**fFitchburg State University**

**EDUCATOR Programs**

**Comprehensive Syllabus**

## SAMPLE SYLLABUS

## Course title CVI and the Ever-Changing Brain Credit hours

7 weeks of asynchronous modules; Number of Contact Hours: 5 hours/week

##

**Instructors:** Fall 2021: Lacey Smith, Ilse Willems; Spring 2022: Rachel Bennett, Emily Cantillon

**Office:** Perkins School for the Blind

**E-mail:** Fall 2021: lacey.smith@perkins.org, ilse.willems@perkins.org; Spring 2022: rachel.g.bennett@perkins.org, emily.cantillon@perkins.org

**Office Hours:** Mondays 7-8PM Zoom

1. **COURSE DESCRIPTION:**

This 7-week course will provide an introduction to the visual system to better understand how our brains make sense of the visual world and what happens when something goes wrong along the way. We will explore the structure of the brain, the early visual pathways, the dorsal and ventral streams and the integration between the two, and the importance of neuroplasticity (our brains are ever-changing). Within this context we will discuss the CVI brain, damage and interruption to certain areas in the visual system, the CVI visual behaviors, visual fatigue, and the barriers to access. Along the way, participants will apply this neuroscience knowledge to case studies of children with CVI to experience how a better understanding of the brain and CVI leads to a deeper understanding of how to evaluate and support individuals with CVI.

 ***If you plan on matriculating into a graduate program at Fitchburg State University, please be aware that twelve semester hours of Fitchburg State University credit taken within a year prior to the student’s admission may be applied to the degree program with the approval of the program chairperson. Anything over 12 credits prior to matriculation will NOT be accepted towards the degree.***

Fitchburg State University Teacher Preparation Programs. (2018).  *Conceptual framework.*  Fitchburg, MA: Author. [Online] Available: <http://www.fitchburgstate.edu/offices-services-directory/education-unit/conceptual-framework/>

Massachusetts Department of Elementary and Secondary Education. (1999-2011). *Curriculum frameworks*. Malden, MA: Author. [Online] Available: <http://www.doe.mass.edu/frameworks/current.html>

**Fitchburg State University Teacher Education Conceptual Framework**

 

1. **LEARNING OUTCOMES / OBJECTIVES:**

This course will address the dispositions of the Conceptual Framework in the following way(s):

**Knowledge**: As a result of the learning experiences in the course, you will become more cognizant of:

* The structure of the brain, its various components, and the visual system within the brain
* How the brain processes the visual world
* Parts and functions of the early visual pathway from the retina to the primary visual cortex
* How the visual cortex in the occipital lobe begins to process information sent from the retina
* Higher-order visual processing in the dorsal and ventral streams, and the integration of the two streams
* How damage and interruption to the brain structure can lead to Cortical/Cerebral Visual Impairment (CVI)
* The CVI visual behaviors, examples of the various ways they can manifest, and the impact on access
* The impact of neuroplasticity on the brain, especially in relation to students with CVI

**Skill**: As a result of the learning experiences in the course, you will become better able to:

* Understand how we use our brains to perceive and makes sense of the visual world
* Identify the ‘red flags’ associated with CVI and how each of those can impact a student’s vision
* Interpret and glean important information from a neurological report and medical history to better understand how CVI uniquely manifests in the individual and/or think of questions that need exploring to develop a whole-child understanding of the individual’s unique needs
* Analyze neuroscience research and literature, think about how it applies to CVI, and how to use this information think about accessibility for individuals with CVI
* Observe the presence of CVI visual behaviors and what these behaviors might reveal about interruptions in the visual system

**Caring**: As a result of the learning experiences in the course, you will become more competent in your ability to

* Explain to others and the school-team how the brain processes the visual world and what happens when something goes wrong.
* Describe why CVI presents multiple barriers to access and why it’s important to create environments and tasks to allow for visual access, along with multisensory access
* Understand how exhausting, confusing, and frightening it is for many individuals to use their vision and try to make sense of their world
* Understand the importance of neuroplasticity when collaborating with the child’s team on developing educational programming that uses high expectations and a multisensory approach
* Value the need for an individualized assessment to address student-specific needs.

**Ethical**: As a result of the learning experiences in the course, you will become more competent in your ability to:

* Instill a sense of responsibility as a lifelong learner of the brain and CVI
* Deeply understand the barriers to access for individuals with CVI living in a world not designed for them
* Use research and various perspectives on how to support individuals with CVI to inform our evolving understanding of the brain, the visual system, and CVI, as well as inform how we think about and utilize a multisensory approach to support access to learning
* Advocate for the need to build awareness around the leading cause of visual impairment and this growing public health crisis associated with CVI
1. **INSTRUCTIONAL STRATEGIES [Place an X for each strategy you use while teaching this course.]**

 X Lecture Data Collection and Analysis

 X Discussion/Questioning Pre-Practicum

 Laboratory Role Playing/Simulation

X Problem Finding/Solving X Independent Learning

X Discovery Field Trips

X Interviewing Computer Applications

 Collaborative Learning Groups X Viewing or Listening to Followed by

X Reflective Responses Discussing

 Creating Visual Illustrations of Concepts Other\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 **Technology Initiatives**:

Users of the Fitchburg State University technology systems are subject to all applicable federal, state, and international technology laws. Questions regarding regulations may be directed to the Office of Information Technology.

Candidates will utilize technology as:

* a research tool
* a format for reading research articles and videos that are posted in the class
* a communication method (discussion questions, email)
* an enhancement tool for the design of lessons and curriculum units
1. **COURSE REQUIREMENTS**:

**Discussion Forums:** There will be a discussion post in all seven sessions. Participants are required to complete each one, utilizing information they have gained from the course (lecture, readings, videos). The discussion posts are interactive - you are required to post your own discussion as well as respond to your peers. You will be assessed on the overall quality of your post as well as your participation in other’s posts.

The rubric point scale will be used to assess your work based on a 5 point scale.

Some characteristics that are considered to be part of excellent discussion contributions are outlined below.

* Discussion posts should have a minimum of 100 words and maximum of 300 words.
* Every week you will submit a minimum of two posts. One is your initial reaction to the post discussion question which should be posted by Thursday. This will ensure that everyone has a chance to interact with one another. Then you will also respond to at least one other candidate. Your response must be submitted by Sunday of each week.
* Your posts should demonstrate your understanding of the session and your use of the course materials.
* Your response post should be thoughtful and should help enhance and build upon the original post. A simple “I agree” is not adequate. Instead, reflect on the post using your own knowledge and experience.
* Follow proper citation guidelines using APA format.

The rubric point scale will be used to assess your work based on a 5 point scale.

