The STEAM Journal

Volume 3
Issue 2 *Standing Still*

Article 7

December 2018

STEAM Lessons from the Forest: Ingenuity, Instruments and Autonomy

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STEAM is a bi-annual journal published by the Claremont Colleges Library | ISSN 2327-2074 | http://scholarship.claremont.edu/steam

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Abstract

This article discusses a case study of an environmental art camp that was modeled after choice-based pedagogies. At this camp the children were able to choose their activities, and taught how to think and work like an artist/scientist using a sketch/field book as a guiding instrument for their inquiry and empowerment. What was found was that three pillars of empowerment formed a foundational structure consisting of three interrelated factors that inspired the campers: 1) ingenuity, 2) a useful instrument, and 3) autonomy. Cultivating the artist/scientist habits gave the students the ingenuity or practical knowledge and understanding of how the roles intersect and are interrelated.

Keywords

STEAM, TAB, Reggio, Forest Kindergartens, Autonomy, Ingenuity

Cover Page Footnote

IRB approved for this study.

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There is a notion of education that envisions happy, wide-eyed children quietly in rows of desks, raising their hands and speaking only when called on, as they are portrayed as proverbial vessels being filled with knowledge by the all-knowing teacher. While this view is laden with hyperbole, it is also vastly unrealistic. Children are not cogs in a wheel, they are intelligent, individuals with distinctive thoughts and interests. This article takes a look at what happens when a child-centered approach to learning intersects with STEAM education at a summer camp where traditional dogmas are removed and children get the opportunity to become artists and scientists with the confidence to inspire ingenuity, proper instruments to record and reflect on ideas, and empowerment through autonomy.

Child-Centered Approaches

Child-centered approaches change the dynamic of instructional leadership. Rather than a top-down, teacher-led curriculum, children and their interests lead the instruction and the teacher facilitates the learning (Moyer, 2001). When children are engaged in topics they find interesting they become motivated to learn (Katz & Chard, 2000). Three examples of child-centered learning are the Reggio Approach, the Forest Kindergarten model, and Teaching for Artistic Behaviors (TAB) learning environments.

The Reggio Approach is named after the town in Northern Italy, Reggio Emilia, where it originated. Children are viewed as independent researchers and focus learning around their interests (Wurm, 2005; Malaguzzi, 1993). Projects and educational themes stem from inquiries

made by the children that could last from one day to several weeks. Building, creating, exploring, and painting are used to make sense of their world and form concrete understanding (Hunter-Doniger, et al., 2018; Griebling, 2011). Another example of a child-center model from Europe is Forest Kindergartens.

The premise of Forest Kindergartens is that they spend nearly the entire school day outside as nature is at the center of the learning (Powers-Costello, 2015). Children's play is often sparked by flora and fauna and their imagination and creativity becomes the foundation for the lessons (Schäffer & Kistemann, 2012). Teachers bring some supplies or tools they might need and encourage the children to explore and ask questions. While it appears to be "free-range learning" there are specific tasks, standards, and goals that are accomplish throughout the school year (Sobel, 2014). Similar to the Reggio Approach, Forest Kindergartens rely heavily on the arts as a catalyst for engagement and comprehension as does TAB.

Teaching Artistic Behaviors or TAB is a child-centered approach where children are encouraged to think, paint, and draw like an artist. The TAB approach is typically found in an art room where children are taught how to use materials and then they are given "studio time" to create an original work of art. They learn from their mistakes and become independent critical thinkers and problem solvers (TAB, 2016). The goal is not to have 25 projects that are exactly the same at the end of class, the emphasis is on content and artistic experience (Parks, 1992). A TAB art room may have fifteen different projects in progress at one time as the art teacher works with individual students as they need assistance.

Methods

The camp for this case study was located on a remote intercoastal property that belongs to a moderately sized university in the Southeastern United States. The qualitative method of intrinsic case study was chosen as the best method to investigate the research question. An intrinsic case study is one that is carried out because the case itself is of interest (Stake, 1994).

The research question (How do children respond to the intersection of art and science in a child-centered outdoor learning environment?) was investigated on site to better understand the connection itself rather than using the case as an instrument to understand a larger, generalizable issue (Cresswell, 2013). The participants were selected as a convenient sampling of 20 campers ages 8-10 and 5 counselors.

The Location

The property for Camp Innovate (pseudonym) immersed the campers in nature with over 864 acres of meadows, wetlands, long-leaf pine forests, and brackish water ponds along the inter-coastal waterways in the Southeastern United States. A generous benefactor bequeathed this property to the university with the vision to share the beauty and history with children of the area. The notion of STEAM and art infusion parallels the benefactor's lifelong career as an ornithologist, renowned fowl artist, hunter-turned-conservationist, global explorer, author, and nature enthusiast. Camp Innovate was a pilot program that envisioned inspiration and opportunities in art and science while young children were surrounded by nature.

