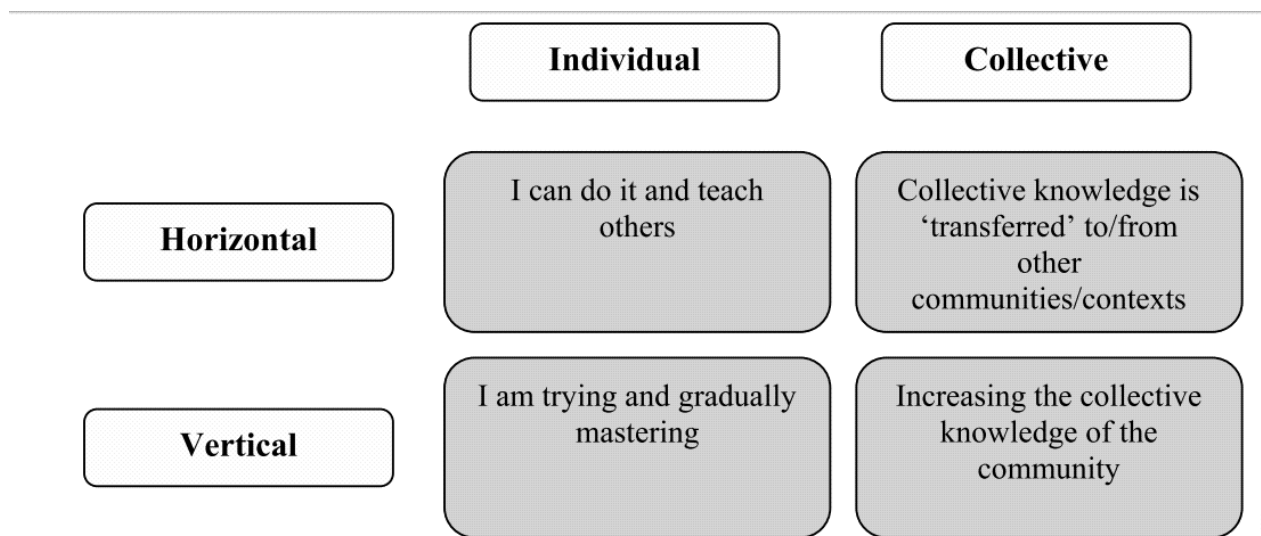


Figure 2. Horizontal and vertical relations and movements in learning and development.

Zamfir, G. (2009). Learning e-Learning. *Informatica Economica*, 13(4), 51–62. Retrieved from <https://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=47082325&site=eds-live&scope=site>.

Online learning strengthens social interactions between classmates as they have more time to analyze what their peers are saying in online discussion posts and have more time to respond with well thought out replies. This leads to a process called horizontal learning where learning occurs between and across activities. These online learning activities enable students to transcend boundaries across communities, socio-economic class, cultures and abilities (Engeström, 2005, as cited in Ryberg & Christiansen, 2008, p. 207).

Vygotsky outlined development into two lines.

1. The natural line of development: individual biological maturation
2. The cultural line of development: the socialisation process, whereby the child

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acquires knowledge of and the ability to use cultural tools through his or her participation in social practices

Under normal circumstances, the natural and the cultural line of child development supports each other. When children read books with their parents, and engage in singing nursery rhymes, alphabet and counting songs they imitate and build on what they see other adults and children do. Many learning activity settings are based on the notion that the participants will be using natural language (speech) and the activity settings support the development of natural language. Although children's development is not automatic, it means that when parents and professionals support children's development, they can draw on a wide cultural knowledge base of what to support and ideas about how to do it (Berk & Winsler, & 1995).

Unfortunately, parents of children without natural language cannot rely on common cultural knowledge about language development and they cannot send their child to the local school and expect it will work out. This example illustrates Vygotsky's basic idea that disability emerges from the incongruence between the individual's psychological structure and the structure of cultural forms such as practices and activity settings. Assistive technology in computer mediated instruction can give children with disabilities a bridge into the cognitive world of language development through text to speech, blending animated phonetics, and whole language into a virtual environment with their childhood heroes (Dell & Newton, et. al, 2008, pp. 158- 174).