Seven discussion forums are required at 5 points possible for each = 35 possible points.

|  |  |  |  |
| --- | --- | --- | --- |
| **Discussion Forum Rubric** | **5 points** | **2 point** | **0 points** |
| **Incorporation of and reference to the readings in discussion responses****Max pts: 1** | Max pts: 1 | Responses include reference to the readings assigned for the week. | Responses do not include any reference to the readings for the week. |
| **Quality, well-written response****Max pts: 4** | Responses clearly address the discussion topic including the candidate’s own thoughts as well as the responses posted by others. | Responses address the discussion topic but the candidate did not respond to responses posted by others. | Responses do not address the discussion topic. |
| **Appropriate number of responses****Max pts: 2** | A minimum of one response is posted. The response is thorough and thoughtful. | A minimum of one response is posted. The response is minimal (ex. ‘I agree’ or ‘good point’). | No responses are posted. |

**Assignments:** There will be an assignment in six of the seven sessions. Participants are required to complete each one, utilizing information they have gained from the course (lecture, readings, videos). You must submit your assignment in a timely manner, before the materials for the following session are posted.

The rubric point scale will be used to assess your work based on a 10 point scale.

Some characteristics that are considered to be part of an excellent assignment are outlined below.

* Each session will open on a Friday. Assignments are due by the following Sunday, thus providing you with 10 days to complete them.
* The assignment should include references from the materials presented in the class (videos and/or articles) or other materials and articles that are relevant.
* Assignments should be thoughtful and thorough. They should demonstrate your understanding of the materials.
* Follow proper citation guidelines using APA format.

The rubric point scale will be used to assess your work based on a 10 point scale.

Six assignments are required at 10 points possible for each = 60 possible points.

**Policy on late assignments:**

Assignments submitted past the due date will result in 0 awarded points. Extensions may be granted due to extenuating circumstances. To request an extension, course participants must contact the instructor prior to the deadline date.

|  |  |  |  |
| --- | --- | --- | --- |
| **Discussion Forum Rubric** | **4 points** | **2 point** | **0 points** |
| **Incorporation of and reference to the readings in discussion responses****Max pts: 4** | Responses are thorough and thoughtful and include reference to the readings assigned for the week. Proper citation is utilized. | Responses are minimal. References are minimal/off-topic and there is no proper citation. | Responses do not include any reference to the readings for the week. |
| ***Quality, well-written response******Max pts: 4*** | Assignment response clearly addresses the question posed. It is thorough and thoughtful.  | Response is on topic but does not thoroughly address the question. | Response is off-topic |
| ***Response is timely******Max pts: 2*** |  | Response is submitted on time. | Response is submitted late and/or not submitted. |

# **EVALUATION OR GRADING POLICY:**

# **Methods of Evaluation**

Participants are evaluated by the following methods:

* Introduction = 5 possible points
* Discussion Forums = 35 possible points
* Assignments = 60 possible points
* Overall Total 100 points

**GRADES**

**4.0** 95 - 100 A

**3.7** 92 - 94 A-

**3.5** 89 - 91 A-/B+

**3.3** 86 - 88 B+

**3.0** 83 - 85 B

**2.7** 80 - 82 B-

**2.5** 77 - 79 B-/C+

**2.3** 74 - 76 C+

**2.0** 71 - 73 C

**0.0**  0 - 70 F

**W** Withdrawn

**IN** Incomplete

**IP** In-Progress

Grades that fall between intervals will be rounded to the higher number.

1. **COURSE CONTENT/TOPICAL OUTLINE**

Internet links change frequently. Please use the links in your current course, which may be updated from this syllabus.

**.............................................................................................................................................................**

**Session One: Overview of the Brain**

**Session Goals:**

Upon completion of this session, the participant will be able to:

* Understand a general overview of the brain and how the brain develops
* Understand the visual pathways in the brain
* Read a neurology report and interpret what the visual implications might be
* develop an initial understanding of the visual behaviors associated with CVI

**Introduce yourself!**

Earn 5 points by introducing yourself to the workshop! Upload a profile photo if you like, and tell us about yourself. In your introduction, please include the following:

* your name
* where you live
* your school and role
* why you are taking this course
* your current understanding of CVI

**Video:**

* Merabet, L. (2020, December 11). *Visual Processing, Part I* [Video]. YouTube. <https://www.youtube.com/watch?v=oK0fGcZUFXY> (watch first 45 minutes)
* St. Clair Tracy, H. (2019). *Lessons* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?cat_id=3>
	+ St. Clair Tracy, H. (2019, February 22). *Lesson 1: Introduction* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=2>
	+ St. Clair Tracy, H. (2019, February 22). *Lesson 1a: the brain* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=3>
	+ St. Clair Tracy, H. (2019, March 4). *Lesson 1b: Occipital Lobes* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=4>
	+ St. Clair Tracy, H. (2019, March 4). *Lesson 1c: Posterior Parietal Lobes* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=5>
	+ St. Clair Tracy, H. (2019, March 4). *Lesson 1d: Middle Temporal Lobes* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=6>
	+ St. Clair Tracy, H. (2019, March 4). *Lesson 1e: Temporal Lobes* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=7>
	+ St. Clair Tracy, H. (2019, March 4). *Lesson 1f: Frontal Lobes* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=8>
	+ St. Clair Tracy, H. (2019, March 4). *Lesson 1g: Conclusion* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=9>
* Mazel, E., Tibaudo, M., & Bennett, R. (2021, January 29). *Visual Processing, Part II* [Video]. YouTube. <https://www.youtube.com/watch?v=kJNxa7vKdfk&t=388s>
* Bozeman Science (2014). *The Brain* [Video]. YouTube. <https://www.youtube.com/watch?v=kMKc8nfPATI>

**Readings:**

* Bennett, R. G. (2020) *How is CVI diagnosed*? CVI Now. <https://www.perkins.org/cvi-now/understanding-cvi/how-is-cvi-diagnosed>
* Bennett, R. G. (2020) *CVI and the brain: Q&A with Dr. Lofti Merabet.* CVI Now. <https://www.perkins.org/cvi-now/understanding-cvi/cvi-brain-dr-lotfi-merabet>
* Siu, C. R. & Murphy, K. M. (2018, April 24). The development of human visual cortex and clinical implications. *Eye and Brain*, *2018*(10), 25-36. <https://www.dovepress.com/getfile.php?fileID=41719>
* Hensch, T. K. (2016, February). The power of the infant brain. *Scientific American*, 64-69. <https://henschlab.files.wordpress.com/2016/03/hensch-final-sciam.pdf>
* Center on the Developing Child (2007). *The Science of Early Childhood Development* (InBrief). <https://46y5eh11fhgw3ve3ytpwxt9r-wpengine.netdna-ssl.com/wp-content/uploads/2007/03/InBrief-The-Science-of-Early-Childhood-Development2.pdf>
* Neurological reports from our two case studies: Harry and Sally (Will be provided)

**Discussion Forum #1:** First post due by the following Wednesday; Response post due by Sunday

Based on this week’s resources and readings, think of a task you completed this morning (ex. brushing your teeth, making your toast). Which areas of the brain allowed you to do this task?