Nurturing Learning in Nature

Having experienced mostly traditional forms of schooling, the children needed to be deprogrammed from a teacher directed or goal-based learning style to a child-centered approach. This required the children to be taught several habits of being an artist/scientist for observations and exploring. Children were taught that the crossover between disciplines in STEAM is not a new concept. For centuries, scientists had to be able to depict their ideas, inventions, and discoveries through sketches, drawings, and paintings since technologies such as cameras were not yet invented. Likewise, artists, such as Leonardo Di Vinci did research and recorded findings and ideas in notebooks. Forming artist/scientist habits empowered the children to observe and record information. Nurturing this type of thinking involved an individual approach to critical thinking that encompassed their interests and deep investigations. Once the children were familiar with a model for learning where their ideas were important and should be recorded, they were given sketch/field journals as an instrument to develop the habits of scientists and artists. Furthermore, the child-centered approach was an enriching atmosphere for the children to explore possibilities in a non-threatening learning environment. As they began to try out their new sense of empowerment, the children embraced STEAM education. The lines between disciplines became blurred and curiosities, by and large, crossed subject areas. While the case study is too small to be generalizable, the findings are notable.

Findings

Even though the curriculum for this summer STEAM camp was meticulously planned to allow for the intersection of multiple disciplines in every activity, modifications were necessary.

First and foremost, while the child-centered approach to learning is widely successful in Europe, at this camp the children were lost without direction. The use of the sketch/field journals helped form artist/scientist habits of observation and recording their thoughts and ideas. During the choice activity time, the sketch/field journals assisted in scaffolding learning by allowing the children to envision, stretch, and explore. Requiring a written or drawn reflection from the students was counter-productive to a child-centered approach, but it was a necessary bridge to guide the children into deeper exploration of STEAM subjects.

The child-centered approach gave the children the opportunity to explore multiple possibilities once they learned the camp activities were not a contest to get done but rather a journey of exploration. It appeared that for the children in this case study, envisioning and stretching, and exploring were not part of an innate skillset. Issues developed during the child-centered time when the educational roles were switched from teacher-led to student-led. The children were familiar with a teacher stating exactly what to do to complete a task, but when there were no explicit directions, the children were at a loss. The children needed instruction on how to explore, inquire, and essentially play on their own. After the students were given the tools, and taught the habits, the children's innovation and communication skills were amplified.

Artists are sometimes at a loss when looking at a blank, white canvas, and scientists are sometimes dumbfounded when considering the infinite possibilities of space. This was the case with the children's first encounter with pure autonomy. The children had no idea how to proceed without an adult telling them what was right or wrong. It was essential to teach the children a procedure for inquiry and exploration where they felt comfortable not having a teacher tell them what to do. Had the camp lasted longer, the counselors could have let the children figure things out on their own, but time was limited and structure was definitely needed. However, with the

structure, the children were able to not only choose their activity, they also implemented their artist/scientist habits and used the sketch/field journal as a guiding instrument for their inquiry. This created three pillars of empowerment (see Figure 1).

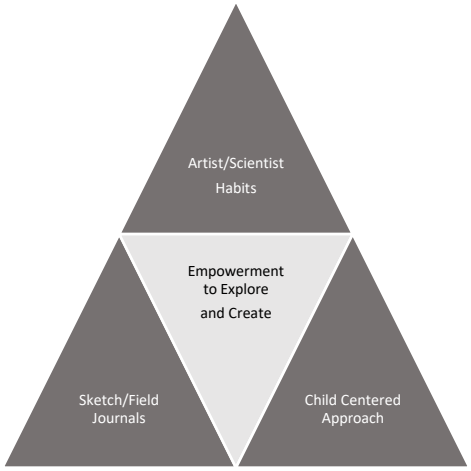

Figure 1

Three Pillars of Empowerment	**Interrelated Factors**	**How this empowered the children to explore and create.**
Artist/Scientist Habits	Ingenuity	The practical knowledge of a specific role and how it intersects with other areas.
Sketch/Field Journal	Instrument	The instrument allows a child to record their thoughts and ideas as something of value to be saved and revisited.
Child-Centered Approach	Autonomy	A pedagogy that embraces freedom for the children to be in charge of their own learning opportunities and explorations.

The three pillars of empowerment formed a foundational structure consisting of interrelated factors that inspired the campers: 1) ingenuity, 2) a useful instrument, and 3) autonomy. Cultivating the artist/scientist habits gave the students the ingenuity or practical knowledge and understanding of how the roles of artist/scientist intersect and are interrelated. This made the use of the sketch/field journal an essential instrument, because it allowed the children to record their

thoughts, ideas, and predictions. The children valued their journals enough to save and revisit them at the end of camp. The child-centered model provided a pedagogical structure that embraced freedom so the children could take control of their learning and creativity. When the disciplines were removed from their silos and the counselors became guides rather than 'all-knowing' an avenue for the intersection of STEAM subjects was created. In the end, the three pillars of empowerment allowed for a unique learning space.

Closing

The autonomy found in the child-centered model, paired with the ingenuity of the artist/scientist habits, and the sketch/field journal as an essential instrument created this space where children were free to explore and create. The children knew they were not in school, but they were learning. They knew that they were in charge of what they were learning, but a counselor was always nearby to assist if needed. The children knew they could create and make mistakes and correct them on their own. The campers learned that they could envision what they would do, and then they could stretch and explore beyond what they imagined. Essentially they became empowered to explore ideas and opportunities at the intersection of disciplines. When students are given proper instruments, the ingenuity to use them, and the autonomy to explore, they are empowered to expand and try new opportunities and ideas.

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