Similarly, with online learning, teachers and classmates can facilitate the development of students with learning disabilities. Students who are auditory learners can

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listen to recorded classes as many times as they need to transfer concepts from their short term memory into their long term memory. Cognitive tools are also provided in an online learning environment to aid the learning by helping to decrease the cognitive load or help with visualisation. These tools can include digitalized individualized education plans for computers, concept maps or calculators (Hall, 2007, p. 96). Students can study their online class notes separately from their online class discussions. This gives students with LD enough time to interpret their teacher's questions and their classmates' comments, which in turn, enables them to respond with well thought out answers. These online learning processes also enable students with LD to monitor their behaviour so they are responding to their peers, instead of reacting.

Vygotsky proposed that:

Cognitive development is not a direct result of activity, but it is indirect; other people must interact with the learner, use mediatory tools to facilitate the learning process, [for] cognitive development [to] occur. These tools are “psychological” (Vygotsky, 1978, p. 53) in nature, in they are used to express thinking, and include language, signs, symbols, texts and mnemonic techniques. The most significant sociocultural tool is language, as it is used to teach tool use and is vital in the process of developing higher psychological functions.

(Karpov, 2003; Rogoff, 1990; Sutherland, Armstrong, Barnes, Brawn, Breeze, Gall et al, 2004, as cited in Hall, 2007, p. 95)

If the online learning environment provides an adequate amount of guidance from the teacher/professor and classmates, then students with LD can master their new skills. This is when students are learning in the zone of proximal development (Gan & Zhu, 2007, p. 207). Guided discussions requires classmates to provide written posts that thoughtfully addresses the criteria the professor prescribes. Professors and students can scaffold learning experiences through helping students with LD develop the required skills to

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progress to the next stage of development. These learning processes empower students' interaction in the social environment can able to help them achieve success in the learning activity, in a way that they could not have done without the social support. In order to provide students with support, activities should be designed in a course with the right amount of assistance to help learners gain expertise in using the new concepts and tools (Hall, 2007, p. 101). Learning support requires careful course design and tracking of students' progress to provide timely and suitable feedback.

In the cognitive apprenticeship theory approach (Brown, et. al., 1989), the teacher, or more experienced peer, models the use of mediatory tools, and provides the scaffolding for learners to practice. Scaffolding is gradually withdrawn as the learner gains expertise. Modelling concerns providing examples of expert behaviour that include explanations; coaching concerns encouragement, diagnosis and direction; and scaffolding is the provision of structure or prompts in the learning environment as indicated in figure #3 (Hall, 2007, p. 96).

Figure # 3 Design Principles for Online Courses

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Table 2: Design principles for Courses using a Sociocultural Approach

	Sociocultural course design
Aim of Course	Cognitive development; to learn how to work in the field of practice
Learning Context	Social environment where that knowledge is used in responding to a problem that community may face.
Instructor's Role	<ul style="list-style-type: none"> • Provide support to help learners work in ZPD • Help learners understand and use new tools.
Role of peers	Provide the social environment where learners develop competency in tool use.
Initial activity in course (after orientation)	Provide conceptually-based teaching for learners to understand new tools.
Initial context	After formal teaching: the social environment

Hall, A. (2007). Vygotsky Goes Online: Learning Design from a Socio-cultural Perspective. *Learning and Socio-cultural Theory: Exploring Modern Vygotskian Perspectives International Workshop 2007. Research Online.* (p. 101).

Case Studies

Dr. Tali Heiman of the Department of Education and Psychology at the University of Israel and Dr. Dorit Olenik Shemesh, (2012) of the Hammill Institute on Disabilities conducted a research study in which they analysed students' patterns of use of online postsecondary education courses. Their data was collected from the online class discussions of 964 undergraduate students with and without learning disabilities at the Open University of Israel (OUI) (535 male and 429 female) studying with an age range from 17 to 57 years (refer to appendix #1 figure 4 for the characteristics of the research participants (Heinman & Shemesh, 2012, p. 312). Their academic responses and social perceptions in relation to their hope and well-being were measured. Students were asked to complete four questionnaires related to their patterns of using various assistive

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technologies. The questionnaires assessed Perceptions of Learning through Online Usage; Accessibility of Campus Computing; Hope Scale and Subjective Well-being Scale (Heinman & Shemesh, 2012, p. 308).