**Assignment:** Due the following Sunday (10 days after the discussion is posted)

Describe how the thalamus and each lobe in the cortex is related to vision. Then write a short response (300-500 words) answering: What are the potential visual implications with damage to each area?

**.............................................................................................................................................................**

**Session Two: Neuroplasticity and CVI**

**Session Goals:**

Upon completion of this session, the participant will be able to:

* Understand the role and importance of neuroplasticity for students with CVI
* deepen their understanding of the visual behaviors associated with CVI
* being able to identify the visual behaviors seen in the case videos (and in your own students)

**Video:**

* Eagelman, D. (2021, January 15). *Brain Plasticity and What We Can Do With It* [Video]. YouTube. <https://www.youtube.com/watch?v=By0Wv5RAIAc>
* St. Clair Helen, T. (2018, April 20). *Neuroplasticity Film* [Video]. YouTube. <https://www.youtube.com/watch?v=By0Wv5RAIAc>
* Videos of our two case studies: Harry and Sally (Will be provided)

**Readings:**

* Bennett, R. G. (2021). *The importance of neuroplasticity*. CVI Now. <https://www.perkins.org/cvi-now/understanding-cvi/the-importance-of-neuroplasticity>
* Merabet, L. B., Mayer, D. L., Bauer, C. M., Wright, D., & Kran, B. S. (2017, April 10). Disentangling how the brain is “wired” in Cortical/Cerebral Visual Impairment (CVI). *Seminars in Pediatric Neurology, 24*(2), 83-91. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5659284/>
* Martin, M. B. C., Santos-Lozano, A., Martin-Hernandez, J., Lopez-Miguel, A., Maldonado, M., Baladron, C., Bauer, C. M., & Merabet, L. B. (2016, December 26). Cerebral versus ocular visual impairment: The impact on developmental neuroplasticity. *Frontiers in Psychology,*  *7*(1958), 1-9. <https://www.frontiersin.org/articles/10.3389/fpsyg.2016.01958/full>

**Discussion Forum #2:** First post due by the following Wednesday; Response post due by Sunday

What surprises you about neuroplasticity (refer to this week’s resources)? What are the visual improvements (e.g. the student’s growth and progress in being able to visually make sense of their world) you notice based on the videos from Harry and Sally (or based on your own student)?

**Assignment:** Due the following Sunday (10 days after the discussion is posted)

Disprove myths related to neuroplasticity based on this week’s readings. Tie in other readings as well.

**.............................................................................................................................................................**

**Session Three: The Early Visual Pathways**

**Session Goals:**

Upon completion of this session, the participant will be able to:

* Understand the general eye anatomy ( for example, understanding the role of the retina, optic chiasm, primary visual cortex)
* Understand motion processing in the brain
* Discuss possible visual implications due to damage to the visual pathways
* Describe the difference between visual acuity and functional vision
* Read and gain information from eye reports

**Video:**

* Merrit, P. (2017, March 28). *Vision: From Retina to LGN* [Video]. YouTube. <https://www.youtube.com/watch?v=zYa9TAePOi4&t=27s>
* Kaniwasher, N. (2018, April 27). *LGN & V1* [Video]. YouTube. <https://www.youtube.com/watch?v=CvxlN2_bTzY&list=PLyGKBDfnk-iAQx4Kw9JeVqspbg77sfAK0&index=28>
* Kaniwasher, N. (2018, April 27). *Retinotopic Maps* [Video]. YouTube. <https://www.youtube.com/watch?v=MhFJIgeY-ZY&list=PLyGKBDfnk-iAQx4Kw9JeVqspbg77sfAK0&index=29>
* Videos of our two case studies: Harry and Sally (Will be provided)

**Readings:**

* Bennett, R. G. (2021). *The visual pathways from the eye to the brain*. CVI Now. <https://www.perkins.org/cvi-now/understanding-cvi/the-visual-pathway-from-the-eye-to-the-brain>
* Perkins (2021). *CVI visual behaviors*. CVI Now. <https://www.perkins.org/cvi-now/understanding-cvi/understanding-visual-behaviors-and-cvi-characteristics>
* Fazzi, E., Signorini, S. G., Bova, S. M., La Piana, R., Ondei, P., Bertone, C., Misefari, W., & Bianchi, P. E. (2007, March). Spectrum of visual disorders in children with cerebral visual impairment. *Jornal of Child Neurology, 22*(3), 294-301. <http://classroster.lvpei.org/cr/images/ARCHEIVE/2019/Rebecca_JC_07-02-2020.pdf>
* Kran, et al. (2019). Cerebral/Cortical Visual Impairment: A Need to Reassess Current Definitions of Visual Impairment and Blindness. *Seminars in Pediatric Neurology,* Volume 31, p. 25-29
* St. Clair Tracy, H. (2019, March 13). 3a Introduction: Your brain creates your visual world. CVI Scotland. <https://cviscotland.org/lessons.php?id=19>
* St. Clair Tracy, H. (2019, March 15). 3j: visual pathways. CVI Scotland. <https://cviscotland.org/lessons.php?id=28>
* CVI Scotland (n.d.). The visual field. <https://cviscotland.org/documents.php?did=1&sid=3>
* Eye Reports and FVAs from our case studies: Harry and Sally (Will be provided)

**Discussion Forum #3:**

Based on the eye report, neuro report, and videos from Harry and Sally, what discrepancies do you notice between their functional vision versus clinical exam findings, i.e. visual acuity, visual field? Where do you think there might be a breakdown in the early pathway and what are possible visual implications?

**Assignment:** Due the following Sunday (10 days after discussion is posted)

Choose one ‘red flag’ of CVI and discuss the potential visual implications.

