Using Universal Design for Learning as a way to provide Access to Learning in Childhood Cancer Survivors

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Children who survive cancer

Survival rates have increased, and treatment not only focuses on treating cancer itself, but also on providing for the changes a person goes through during and after cancer. According to the National Center for Chronic Disease Prevention and Health Promotion (2002), the most common cancer types among children are acute lymphocytic leukemia (ALL) and brain tumors.

Learning in children who survive cancer

The learning process of children who survive cancer is impacted by cancer itself and/or by its treatment. The treatment of ALL and brain tumors involves the administration or combination of chemotherapy, cranial radiation therapy and surgery (Moore, 2005). Despite the differences between ALL and brain tumors, neurocognitive deficits can be similar because treatment usually involves both chemotherapy and radiation (Butler and Mulhern, 2005). However, individual differences should always be acknowledged.

Chemotherapy and radiation damage blood vessels that carry nutrition and oxygen to the brain, which results in calcifications (Sumpter, 2005). Chemotherapy and radiation can also interfere with the development of myelin (Sumpter, 2005). Since white matter is developing during childhood, the brain is especially vulnerable to damage produced by chemotherapy and radiation (Moore, 2005).

- Myelinization of the frontal lobe- responsible for planning, working memory and goal-oriented activity- is achieved at puberty (Spitzer, 1999) .
- White matter is associated with widely distributed functions in the brain, such as attention and information processing speed (Mulhern and Palmer, 2001).

Improved quality of life

Access to learning

Brain networks

Recognition networks

Common neurocognitive symptoms involve deficits in attention and concentration (Butler and Mulhern, 2005), information processing efficacy (Butler and Copeland, 2002), visual perceptual ability (Anderson, Rennie, Ziegler, Neglia, Robison, & Gurney, 2001), and memory (Sumpter, 2005). However, children who survive cancer are still capable of analyzing information if they are given appropriate instructions and time to process the material.

Strategic networks

Children who survive cancer can loose some body parts, and hence, their ability to use these body parts to aide them in learning and in expressing themselves. Cancer treatments can produce deficits in executive functions, impacting the ability to plan, organize behavior and allocate attentional resources (Mulhern, and Palmer, 2001). Cancer survivors can have well-defined opinions about their likes and dislikes and how things should change (Bessell, 2001). Thus, they can discriminate what they like and do not like, an ability that can facilitate their decision-making process.

Affective networks

The impact cancer has on the emotional life can have a dramatic change in the lives of cancer survivors and their

Supporting learning through the universal design for learning framework:

Supporting the recognition network

Presenting information through different routes, via lectures, digitized text, and other kinds of demonstrations (Meyer and Rose, 2005) can help children who have trouble perceiving or interpreting visual information, access the information provided. For children with attention and concentration issues, highlighting critical features and providing multiple examples can help them focus their attention on what is really important, and facilitate their information processing skills.

Supporting the strategic networks

By giving options to children who survived cancer on how to express their knowledge, teachers can empower learners to choose the medium in which they can express themselves best.

Providing flexible models of skilled performance, granting opportunities to practice with supports and giving ongoing feedback (Rose, Meyer, Strangman, & Rappolt, 2002) can help students who might have difficulties in planning and organizing behavior by guiding them throughout the execution of the skill and teaching them how plan and organize better.

Supporting affective networks

Given that cancer and its treatment can cognitively affect

Universal Design for Learning

Drawing from neuroscience and technology, the universal design for learning framework seeks to provide access to learning for all, offering built-in flexibility to the curriculum (Meyer and Rose, 2005).

Universal Design for Learning Principles

Meyer and Rose (2005) identify three inter-connected brain networks that take part in learning:

- The recognition networks receive and analyze information.
- The strategic networks plan and perform action.
- The affective networks evaluate and establish priorities.

Cancer and its treatment can have an effect on these three brain networks, resulting in a varied palette of strengths and weaknesses. Supporting each of these networks is essential for learning (Meyer & Rose, 2005).

Each of the three principles corresponds to a specific brain network (Meyer and Rose, 2005):

- The recognition networks are supported by providing multiple, flexible methods of presentations.
- The strategic networks are supported by providing multiple, flexible methods of expression and apprenticeship.
- The affective networks are supported by providing multiple, flexible options for engagement.

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