The Hope Scale was defined by Snyder (2002) as a positive motivational state that is based on an interactively derived sense of success and claimed that people typically think in terms of goals (Heinman & Shemesh, 2012, p. 311). The theory of hope, which is part of a cognitive model, involves two main components: (a) agency (the motivation to pursue the goals) and (b) pathways (strategies and planning to meet goals (p. 311). Agency thinking involves thoughts about one's ability to endure his/her journey towards his/her goals, even when faced with challenges and obstacles. The lower hope scores of the students with LD were related to their long term frustration that students with LD remember from negative learning experiences in childhood (Lackaye, et. al., 2006, as cited in Heiman, & Shemesh, 2012, p. 311).

Their research revealed that compared to the control group, students with learning disabilities (LD) logged more often into the course sites, going into the forum more frequently and posted many more messages in the discussion forum than students without LD (control group). The research indicated that students with LD are more familiar with assistive technology and use it more often than their classmates who do not have LD. Students with LD reported higher scores on the Hope scale because they were more motivated to find different methods (pathways) to reach their goals, and their subjective well-being was higher than their classmates without LD (control group) (Heinman & Shemesh, 2012, p. 315). The results are indicated in the following figure 5

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and figure 6 in appendix #2 :

Figure #5 Means, Standards, and Deviations & Scores for Usage, Patterns, Assistive Technology, Web Course Contribution, Hope & Well Being Between Students

Table 2. Means, Standard Deviations, and *F* Scores for Usage Patterns, Assistive Technology Usage, Web Course Contribution, Hope, and Well-Being Between Student Groups

Variable	Students With LD (<i>n</i> = 363)		Non-LD Group (<i>n</i> = 601)		<i>F</i> (1, 960)	η
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Website usage patterns	2.78	0.57	2.66	0.53	8.10***	.025
Assistive technology usage	3.91	1.66	3.20	1.71	31.67***	.032
Web courses contribution: Academic aspects	3.75	0.75	3.76	0.62	0.82	.00
Web courses contribution: Social aspects	3.18	0.65	3.12	0.62	1.06	.00
Global Hope	48.17	7.55	44.24	9.73	3.05*	.01
Well-being	27.3	5.67	25.9	5.99	2.39*	.01

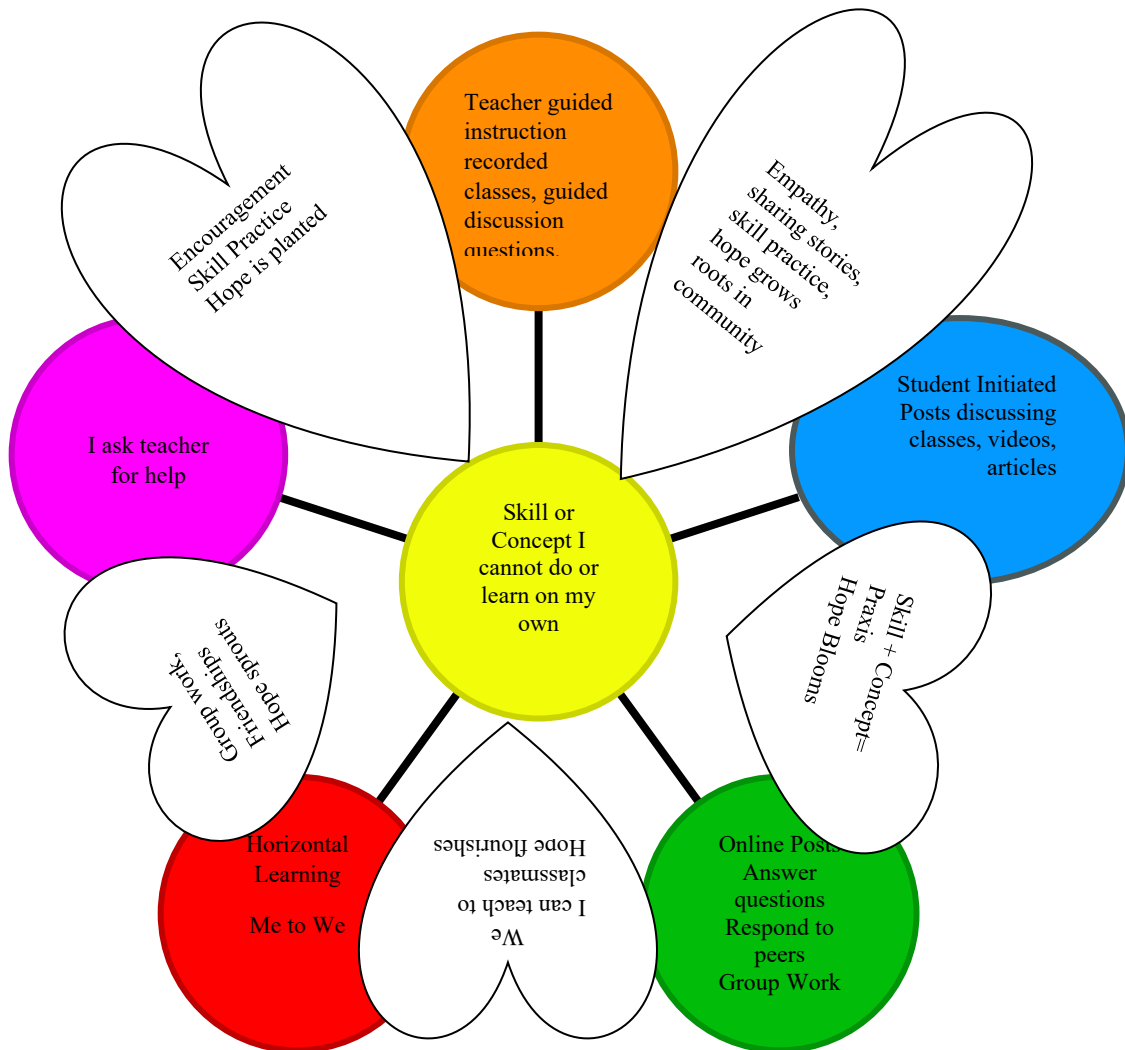
Note: For usage patterns, assistive technology, website courses contribution, and *Hope Scale*, range = 1–5, Well-being range = 1–7. Higher scores indicate higher perceived hope or well-being.