**.............................................................................................................................................................**

**Session Four: Dorsal and Ventral Streams - Part I**

**Session Goals:**

Upon completion of this session, the participant will be able to:

* understand an overview of the dorsal and ventral streams and the function of each
* Understand that the dorsal and ventral streams are integrated and connected
* More thoroughly understand CVI visual behaviors and how they’re connected to the dorsal and ventral streams

**Video:**

* Kaniwasher, N. (2018, April 27). *Beyond V1: Lots of visual areas*  [Video]. YouTube. <https://www.youtube.com/watch?v=yqh9P_nVEMc&list=PLyGKBDfnk-iAQx4Kw9JeVqspbg77sfAK0&index=32>
* Bauer, C. (2021, April 14). *Ventral stream functions in CVI: Object and face perception*. Perkins School for the Blind: CVI for the TVI. <https://www.perkinselearning.org/videos/webinar/ventral-stream-functions-cvi-object-and-face-perception>
* Videos of our two case studies: Harry and Sally

**Readings:**

* Bennett, R. G. (2021). *Higher order visual pathways and the CVI brain*. CVI Now. <https://www.perkins.org/cvi-now/understanding-cvi/higher-order-visual-pathways-and-the-cvi-brain>
* Perkins (2020). *Understanding visual behaviors and CVI characteristics.* CVI Now. <https://www.perkins.org/cvi-now/understanding-cvi/understanding-visual-behaviors-and-cvi-characteristics>
* Atkinson, J. (2017). Visual brain development: A review of “dorsal stream vulnerability”—motion, mathematics, amblyopia, actions, and attention. *Journal of Vision*, *17*(3):26, 1-24. <https://jov.arvojournals.org/article.aspx?articleid=2613613>
* Milner, A. D. (2017, March 2). How do the two visual streams interact with each other? *Experimental Brain Research, 235*, 1297-1308. <https://rdcu.be/cliDg>
* St Clair Tracy, H. (2021, May 24). *Dorsal stream dysfunction CVI experience*. CVI Scotland. <https://cviscotland.org/mem_portal.php?article=191>
* Teach CVI Project (2015). *Screening Tools*. <https://www.teachcvi.net/screening-tools>
* Dutton, G. (2015). Questions to ask parents and caregivers of children with CVI. In A. H. Lueck & G. N. Dutton (Eds.), *Vision and the brain: Understanding Cerebral Visual Impairment in Children*, pp. 270-274. New York, NY: AFB Press. Link: https://www.ulster.ac.uk/\_\_data/assets/pdf\_file/0003/167457/Visual-Skills-Inventory-Younger-Child-4-8-years.pdf

**Discussion Forum #4:** First post due by the following Wednesday; Response post due by Sunday

Given Harry and Sally’s neurology report, what assumptions and questions do you have about the dorsal and or ventral stream function? Be sure and include at least one reference.

**Assignment:** Due Sunday, 10 days after assignment is posted.

On this chart below, you will find question statements from the TeachCVI Screening 2. These statements capture observable behaviors. Next to each statement add the CVI visual behavior(s) that best match. Then include if these behaviors are mainly dorsal or ventral or both. Write a reflection statement after completing this activity.

**.............................................................................................................................................................**

**Session Five: Dorsal and Ventral Streams - Part II**

**Session Goals:**

Upon completion of this session, the participant will be able to:

* More thoroughly explain and understand the integration between the dorsal and ventral streams
* Identify visual behaviors that they note in their students

**Video:**

* Kanwisher, N. (2018, May 10). *Evidence from brain damage for the two pathways* [Video]. YouTube. <https://www.youtube.com/watch?v=qVDRUiIduEQ&list=PLyGKBDfnk-iAQx4Kw9JeVqspbg77sfAK0&index=34>
* St. Clair Tracy, H. (2020). *Level 7 Lessons: CVIs Movement and Dorsal* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?cat_id=9>
	+ St. Clair Tracy, H. (2020, February 24). *7a Dyskinetopsia* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=42>
	+ St. Clair Tracy, H. (2020, February 24). *7b Optic ataxia* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=43>
	+ St. Clair Tracy, H. (2020, February 24). *7c Simultangastic Vision* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=44>
	+ St. Clair Tracy, H. (2020, February 24). *7d Apraxia of Gaze* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=45>
* St. Clair Tracy, H. (2020). *Level 8 Lessons: CVIs Ventral* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?cat_id=10>
	+ St. Clair Tracy, H. (2020, February 24). *8a CVI and Recognition Introduction* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=46>
	+ St. Clair Tracy, H. (2020, February 24). *8b Impaired Facial Recognition* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=47>
	+ St. Clair Tracy, H. (2020, February 24). *8c Impaired Recognition of Facial Expressions* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=48>
	+ St. Clair Tracy, H. (2020, February 29). *8d Impaired Route Recognition* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=49>
* St Clair Tracy, H. (2021, April 29). CVI-SIM Virtual reality progress videos. CVI Scotland. <https://cviscotland.org/mem_portal.php?article=267>
* Videos of our two case studies: Harry and Sally

**Readings:**

* Ray, D., Hajare, N., Roy, D., & Banerjee, A. (2020, May 1). Large-scale functional integration, rather than functional dissociation along dorsal and ventral streams, underlies visual perception and action. *Journal of Cognitive Neuroscience, 32*(5), 847-861. <https://direct.mit.edu/jocn/article/32/5/847/95452/Large-scale-Functional-Integration-Rather-than>
* Das, M., Bennett, D. M., & Dutton, G. N. (2007, November). Visual attention as an important visual function: an outline of manifestations, diagnosis and management of impaired visual attention. *British Journal of Ophthalmology*, *91*(11), 1556-1560. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2095436/>
* Bennett, C. R., Bauer, C. M., Bailin, E. S., & Merabet, L. B. (2020, January). Neuroplasticity in Cerebral Visual Impairment (CVI): Assessing Functional Vision and the Neurophysiological Correlates of Dorsal Stream Dysfunction. *Neuroscience and Biobehavioral Reviews, 108*, 171-181. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6949360/pdf/nihms-1545356.pdf>

**Discussion Forum #5:** First post due by the following Wednesday; Response post due by Sunday

Choose a daily activity (i.e.toothbrushing) and discuss how you utilize both the dorsal and ventral streams. Now think about one of your students (you can also use Harry or Sally) and choose a simple task that he/she participates in. Where do you notice any dorsal/ventral stream dysfunction? What are the barriers to access?

**Assignment:** This assignment will continue for 2 weeks and isn’t due until Session Six:

Choose either Harry or Sally. Read the two problem scenarios. Based on his/her neurology report, eye report, FVA, video observations, and parent interview, discuss how each scenario might be inaccessible and visually difficult for them. Develop ideas for accessibility, adaptations, and modifications that consider the needs of the whole-child.

