



Center for Teaching Brain Literacy
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BRAIN LITERACY INSTRUCTION PROPOSAL James Bradford Hale, PhD, MEd, ABPdN

Overview

The missing link for a majority of educators, psychologists, and neuroscientists is understanding brain-behavior relationships impact student functioning in the real world. Practitioners in the schools know how education works – but know little about the brain or how their practice influences the brains of students. On the other hand, educational neuroscientists understand the brain and how this impacts academics and behavior, but know little about classrooms or instruction. The proposed workshop will bridge these disparate fields through *direct instruction*, *small group discussion*, and *jigsaw cooperative learning* to develop participant *brain literacy*. *Consultation* with psychologists and classroom teachers is also offered as an option, so practitioners can obtain feedback about their *brain literacy* skills on the job. This instruction can occur online, in person, or some combination thereof. The three training opportunities are discussed below.

I. Direct Instruction/Small Group Discussion (2 Days)

Brain literacy training requires direct instruction to develop an understanding of brain functioning in the real world. Led by Dr. James B. Hale, lectures can be presented via in person training (preferred) or via videoconferencing. To determine overall course efficacy, Brain Literacy Survey data following each phase (1. Direct Instruction/Small Group Discussion; 2. Jigsaw Cooperative Learning; 3. Practice Consultation) will be subjected to repeated measures MANOVA. Quizzes for each module will be used to determine mastery of content, and also subjected to repeated measures MANOVA. The following lectures are offered:

DAY 1 MODULES

1. Brain Literacy Within Multi-tier Systems of Support (MTSS) (2 CE Hours) – This module provides a historical overview of education systems, special education, and current practices. Participants will be shown data that show that combining response-to-intervention (RTI) and cognitive/neuropsychological assessment for non-responders is best practice, not only to accurately identify children with disabilities, but also to guide their instruction. Tier 1 is Standard Protocol RTI (recommended by general and special education leaders); Tier 2 is Problem Solving RTI (recommended by school psychology leaders); Tier 3 is Special Education, with



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the comprehensive evaluation occurring after non-response in Tier 2 (recommended by 58 expert White Paper (Hale et al., 2010). The science of learning is emphasized throughout, with research findings offered to show the model in practice.

2. A Model of Brain Functioning (2 CE Hours) – This module breaks down long-held beliefs about the brain which are inaccurate according to the current evidence (i.e., neuromyths). A neurodevelopmental approach is then emphasized, showing how the brain changes normally, and how brain plasticity can help develop or even hamper student brain development. The main part of this presentation builds on the works of A. R. Luria as its foundation, updating participants of how the model has evolved to incorporate current evidence.
3. Understanding How Cognitive Processes Affect Instruction and Intervention (2 Hours) – this module is about understanding psychological and educational tests and other data from a cognitive/neuropsychological perspective, with case examples discussed to highlight how the brain works in interconnected circuits, not segregated silos. Commonly used psychological and educational measures will be discussed in detail, so participants realize a “one size fits all” approach to test interpretation leads to error. Real world examples are offered to highlight how to accurately interpret test and other data, and the importance of error analysis in interpretation. Throughout this presentation, examples of how traditional approaches to interpretation negatively affected student outcomes will be discussed. Examples of interventions based on cognitive and academic assessment will be provided. Participants will use small group discussion to interpret a student’s data, and then offer brain literate strategies for instruction and/or intervention, with each group providing a team leader who will present findings to the whole cohort.
4. Neuropsychology of Reading and Reading Disability (2 Hours) – this module details participants with a means to map brain functions previously learned to the cognitive processes involved in word reading, reading fluency, and reading comprehension. A detailed case study is presented that highlights how the brain reads individual sentences, and accesses lexical-semantic memory and language comprehension networks to understand what is being read. Emphasis is placed in linking these processes to both cognitive and academic tests results, and real-world classroom reading skills. Neuroimaging and neuropsychological research will highlight similarities and differences between typical readers and students with reading disabilities. Evidence based interventions will be offered throughout. Participants



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will use small group discussion to interpret a student's data, and then offer brain literate strategies for reading instruction and/or intervention, with each group providing a team leader who will present findings to the whole cohort.