p* < .05. **p* < .001.

Heinman, T., & Shemesh, D. O. (2012). Students with LD in Higher Education: Use and Contribution of Assistive Technology and Website Courses and Their Correlation to Students' Hope and Well-Being. *Journal of Learning Disabilities, 45*(4), p. 315.

Figure # 7 Synthesizing Theories ZPD, AT & Hope Case Study into a Pedagogical Paradigm for Online Learning for Students with LD

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This is my synthesis of Vygotsky's zone of proximal development (ZPD)

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intertwined with learning disabilities (LD) and online learning. The cycle of learning starts with my teacher's encouraging guided instruction which plants the seeds of hope with her/his guided discussion questions, recorded classes, videos, articles, blogs. As I reach out to my classmates, we germinate empathy through sharing stories, discussing concepts, and questions. Our guided discussions grow hopeful roots in our relationships in our online community. Throughout our online classes, students initiate their own discussion questions on controversial issues such as cell phone use and other topics reflecting our assigned videos and articles. Through horizontal learning our friendships develop as we participate in group presentations making hope sprout.

As our class connects skills and concepts we develop praxis in developing online learning tools and our hope blooms with creativity. Our online posts progress from just answering assigned questions to responding to peers not merely for participation marks, but because we want to reciprocate in the online relationships of reciprocity. Harvesting reciprocity is a multi-dimensional gift as the concepts and skills our classmates taught us become the lessons we teach to other classmates in our individual presentation as hope flourishes we can pollinate or nourish other learning cycles. This reflects the concept of collective wisdom in online learning environments as "dynamic ecosystems that interact, cross-fertilize, feed upon, and grow on each other (P6r, 1995, as cited in Gon & Zhu, 2007, p. 208). Harvesting hope in online learning environments inspires intrinsic motivation in students with LD.

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Critical Analysis and Implications for the Future

There are many elements of learning to consider when teachers embark on creating an online E-Learning class. In a pre-service teacher education research study on the use of Google Classroom, the student teachers appreciated the ease of access, collaboration, student voice, agency and pace. Many of them were concerned with their personal privacy and did not want to be treated as students because they considered themselves to as participants. They felt that the university treated them as students when they saw themselves as professionals (Halverson, 2011, as cited in Heggart & Yoo, 2018, p. 152).