………………………………………………………………………...……………………………………

**Session Six: CVI as a Different Network**

**Session Goals:**

Upon completion of this session, the participant will be able to:

* Discuss the attention network and load effect, and its impact on students with CVI
* Identify visual fatigue and how it might present
* Understand how complexity and sensory integration impacts vision

**Video:**

* Bennett, R. G. (2020). Aiden shares what it’s like to live with CVI. CVI Now. <https://www.perkins.org/cvi-now/understanding-cvi/aidan-shares-what-its-like-to-live-with-cvi>
	+ Perkins School for the Blind. (2020, November 25). *Aiden shares what it’s like to live with CVI: Impact of color and form accessibility* [Video]. YouTube. <https://www.youtube.com/watch?v=XCRETpuGOnc&list=PLLEUo5gL4-enuXEXFPwcs913Qu8pPxB4V&index=1>
	+ Perkins School for the Blind. (2020, November 25). *Aiden shares what it’s like to live with CVI: Visual attention and difficulty with visual clutter* [Video]. YouTube. <https://www.youtube.com/watch?v=hN8sbMdLMEE&list=PLLEUo5gL4-enuXEXFPwcs913Qu8pPxB4V&index=2>
	+ Perkins School for the Blind. (2020, November 25). *Aiden shares what it’s like to live with CVI: Facial recognition* [Video]. YouTube. <https://www.youtube.com/watch?v=XDUaJdaUxXo&list=PLLEUo5gL4-enuXEXFPwcs913Qu8pPxB4V&index=3>
	+ Perkins School for the Blind. (2020, November 25). *Aiden shares what it’s like to live with CVI: Object recognition* [Video]. YouTube. <https://www.youtube.com/watch?v=NAhv-QUKcP0&list=PLLEUo5gL4-enuXEXFPwcs913Qu8pPxB4V&index=4>
	+ Perkins School for the Blind. (2020, November 25). *Aiden shares what it’s like to live with CVI: Impact of light* [Video]. YouTube. <https://www.youtube.com/watch?v=GeGNNJmMU2w&list=PLLEUo5gL4-enuXEXFPwcs913Qu8pPxB4V&index=5>
	+ Perkins School for the Blind. (2020, November 25). *Aiden shares what it’s like to live with CVI: Impact of motion* [Video]. YouTube. <https://www.youtube.com/watch?v=Hz_0v0nZORg&list=PLLEUo5gL4-enuXEXFPwcs913Qu8pPxB4V&index=6>
	+ Perkins School for the Blind. (2020, November 25). *Aiden shares what it’s like to live with CVI: Visual field abilities* [Video]. YouTube. <https://www.youtube.com/watch?v=Ps1CaO72ZK8&list=PLLEUo5gL4-enuXEXFPwcs913Qu8pPxB4V&index=8>
* Bennett, R. G. (2021, June 9). *CVI and Visual Fatigue* [Video]. Perkinselearning: CVI for the TVI. <https://www.perkinselearning.org/videos/webinar/cvi-and-visual-fatigue>

**Readings:**

* Bennett, R. G. (2021). The science behind visual fatigue and CVI. CVI Now <https://www.perkins.org/cvi-now/understanding-cvi/the-science-behind-visual-fatigue-and-cvi>
* Bennett, R. G. (2021). Why music is my vision: Dagbjort talks about living with CVI as an adult. CVI Now. <https://www.perkins.org/cvi-now/family-stories/why-music-is-my-vision-dagbjort-talks-about-living-with-cvi-as-an-adult>
* Philip, S. S., & Dutton, G. N. (2014, April 27). Identifying and characterizing cerebral visual impairment in children: A review. *Clinical and Experimental Optometry, 97*(3), 196-208. <https://onlinelibrary.wiley.com/doi/full/10.1111/cxo.12155>
* Interview with person from CVI Perspectives Blog (link will be provided)

**Discussion Forum #6:** First post due by the following Wednesday; Response post due by Sunday

Discuss the impact of visual fatigue on one of your students. Describe what visual fatigue looks like for your student. How do you support this student throughout the school day?

 **Final Assignment:** Due the following Sunday (10 days after discussion is posted)

Choose either Harry or Sally. Read the problem scenarios. Based on his/her neurology report, eye report, FVA, video observations, and parent interview, discuss how each scenario might be inaccessible and visually difficult for them. Develop ideas for accessibility, adaptations, and modifications that consider the needs of the whole-child.

**.............................................................................................................................................................**

**Session Seven: Wrap-Up**

**Session Goals:**

Upon completion of this session, the participant will be able to:

* understand how the visual behaviors can impact students with CVI in various ways
* discuss accessibility ideas and creative solutions case study problem solutions
* reflect on how understanding of the brain and the visual system improve their ability to work with individuals with CVI.

**Video:**

* McDowell, N. (2017, September 5). *Nicola McDowell: My CVI Journey* [Video]. YouTube. <https://www.youtube.com/watch?v=H7SoRdMovfI>
* CVI Scotland. (2019, February 25). *BBC Scotland Documentary: Not in plain sight* [Video]. Vimeo. <https://vimeo.com/319804738>
* Reisman, T. (2020, November 11). *Making literacy decisions for children with CVI* [Video]*.* Perkins School for the Blind: CVI for the TVI. <https://www.perkinselearning.org/videos/webinar/making-literacy-decisions-children-cvi-tammy-reisman>

**Readings:**

* St. Clair Tracy, H. (2021, May 6). Nicola McDowell’s Blog: The vision gremlins are back. CVI Scotland. <https://cviscotland.org/news/nicola-mcdowells-blog-29-the-vision-gremlins-are-b-06-05-2021>
* The CVI Perspective. (n.d.). An open letter to all parents, professionals, and other loved ones of folks with cerebral visual impairment (CVI). <https://thecviperspective.wordpress.com/home/>

**Discussion Forum #7:** First post due by the following Wednesday; Response post due by SundayPart 1:React to the accessibility ideas for Harry and/or Sally in the presentation and share two of your ideas from your final assignment.

Part 2: After reading blogs from adults with CVI, describe the anxieties they experience just existing in this world not designed for their unique needs. How does this better help you understand and support children with CVI? How does your understanding of the brain and the visual system improve your ability to assess, observe, and teach kids with CVI?

**.............................................................................................................................................................**

**Fitchburg State University** encourages all Extended Campus students to take advantage of our online student services. We have created a “virtual student center” just for you. Here you will find access to Counseling Services, Career Services, The Student Activity Center, the university bookstore and many other helpful links. You can access our student center by going to the university homepage at <http://www.fitchburgstate.edu> and clicking on Offices and Services. Scroll down and click on Extended Campus Center. You will find links to Library Services, our Virtual Student Center and other important information.

**FITCHBURG STATE UNIVERSITY**

**DISTANCE LEARNING & EXTENDED CAMPUS LIBRARY SERVICES**

**Fitchburg State University** encourages all Extended Campus students to take advantage of our online student services. We have created a “virtual student center” just for you. Here you will find access to Counseling Services, Career Services, The Student Activity Center, the university bookstore and many other helpful links. You can access our student center by going to the university homepage at <http://www.fitchburgstate.edu> and clicking on Offices and Services. Scroll down and click on Extended Campus Center. You will find links to Library Services, our Virtual Student Center and other important information.

