Tennessee Association for Childhood Education International

International Journal of the Whole Child

Volume 9, Number 1
January 2024-May 2024
ISSN 2474-297X

International Journal of the Whole Child

International Journal of the Whole Child

Table of Contents

Volume 9 Number 1 2024

Introduction

This Spring issue provides readers with a variety of topics that include nature-based learning, the implications of screen time, how STEM experiences impact cognitive development, and how coaches can impact the mental health of youth athletes. There is also information on student questioning, strategies to empower independent learners, and the utilization of in-class simulations as an effective pedagogy. The International Journal of the Whole Child continues to be committed to promoting holistic learning and the development of the whole child.

Article #1:
Teacher Perceptions of Elasticity in Student Questioning
Brian Stone, Rachael Pearson

The authors of this article discuss the importance of teachers cultivating an elastic learning environment in their classrooms. The authors include the findings of their pilot study to illustrate the benefits of taking an elastic approach with students. In addition, the authors suggest different ways for teachers to increase the elasticity of their classrooms via teacher training, professional development, and administrative support.

Article #2
4-H Forestry: Using Nature-Based Programming to Enhance Positive Youth Development Outcomes
Amy Long

The author of this article explains the importance of positive youth development (PYD) practices and how they can be enhanced by incorporating nature-based experiences. In addition, the author gives an overview of The Thrive Naturally 4-H Forestry Program and how it was used to generate research data via post program surveys. Their findings support the program's capacity to benefit both children and their caregivers.

Teacher Talk: Theory to Practice
Failing to Learn, Learning to Fail: Strategies to Create Empowered and Independent Learners
Lando Carter, Katie Schrodt, Bonnie Barksdale

The authors discuss the importance of using failure as a catalyst for future success. This involves fundamentally altering the way students currently perceive failure through the implementation of positive alternatives like the Language of Failure Quote Bank, Failure Self-Talk Quote Bank, Failure Indices, Brave Speller Chart Sample, Got It and Gonna Get It Card Sorters, and Due Date Windows. The authors encourage teachers to use authentic examples, self-disclosure, and creativity to demonstrate to students the power of failure in the pursuit of learning.

Tech Talk

Screen Time: Issues and Recommendations

Nancy Caukin

The author discusses the different forms of screen time, as well as the potential consequences unrestricted screen time can have on childhood development. In addition, the article provides recommendations for appropriately monitoring screen time for different age groups. Furthermore, the author highlights specific resources to help parents implement strategies to manage their child's screen time and generate more positive outcomes.

Science, Technology, Engineering, Art, and Mathematics: STEAM

The Impact of Authentic Early Childhood STEM Experiences on Cognitive Development

Brian Stone

The author of this article discusses STEM education and the corresponding positive impact it has on the cognitive development of young children. In addition, the article explains the importance of allowing children the opportunity to engage in play, to inquire, to follow their interests/curiosities, to develop STEM identities, and to be creative. The author provides recommendations for educators and parents looking to implement STEM activities within these contexts.

Families and Children: Health and Wellness

Mental Health of Youth Athletes and the Roles of Coaches

Chandler Coley, Tiffany Wilson

The authors discuss how the popularity of sports in America could serve as an opportunity to provide mental health related services to youth athletes. In addition, the article explains how coaches' existing influence on the lives of their players makes them ideal candidates to facilitate the delivery of these mental health related services. The authors describe coaches and players' perceptions of mental health, the perception to change, and the recommended next steps towards implementation.

Play: Development, Learning, Therapy

Changing Students Belief in a Just World: In-Class Simulations as Effective Pedagogy

Susan Elswick, Peter A. Kindle, David H. Johnson, Brooke Blaalid, Laura Brierton Granruth, Elena Delavega, Michael L. Burford, Jeffrey D. Thompson

The authors discuss existing literature pertaining to cognitive dissonance, learning, and game and simulation practices in training future school-based mental health professionals. In addition, the authors describe the results of their quasi-experimental non-random comparison group study covering one simulation activity. Furthermore, the article seeks to provide guidance on how to implement simulations.

Education by the Numbers
Donald Snead

The data provided by the author in "Education by the Numbers" discuss the correlation between education attainment and employment.