Many critics could claim that it is too difficult to quantify hope, especially in students with LD who have already had their IQ quantified empirically. Heinman and Shemesh discuss how their research study was based on a correlation with the students' online participation in their course activities with their classmates and the subjective reports of hope and well being from students with LD. In empirical science, correlation studies often come with disclaimers of inconclusive results. However, although hope is may be intangible, the online interactions shared between students in Vygotsky's zone of proximal development are learning strategies that can advance students with LD from isolation into academic discourse communities of dynamic possibilities for social change: "to undergo a revolution to become "idea-centered" from "activity-centered," and to become collaborative learning from independent learning, so that learners can embark on a knowledge building" journey (Scardamalia, 2002, as cited in Gon & Zhu, 2007, p. 206). Online learning can be developed into a knowledge building community through

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cognitive processes of the zone of proximal development in students where they: “discuss problems, extend points of view, exchange learning experiences, debate opinions” in a safe ecosystem of collective learning (Gon & Zhu, 2007, p. 208) as indicated in figure 7:

Figure #8: A Learning Framework for Knowledge Building and Collective Wisdom

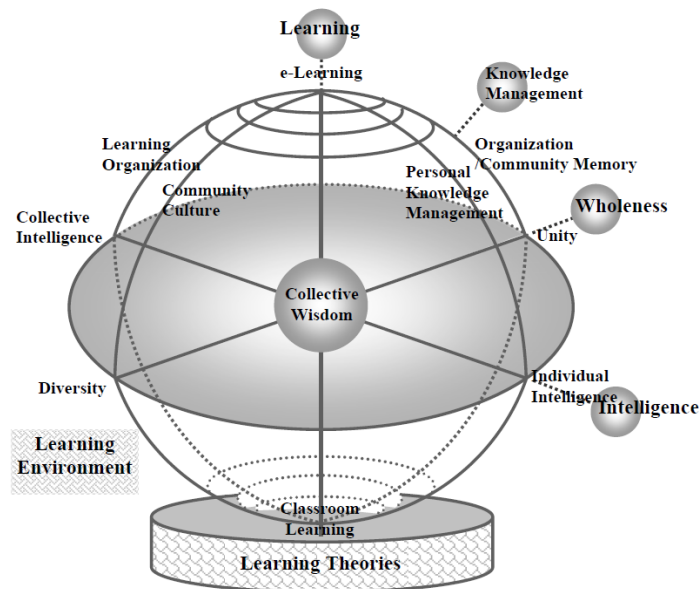


Figure 2. A learning framework for knowledge building and collective wisdom

Gan, Y., & Zhu, Z. (2007). A learning framework for knowledge building and collective wisdom advancement in virtual learning communities. *Journal of Educational Technology & Society*, 10(1), 206-226.

The conceptual framework for students with disabilities is for educators to provide them with the least restrictive learning environment possible. Taking students with LD through Vygotsky’s zone of proximal development online transforms the boundaries of classroom walls and IQ test restrictions into learning cycles that flow (Csikszentmihalyi, 2014) cognitively with endless possibilities through lap tops, i-pads, tablets and smart phones. For most people, [online learning classes] makes [learning convenient]. For people with learning disabilities, [online learning classes] makes

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[learning] *possible*” (Mary Pat Radabaugh, as cited in Borg, & Berman-Bieler, et. al. 2015, p. 8).

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Appendix # 1

Figure #4 Characteristics of the Research Participants (Student Groups)

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Table 4. Pearson Correlations for Global Hope Score With Students' Measures, Separately for Each Group

Variable	Hope Score: Students With LD	Hope Score: Non-LD Group
Well-being	.55**	.44**
Assistive technology usage	.22**	.12**
Web courses contribution: Academic aspects	.30**	.22**
Web courses contribution: Social aspects	.27**	.19**
Website usage patterns	.13*	.22**
GPA's	.02	.21**
Age group	.15**	.09*
Gender	.05	.04

* $p < .05$. ** $p < .01$.

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Appendix #2

Figure #6: Hierarchical Regression Analyses for Variables Predicting Global Hope

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Table 5. Hierarchical Regression Analyses for Variables Predicting Global Hope

Students' Variable	B	β	t
Well-being	0.67	.47	14.36***
Web courses contribution: Academic aspects	1.20	.09	2.18**
Web courses contribution: Social aspects	0.70	.05	1.24
Assistive technology	0.40	.08	2.31**
Website usage patterns	1.694	.11	2.96**
GPA's	0.09	.11	3.39**
Students' group (LD, non-LD)	0.29	.02	0.49
Age group	1.47	.08	2.59**

Note: $R = .55$, $R^2 = .31$, $Adj. R^2 = .30$, $F(8, 956) = 36.67$, $p < .001$.
 ** $p < .01$. *** $p < .001$.

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