The Gallucci-Cirio Library at Fitchburg State University provides a full range of library services including borrowing privileges; document delivery (books and articles mailed to your home); Interlibrary Loan; reference assistance via: phone, email, IM, Blackboard’s Collaborate tools, Skype and in-person; library instruction via online and in-person at extended campus sites; research help and more. Any questions relating to library services should be directed to the E-Learning & Instruction Librarian, at 978-665-3062 or dllibrary@fitchburgstate.edu. There is also a special section for Distance Learning and Extended Campus Services at <https://fitchburgstate.libguides.com/dlservices> outlining the wide range of services available to you and how to access them.  Activate your library account online through our ILLiad system at  https://fitchburgstate.libguides.com/dlservices; from here you can access article, book, and media. Request forms to get items from our library and from other libraries. If you haven't used ILLiad before, you will need to click on the "First Time User? Create Your Account" link and set up your account.

Students who are currently registered with the university may access any of the library’s subscription databases, including an increasing number with full-text, by visiting the Gallucci-Cirio Library’s homepage at<https://library.fitchburgstate.edu/> and clicking on the DATABASES tab in the center of the page. Select the resource you want to access from the alphabetical or subject listing. Once you click on the database title you will be prompted for your Falcon Key logon information; this is the same logon you will use for your Fitchburg State email account and if you have any online Blackboard courses. If you do not know your Falcon Key username and password or if you have any problems logging in, contact the university’s Technology Help Desk at 978-665-4500 or helpdesk@fitchburgstate.edu. The Library can issue you a temporary guest login to access the library's databases while the Technology Department is setting up your account: contact us at 978-665-3062 or dllibrary@fitchburgstate.edu

All registered Fitchburg State University students are eligible for a Fitchburg State University OneCard ID which also serves as his/her library card. If you have not received your OneCard yet, you can still access all of our online services as long as you have activated your library account through ILLiad. After activation by the Gallucci-Cirio Library and receipt of your OneCard, students may access participating Massachusetts State College/University Libraries and you may request an ARC Card to access participating libraries in the Academic and Research Collaborative (ARC) during the current semester. OneCards are available on campus all year round.  Students wanting a OneCard must either complete the online Extended Campus OneCard request form at [https://survey.fitchburgstate.edu/TakeSurvey.aspx?SurveyID=984L9n2#](https://survey.fitchburgstate.edu/TakeSurvey.aspx?SurveyID=984L9n2) or present a course registration confirmation at the One Card Office in the Anthony Building of the main campus. Please call 978-665-3039 for available times or if you have any questions about your One Card.

**UNIVERSITY AND EDUCATION UNIT POLICIES**

**Policy on Disability**

 Disability Services is the primary support system for students with disabilities taking classes in the day and evening divisions. The office is located on the third floor of the Hammond Building and can be reached at 978-665-4020 (voice/relay). If you need course adaptations or accommodations because of a disability, if you have emergency medication information, or if you need special arrangements in case the building must be evacuated, please make an appointment at the beginning of the course to talk with me. It is important that the issues relating to disabilities be discussed with me as soon as possible.

**Attendance and Participation**

1. As an emerging professional, you are expected to attend every class session, to be on time, and to communicate with the instructor regarding any absences. Absences and tardiness may result in a permanent grade change. Attendance at all pre-practicum sessions is mandatory.
2. Participation in class discussions and cooperative groups is expected. All candidates are responsible for meeting required deadlines on projects and assignments; your ability to complete tasks in a timely fashion demonstrates professional maturity and an ability to organize and manage time. Completion of assigned reading is imperative to your individual development as a professional.
3. All of these behaviors regarding attendance, preparation, and meeting deadlines are critical for successful teaching and thus are factored into the final grade.

# **Education Unit Computer Literacy Requirement**

All assignments must be typed, doubled-spaced, and use APA format when appropriate. Refer to Internet Resources for Writing on the Fitchburg State University website for assistance.

You are expected to use word processing for all assignments (unless otherwise instructed). [If your course has other requirements list those also, e.g., ‘You are expected to use email for dialogues with other class members, to examine the use of software in the field, and to use the Internet to obtain information, ideas and resources.’]

**Cellular Telephones and Other Devices**

Kindly turn-off cellular telephones during class time and field experiences and place them in book bags or purses. Please no texting in class. It reflects negatively upon you as a developing professional. Once class begins and if use of the laptop is not required, all laptops should be closed during class time so that your full attention can be focused on your colleagues and the discussion or lecture in progress. If you prefer to take class notes on your laptop, please inform the instructor. You are on your honor to be focused on note taking and not on email, Facebook or other technological enterprise not germane to the class in progress. Thank you in advance for your consideration of colleagues and students.

# **Grade Appeal**

If you disagree with the evaluation of your work or believe an improper grade has been assigned, an appeal may be followed. Please discuss the matter with the instructor and refer to the Fitchburg State University Grade Appeal Policy in the university catalog.

# **Academic Integrity Policy**

The faculty in the Education Unit at Fitchburg State University that work submitted in fulfillment of course requirements will be solely that of the individual candidate and all other sources will be cited appropriately. University Academic Integrity Policy, as outlined in the University Catalogue, will be strictly adhered to.

# **Copyright Policy**

You are reminded that, in preparing handouts for peers or the instructor, reproduction of copyrighted material without permission of the copyright owner is illegal. Such unauthorized copying may violate the rights of the author or publisher. Fitchburg State University adheres to federal laws regarding use of copyrighted materials. See the Electronic Use of Copyrighted Materials on the Fitchburg State University website for more details.

### READING AND RESOURCES

Merabet, L. (2020, December 11). *Visual Processing, Part I* [Video]. YouTube. <https://www.youtube.com/watch?v=oK0fGcZUFXY> (watch first 45 minutes)

St. Clair Tracy, H. (2019). *Lessons* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?cat_id=3>

St. Clair Tracy, H. (2019, February 22). *Lesson 1: Introduction* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=2>

St. Clair Tracy, H. (2019, February 22). *Lesson 1a: the brain* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=3>

St. Clair Tracy, H. (2019, March 4). *Lesson 1b: Occipital Lobes* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=4>

St. Clair Tracy, H. (2019, March 4). *Lesson 1c: Posterior Parietal Lobes* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=5>

St. Clair Tracy, H. (2019, March 4). *Lesson 1d: Middle Temporal Lobes* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=6>

St. Clair Tracy, H. (2019, March 4). *Lesson 1e: Temporal Lobes* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=7>

St. Clair Tracy, H. (2019, March 4). *Lesson 1f: Frontal Lobes* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=8>

St. Clair Tracy, H. (2019, March 4). *Lesson 1g: Conclusion* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=9>

Mazel, E., Tibaudo, M., & Bennett, R. (2021, January 29). *Visual Processing, Part II* [Video]. YouTube. <https://www.youtube.com/watch?v=kJNxa7vKdfk&t=388s>

Bozeman Science (2014). *The Brain* [Video]. YouTube. <https://www.youtube.com/watch?v=kMKc8nfPATI>