DAY 2 MODULES

5. Neuropsychology of Math and Math Disabilities (2 Hours) – This module provides participants with knowledge of the brain structures and functions involved in math calculation, math fluency, and math problem solving. By exploring the interrelationships between brain and math performance, participants will see similarities with the reading brain, but also important differences in cognitive and neuropsychological processes that are more important in math. Examples of math error patterns will be explored, and how these are critical for understanding what typical learners do during math performance, and how this differs for students with math disabilities. Evidence based interventions will be offered throughout. Participants will use small group discussion to interpret a student's data, and then offer brain literate strategies for math instruction and/or intervention, with each group providing a team leader who will present findings to the whole cohort.
6. Neuropsychology of Written Expression and Writing Disabilities (2 Hours) This module highlights how the psychological processes involved in handwriting, spelling, writing fluency, and written expression reveal important relationships with executive function circuits and other circuitry discussed in the reading module. This link between posterior and anterior brain networks makes written expression the most difficult academic task, especially for children with comorbid socioemotional problems, since executive circuits are impaired in most. Case studies highlight different types of executive problems that lead to different patterns of writing performance, with writing disability subtypes offered. In addition, examples of different writing patterns among different emotional and behavior disorders will be offered, with a discussion of comorbidity ensuing. Evidence based interventions will be offered throughout. Participants will use small group discussion to interpret a student's data, and then offer brain literate strategies for writing instruction and/or intervention, with each group providing a team leader who will present findings to the whole cohort.
7. Neuropsychology of Socioemotional Functioning and Psychopathology (2 Hours). This module begins with how brain development intersects with social, emotional, and behavioral development, and compares and contrasts the neuroscience and



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neuropsychology of disabilities such as ADHD, depression, and autism. Hale's *Circuit Balance Theory*, published in the *APA Handbook of Psychopathology* (Hale et al., 2018), will anchor the presentation so practitioners can change their thinking from one of global executive dysfunction to the types of executive deficits found for different disorders. Case studies and evidence-based interventions will be offered throughout. Participants will use small group discussion to interpret a student's data, and then offer brain literate strategies for students with socioemotional problems, with each group providing a team leader who will present findings to the whole cohort.

NOTE: If the training is done live on-site, the reading module often has to be completed in Day 2. Each module will have a pre-post designed, with 90 percent accuracy required for CE credit (14 CE Credits possible). The *Brain Literacy Survey* (BLS) developed by Hale several years ago and used to judge course efficacy in previous studies, measures three domains: Knowledge, Skills, and Attitudes Toward Difference/Disability. Previous pre-post course BLS results showed significant improvement for all three domains (Walker et al., 2019). These results are predicted to be replicated here. If both surveys are completed, and a participant passes all 7 quizzes with 90 accuracy or better, they will earn a *Brain Literacy Foundations Certificate*.

II. JIGSAW COOPERATIVE LEARNING

The importance of brain literacy instruction is not only about learning new content, but in the ability to apply that skill in the classroom, clinic, or hospital, to benefit those we attempt to serve. To accomplish this feat, one must begin to understand their thoughts and behavior in relationship to the children we serve. As a result, Dr. Hale developed a jigsaw cooperative learning activity wherein participants were broken into reading, math, writing, and psychopathology groups (two groups each area), and they worked cooperatively to develop and present a powerpoint presentation on the student they picked to the entire cohort. A socratic teaching method is used during the cohort presentations in an effort to think independently about the brain-behavior relationships they posit during the presentations. Each presentation starts with a history, followed by data available (test and/or classroom work samples). Next, the group would present their thoughts about the student's brain functioning in relation to those findings, and then conclude the presentation with recommendations for intervention, and how one might measure intervention efficacy using single subject designs. The following steps in the model not only



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allowed for an incremental gain in BLC Skills beyond the module gains, it also led to powerful sharing of ideas regarding instruction and intervention.

1. Reading (2), Math (2), Writing (2), Psychopathology (2) Teams formed
2. Each Team participant picks a relevant student they've taught and/or evaluated at their sites and emails the work samples, testing and other data, and a short write up to give to the Team one week prior to Initial Team Meeting.
3. In the Initial Team Meeting, each participant goes over the handout emailed to the Team, and makes an argument to the entire Team that this student should be presented to the Cohort. The Team decides which case would be most interesting and relevant for the Course. Dr. Hale remains on the periphery during the discussion, but remains available to answer questions when teams meet.
4. The Team then decides the tasks it needs to accomplish, which includes additional data collection from work samples/tests/other data sources. It may include direct observation of the student. However, this is not necessarily new data collection, but rather a more thorough approach to seeing what is available in the student's files, desk, gradebooks, etc. The individuals who collect the data should be communicating with other Team Members who will prepare the powerpoint slides, working cooperatively back and forth to understand the student in relation to the environment, and hypothesize about the student's brain-behavior relationships and how this impacts instruction and intervention in the student's real world.
5. In the Second Team Meeting, individuals then practice the presentation, giving each other feedback on how to present the student accurately to the Cohort. Each presentation includes the student's background/history, data collected, hypotheses about the student's brain functioning (including strengths and weaknesses), and hypotheses of what interventions might help the student. Dr. Hale does not attend this meeting, but is available for consultation as necessary.
6. In the Cohort Meeting, each team presents their findings, slides, and a presentation (8 total presentations). Dr. Hale uses, and encourages other Cohort members, to use a Socratic teaching style guided by questioning, to get each Team to develop even a more nuanced understanding of the student. Dr. Hale takes notes to determine individual and group member efficacy. He also then finishes each presentation with a summarization of the findings and discussion. Usually, each presentation takes about 1 to 2 hours, and each Team Member has to attend all Team Meetings, complete all steps, and present at least one slide to the Cohort for CE Credits. It is estimated that this takes a total of 21 hours for CE purposes.