Education: Words and Meanings
Multiage: Words and Meanings
Sandra Stone

The author of this article provides a definition of Multiage Education and articulates the differences between the Multiage System and the Graded System. In addition, the author includes a table that clarifies the distinctions among different systems as well as examples falling into each category. This article serves to give readers a deeper, more informed understanding of how multiage was intended to be used in an educational context.

Pictures for Reflection
Growing Up is a Playful Way to Go
Kathy Burris, Larry Burris

The authors discuss how a simple metal frame can be used in a multitude of ways to inspire imagination and play.

Page Turners: Books for Children
Michelle J. Sobolak, Patricia Crawford, Maria Genest, Katrina Bartow Jacobs, Carla K. Meyer,

In this article, different children's books are listed with descriptive summaries on each one. The books include: *Agatha May and the Angler Fish; Big; Hello, Puddle!; Kitty; The Last Stand; Oh, Panda; Rabbit, Duck, and Big Bear; What's Inside a Caterpillar Cocoon? (And Other Questions about Moths and Butterflies); Freaky Heart.*

International Journal of the Whole Child
2024, VOL. 9, NO. 1

Teacher Perceptions of Elasticity in Student Questioning

Brian Stone[a], Rachael Pearson[b]
[a]Northern Arizona University, [b]Kyrene School District

Dr. Brian Stone is an Assistant Professor at Northern Arizona University. He is the faculty lead for the Professional Development School program and the Museum of Northern Arizona Partnership program at NAU. He received his doctorate in curriculum and instruction with a content concentration in science and math education. He also holds two master's degrees, one in elementary education, and another in World War II studies. He teaches both undergraduate and graduate courses, including courses in the doctoral program. Dr. Stone specializes in science education, but also teaches methods courses in social studies, math, literacy, and assessment. While at NAU, Dr. Stone has led multiple study abroad trips all around the world to study multiage education and integrated curriculum. He has taken students to New Zealand, Australia, the United Kingdom, Ireland, Germany, Austria, Switzerland, and France. Dr. Stone also serves as the editor for the STEAM section of the International Journal of the Whole Child. He is a Play Ambassador and recurring Expert Contributor for the Genius of Play (a non-profit website devoted to play advocacy), which is a part of The Toy Association. Dr. Stone has many areas of expertise and interests including scientific inquiry, play, integrated curriculum, and multiage education. Prior to teaching in higher education, Dr. Stone served as a 4th, 5th, and 6th grade multiage teacher. He was the lead multiage teacher in his school and helped other multiage teachers in their implementation of multiage strategies in the classroom. He also works as an educational consultant, traveling all over the United States and around the world helping schools with multiage programs. Dr. Stone has authored many peer-reviewed journal articles and book chapters in the aforementioned areas.

Rachael Pearson is an elementary school teacher in Phoenix, Arizona. She is currently in her eighth year of teaching, all in third grade. She received her undergraduate degree from Northern Arizona University (NAU) in Elementary Education, with a certificate in Early Childhood Education, and a Spanish Minor. She also holds a master's degree from NAU in Elementary Education with a K-8 reading emphasis as well as a second master's degree from Boston College in Educational Leadership & Policy. Rachael has served on various school and district wide committees including one focusing on diversity and equity initiatives. She is also a Play Ambassador for the Genius of Play which is part of The Toy Association. In her free time, Rachael enjoys hiking, traveling, cooking, and spending time with family and friends.

Teacher Perceptions of Elasticity in Student Questioning

Abstract

Elasticity, the capacity for students to explore or investigate their own questions of interest during or after teacher-directed events in the classroom, is highly beneficial for students in terms of their retention and deeper understanding of the content. An elastic environment is child-centered and inquiry-based. An inelastic environment (teacher-directed) results in students refraining from asking, investigating, or exploring their interests/curiosities. Teachers' perceptions of their classroom environments become an important consideration when evaluating their ability to enact elastic explorations. In this pilot study, teachers (two separate public-school districts) completed surveys describing perceptions of elasticity in their classrooms. Results indicate teachers' high value for elasticity in learning, inquiry-based investigating, and authentic student questioning. However, most teachers describe their environments as highly inelastic due to multiple barriers including time, standards, testing, stress, and a lack of training. The authors discuss potential pathways for increasing elastic environments including teacher training, professional development, and administrative support. The authors also discuss the relationship between teachers' beliefs and developing an elastic classroom environment.