Bennett, R. G. (2020) *How is CVI diagnosed*? CVI Now. <https://www.perkins.org/cvi-now/understanding-cvi/how-is-cvi-diagnosed>

Bennett, R. G. (2020) *CVI and the brain: Q&A with Dr. Lofti Merabet.* CVI Now. <https://www.perkins.org/cvi-now/understanding-cvi/cvi-brain-dr-lotfi-merabet>

Siu, C. R. & Murphy, K. M. (2018, April 24). The development of human visual cortex and clinical implications. *Eye and Brain*, *2018*(10), 25-36. <https://www.dovepress.com/getfile.php?fileID=41719>

Hensch, T. K. (2016, February). The power of the infant brain. *Scientific American*, 64-69. <https://henschlab.files.wordpress.com/2016/03/hensch-final-sciam.pdf>

Center on the Developing Child (2007). *The Science of Early Childhood Development* (InBrief). <https://46y5eh11fhgw3ve3ytpwxt9r-wpengine.netdna-ssl.com/wp-content/uploads/2007/03/InBrief-The-Science-of-Early-Childhood-Development2.pdf>

Eagelman, D. (2021, January 15). *Brain Plasticity and What We Can Do With It* [Video]. YouTube. <https://www.youtube.com/watch?v=By0Wv5RAIAc>

St. Clair Helen, T. (2018, April 20). *Neuroplasticity Film* [Video]. YouTube. <https://www.youtube.com/watch?v=By0Wv5RAIAc>

Bennett, R. G. (2021). *The importance of neuroplasticity*. CVI Now. <https://www.perkins.org/cvi-now/understanding-cvi/the-importance-of-neuroplasticity>

Merabet, L. B., Mayer, D. L., Bauer, C. M., Wright, D., & Kran, B. S. (2017, April 10). Disentangling how the brain is “wired” in Cortical/Cerebral Visual Impairment (CVI). *Seminars in Pediatric Neurology, 24*(2), 83-91. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5659284/>

Martin, M. B. C., Santos-Lozano, A., Martin-Hernandez, J., Lopez-Miguel, A., Maldonado, M., Baladron, C., Bauer, C. M., & Merabet, L. B. (2016, December 26). Cerebral versus ocular visual impairment: The impact on developmental neuroplasticity. *Frontiers in Psychology,*  *7*(1958), 1-9. <https://www.frontiersin.org/articles/10.3389/fpsyg.2016.01958/full>

Merrit, P. (2017, March 28). *Vision: From Retina to LGN* [Video]. YouTube. <https://www.youtube.com/watch?v=zYa9TAePOi4&t=27s>

Kaniwasher, N. (2018, April 27). *LGN & V1* [Video]. YouTube. <https://www.youtube.com/watch?v=CvxlN2_bTzY&list=PLyGKBDfnk-iAQx4Kw9JeVqspbg77sfAK0&index=28>

Kaniwasher, N. (2018, April 27). *Retinotopic Maps* [Video]. YouTube. <https://www.youtube.com/watch?v=MhFJIgeY-ZY&list=PLyGKBDfnk-iAQx4Kw9JeVqspbg77sfAK0&index=29>

Bennett, R. G. (2021). *The visual pathways from the eye to the brain*. CVI Now. <https://www.perkins.org/cvi-now/understanding-cvi/the-visual-pathway-from-the-eye-to-the-brain>

Perkins (2021). *CVI visual behaviors*. CVI Now. <https://www.perkins.org/cvi-now/understanding-cvi/understanding-visual-behaviors-and-cvi-characteristics>

Fazzi, E., Signorini, S. G., Bova, S. M., La Piana, R., Ondei, P., Bertone, C., Misefari, W., & Bianchi, P. E. (2007, March). Spectrum of visual disorders in children with cerebral visual impairment. *Jornal of Child Neurology, 22*(3), 294-301. <http://classroster.lvpei.org/cr/images/ARCHEIVE/2019/Rebecca_JC_07-02-2020.pdf>

St. Clair Tracy, H. (2019, March 13). 3a Introduction: Your brain creates your visual world. CVI Scotland. <https://cviscotland.org/lessons.php?id=19>

St. Clair Tracy, H. (2019, March 15). 3j: visual pathways. CVI Scotland. <https://cviscotland.org/lessons.php?id=28>

CVI Scotland (n.d.). The visual field. <https://cviscotland.org/documents.php?did=1&sid=3>

Kaniwasher, N. (2018, April 27). *Beyond V1: Lots of visual areas*  [Video]. YouTube. <https://www.youtube.com/watch?v=yqh9P_nVEMc&list=PLyGKBDfnk-iAQx4Kw9JeVqspbg77sfAK0&index=32>

Bauer, C. (2021, April 14). *Ventral stream functions in CVI: Object and face perception*. Perkins School for the Blind: CVI for the TVI. <https://www.perkinselearning.org/videos/webinar/ventral-stream-functions-cvi-object-and-face-perception>

Bennett, R. G. (2021). *Higher order visual pathways and the CVI brain*. CVI Now. <https://www.perkins.org/cvi-now/understanding-cvi/higher-order-visual-pathways-and-the-cvi-brain>

Perkins (2020). *Understanding visual behaviors and CVI characteristics.* CVI Now. <https://www.perkins.org/cvi-now/understanding-cvi/understanding-visual-behaviors-and-cvi-characteristics>

Atkinson, J. (2017). Visual brain development: A review of “dorsal stream vulnerability”—motion, mathematics, amblyopia, actions, and attention. *Journal of Vision*, *17*(3):26, 1-24. <https://jov.arvojournals.org/article.aspx?articleid=2613613>

Milner, A. D. (2017, March 2). How do the two visual streams interact with each other? *Experimental Brain Research, 235*, 1297-1308. <https://rdcu.be/cliDg>

St Clair Tracy, H. (2021, May 24). *Dorsal stream dysfunction CVI experience*. CVI Scotland. <https://cviscotland.org/mem_portal.php?article=191>

Teach CVI Project (2015). *Screening Tools*. <https://www.teachcvi.net/screening-tools>

Dutton, G. (2015). Questions to ask parents and caregivers of children with CVI. In A. H. Lueck & G. N. Dutton (Eds.), *Vision and the brain: Understanding Cerebral Visual Impairment in Children*, pp. 270-274. New York, NY: AFB Press. https://www.ulster.ac.uk/\_\_data/assets/pdf\_file/0003/167457/Visual-Skills-Inventory-Younger-Child-4-8-years.pdf

Kanwisher, N. (2018, May 10). *Evidence from brain damage for the two pathways* [Video]. YouTube. <https://www.youtube.com/watch?v=qVDRUiIduEQ&list=PLyGKBDfnk-iAQx4Kw9JeVqspbg77sfAK0&index=34>