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NOTE: If the training is done live on-site, it is best that it be combined with the two day introductory training for one full week of training, with the first two days on a Thursday and Friday, and then presentations the following Monday, Tuesday, and Wednesday as necessary. If completed separately or online, this can be spread out over about 3 to 4 weeks. Again, the BLS is used to see if there is any *incremental* gain in skills beyond that of the initial instruction. If all tasks and the BLS is completed by a participant, an *Advanced Brain Literacy Certificate* is awarded. If some members drop out of a Team, for whatever reason, individual Team Members can still be awarded the Certificate. It is predicted that there will be an incremental gain in participant skills as a result of this jigsaw cooperative learning activity. If all components of the *Brain Literacy Foundations Certificate and Advanced Brain Literacy Certificate* are met, participants become eligible for the *Brain Literacy Practitioner Training*, which includes the *Brain Literacy Consultation* phase of the course. As stated earlier, participants do not have to complete the entire course, and this last consultation component will likely be completed by more than a few participants in a Cohort.

BRAIN LITERACY CONSULTATION

The capstone experience in brain literacy training is the Brain Literacy Consultation process. This can be done live or virtually. The participant returns to the workplace with newfound understandings of both brain literacy and evidence-based practice. However, does the newfound knowledge, skills, and attitudes, translate into actual professional gains that can be applied in real world? This Consultation piece is all about knowledge translation (KT), transferring what was learned into daily practice. To accomplish this feat, Dr. Hale observes participants in their daily practices. For instance, he might observe a teacher during reading, math, written expression, and/or social activities in the classroom and/or playground. For psychologists, Dr. Hale would observe testing students in an office and/or when the psychologist collects observational data in the classroom.

These real-world activities are video recorded for later discussion and feedback. After receiving the electronic files, Dr. Hale watches the recording and prepares discussion items/feedback for the participant. An rubric will be used to judge efficacy. Then the participant and Dr. Hale have a meeting to discuss the activities that occurred and the rubric results, coming to consensus about what ensued, and recommendations for the participant on how better to serve students in the future.



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At preselected spots in the video, Dr. Hale will stop the recording and ask the participant to consider what was happening before the stop, what the participant was thinking and feeling when the recording was stopped, what the student was thinking and feeling during the stop. Then the participant considers what happened, and how this might improve the next time the participant is in that situation. This process is repeated several times during the recording. The Consultation objective is to help participants develop real-time brain literate job performance, so Dr. Hale will use a rubric to see how effectively the participant is in recognizing and utilizing their skills in the natural environment, and whether this changes over sessions. The number of sessions is individualized for participants based on the number of observations/consultations preferred. The steps in the *Brain Literacy Consultation* include:

1. Participant identified and seeks insitutional permission to conduct observations.
2. Participant chooses type of setting and instruction to record.
3. Participant video records in classroom or office and sends copy to Dr. Hale.
4. Dr. Hale views video, deciding on several points that will be discussed.
5. During the consultation, the video will be observed again, with Dr. Hale asking the five questions of the participant:
 - a. What was happening before the stop?
 - b. What were you thinking and feeling at the stop time?
 - c. What do you think the student was thinking and feeling at the time?
 - d. What was positive about the exchange?
 - e. What could have been done differently, if anything, to foster brain literate assessment, instruction, and/or intervention.

NOTE: If the training is done live on-site at the participant's classroom or office (preferred), consultation can follow the observation. The participant would schedule a time following the observation to do the consultation, so each session could happen all in one day. Consultation CE hours will vary based on the interest and need of the participant, but should be at least 4 sessions, and 2 hours minimum of CE credit each (8 CE hours). If a university certificate/degree is developed, this would require 8 sessions and at least two different settings (16 CE hours). If participants complete the entire course, they should achieve a *Brain Literacy Practitioner Certificate*, either through an organization or university.