St. Clair Tracy, H. (2020). *Level 7 Lessons: CVIs Movement and Dorsal* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?cat_id=9>

St. Clair Tracy, H. (2020, February 24). *7a Dyskinetopsia* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=42>

St. Clair Tracy, H. (2020, February 24). *7b Optic ataxia* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=43>

St. Clair Tracy, H. (2020, February 24). *7c Simultangastic Vision* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=44>

St. Clair Tracy, H. (2020, February 24). *7d Apraxia of Gaze* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=45>

St. Clair Tracy, H. (2020). *Level 8 Lessons: CVIs Ventral* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?cat_id=10>

St. Clair Tracy, H. (2020, February 24). *8a CVI and Recognition Introduction* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=46>

St. Clair Tracy, H. (2020, February 24). *8b Impaired Facial Recognition* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=47>

St. Clair Tracy, H. (2020, February 24). *8c Impaired Recognition of Facial Expressions* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=48>

St. Clair Tracy, H. (2020, February 29). *8d Impaired Route Recognition* [Video]. CVI Scotland. <https://cviscotland.org/lessons.php?id=49>

St Clair Tracy, H. (2021, April 29). CVI-SIM Virtual reality progress videos. CVI Scotland. <https://cviscotland.org/mem_portal.php?article=267>

Ray, D., Hajare, N., Roy, D., & Banerjee, A. (2020, May 1). Large-scale functional integration, rather than functional dissociation along dorsal and ventral streams, underlies visual perception and action. *Journal of Cognitive Neuroscience, 32*(5), 847-861. <https://direct.mit.edu/jocn/article/32/5/847/95452/Large-scale-Functional-Integration-Rather-than>

Das, M., Bennett, D. M., & Dutton, G. N. (2007, November). Visual attention as an important visual function: an outline of manifestations, diagnosis and management of impaired visual attention. *British Journal of Ophthalmology*, *91*(11), 1556-1560. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2095436/>

Bennett, C. R., Bauer, C. M., Bailin, E. S., & Merabet, L. B. (2020, January). Neuroplasticity in Cerebral Visual Impairment (CVI): Assessing Functional Vision and the Neurophysiological Correlates of Dorsal Stream Dysfunction. *Neuroscience and Biobehavioral Reviews, 108*, 171-181. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6949360/pdf/nihms-1545356.pdf>

Bennett, R. G. (2020). Aiden shares what it’s like to live with CVI. CVI Now. <https://www.perkins.org/cvi-now/understanding-cvi/aidan-shares-what-its-like-to-live-with-cvi>

Perkins School for the Blind. (2020, November 25). *Aiden shares what it’s like to live with CVI: Impact of color and form accessibility* [Video]. YouTube. <https://www.youtube.com/watch?v=XCRETpuGOnc&list=PLLEUo5gL4-enuXEXFPwcs913Qu8pPxB4V&index=1>

Perkins School for the Blind. (2020, November 25). *Aiden shares what it’s like to live with CVI: Visual attention and difficulty with visual clutter* [Video]. YouTube. <https://www.youtube.com/watch?v=hN8sbMdLMEE&list=PLLEUo5gL4-enuXEXFPwcs913Qu8pPxB4V&index=2>

Perkins School for the Blind. (2020, November 25). *Aiden shares what it’s like to live with CVI: Facial recognition* [Video]. YouTube. <https://www.youtube.com/watch?v=XDUaJdaUxXo&list=PLLEUo5gL4-enuXEXFPwcs913Qu8pPxB4V&index=3>

Perkins School for the Blind. (2020, November 25). *Aiden shares what it’s like to live with CVI: Object recognition* [Video]. YouTube. <https://www.youtube.com/watch?v=NAhv-QUKcP0&list=PLLEUo5gL4-enuXEXFPwcs913Qu8pPxB4V&index=4>

Perkins School for the Blind. (2020, November 25). *Aiden shares what it’s like to live with CVI: Impact of light* [Video]. YouTube. <https://www.youtube.com/watch?v=GeGNNJmMU2w&list=PLLEUo5gL4-enuXEXFPwcs913Qu8pPxB4V&index=5>

Perkins School for the Blind. (2020, November 25). *Aiden shares what it’s like to live with CVI: Impact of motion* [Video]. YouTube. <https://www.youtube.com/watch?v=Hz_0v0nZORg&list=PLLEUo5gL4-enuXEXFPwcs913Qu8pPxB4V&index=6>

Perkins School for the Blind. (2020, November 25). *Aiden shares what it’s like to live with CVI: Visual field abilities* [Video]. YouTube. <https://www.youtube.com/watch?v=Ps1CaO72ZK8&list=PLLEUo5gL4-enuXEXFPwcs913Qu8pPxB4V&index=8>

Bennett, R. G. (2021, June 9). *CVI and Visual Fatigue* [Video]. Perkinselearning: CVI for the TVI. <https://www.perkinselearning.org/videos/webinar/cvi-and-visual-fatigue>

Bennett, R. G. (2021). The science behind visual fatigue and CVI. CVI Now <https://www.perkins.org/cvi-now/understanding-cvi/the-science-behind-visual-fatigue-and-cvi>

Bennett, R. G. (2021). Why music is my vision: Dagbjort talks about living with CVI as an adult. CVI Now. <https://www.perkins.org/cvi-now/family-stories/why-music-is-my-vision-dagbjort-talks-about-living-with-cvi-as-an-adult>

Philip, S. S., & Dutton, G. N. (2014, April 27). Identifying and characterizing cerebral visual impairment in children: A review. *Clinical and Experimental Optometry, 97*(3), 196-208. <https://onlinelibrary.wiley.com/doi/full/10.1111/cxo.12155>

McDowell, N. (2017, September 5). *Nicola McDowell: My CVI Journey* [Video]. YouTube. <https://www.youtube.com/watch?v=H7SoRdMovfI>

CVI Scotland. (2019, February 25). *BBC Scotland Documentary: Not in plain sight* [Video]. Vimeo. <https://vimeo.com/319804738>

Reisman, T. (2020, November 11). *Making literacy decisions for children with CVI* [Video]*.* Perkins School for the Blind: CVI for the TVI. <https://www.perkinselearning.org/videos/webinar/making-literacy-decisions-children-cvi-tammy-reisman>

St. Clair Tracy, H. (2021, May 6). Nicola McDowell’s Blog: The vision gremlins are back. CVI Scotland. <https://cviscotland.org/news/nicola-mcdowells-blog-29-the-vision-gremlins-are-b-06-05-2021>

The CVI Perspective. (n.d.). An open letter to all parents, professionals, and other loved ones of folks with cerebral visual impairment (CVI). <https://thecviperspective.wordpress.com/home/>