Keywords: Inquiry, Questioning, Child-Centered, Constructivism, Elasticity

Introduction

Teacher perceptions remain a critical component in implementing curriculum in elementary classrooms. These perceptions generate from a combination of training in theoretical knowledge and practical classroom experience. An exploration of teachers' perceptions provides valuable information regarding whether teachers believe themselves to be child-centered or teacher-directed (Luan et al., 2010). The current design follows previous research exploring teacher perceptions of child-centered learning (Greaves & Bahous, 2020; McCombs et al., 2008). Specifically, narrative data in this study describe elementary (kindergarten through fifth grade) teachers' perceptions of the concept of elasticity in three schools (from two distinct districts and regions) located in the Southwest.

The authors define elasticity as the capacity for children to pose and explore their own questions of interest during or after a teacher-directed event (lesson). If the children do not pose or explore their own questions, the environment is considered inelastic. Previous research describes the benefits of student-directed inquiry in multiple subject areas (Patchen & Smithenry, 2013; Stone, 2016; Stone, 2020). However, the existing data describing teachers' perceptions associated with elasticity are minimal. In particular, there is a paucity of data regarding the perceived existence of elasticity in the classroom environment, its overall effectiveness, and the barriers diminishing its implementation. Therefore, the purpose of this current pilot study is to investigate general elementary teachers' perceptions of elasticity in their own classrooms with particular regard for self-described usage, perceptions of the value for creating elastic environments, and the perceived barriers to elasticity.

Authentic Inquiry and an Open-Ended Process

Student-directed inquiry is a way of thinking that supports students developing explanations using evidence and logic. It is an active process that resides within the individual (Crawford, 2015). These evolving student processes are guided and supported by the teacher. However,

many classroom teachers use outdated practices by not facilitating learning or thinking in the manner of real scientists (Crawford, 2015). Children become limited in their capacity to ask questions and may be unable to embark upon research processes involving free exploration of the content, experimentation, and construction of understandings (Stone, 2016).

Inquiry, within an understanding of constructivist theory, emphasizes the "active task of the subject and the significance of his/her inner presumptions" (Serafin et al., 2015, p. 593). Individuals build their understandings through personally meaningful and relevant experiences, and they should have plenty of opportunities to ask their own questions (Brooks & Brooks, 2001). Fosnot (2005) suggests that constructivist teaching gives learners the chance for "concrete, contextually meaningful experience through which they can search for patterns; raise questions; and model, interpret, and defend their strategies and ideas" (p. ix). This means, as children build understandings, their ability to question is paramount to navigating content and constructing meaning. Furthermore, questioning is a fundamental tool to "resolve a curiosity and grapple with trying to understand the answer" (Vale, 2013, p. 681). Children construct knowledge through relevant, meaningful, active experiences and questions (inquiries), which provide the mode for continual exploration (Lister, 2015).

However, education often focuses on the "game of facts rather than the exploratory root of scientific process," and if students "are placed in an environment that does not encourage active questioning, then that skill will not become an active habit of the mind" (Vale, 2013, p. 681). Rubin (2018) suggests that teachers ask, "all the questions and the students' job is to supply the correct answers" (para. 4). These "teacher-directed" questions are common; in contrast, when students ask their own questions (and subsequently explore/research), discourse is promoted, and creative thinking will ensue (Peters & Stout, 2006). Standards, testing, coverage mindsets and prescribed curricula (collectively referred to as "instructionism") negate the potential for elasticity (Zion & Mendelovici, 2012). Questioning is a critical component of constructivism, as inquiries remain rooted in interest, prior knowledge, and the child's unique interpretation of the world (Lister, 2015; Walker & Shore, 2015). A child's questions become expressions of innate curiosity, an attempt to understand, a starting point for investigation and process-oriented activity and are intrinsically motivated (Aulls & Shore, 2008; Stone et al., 2019).

Elasticity, Self-Motivation and Students' Inquiries

Elasticity fits well (or is evident) in an autonomy-supportive environment, as teachers in these types of classrooms guide students' personal constructions of knowledge by nurturing their interests, curiosities, and questions (Reeve, 2006). An autonomous learning environment leads to higher academic achievement and enjoyment of school (Furtak & Kunter, 2012). In contrast, controlling teachers interfere with students' self-determination because they require students to adhere to their strict agenda (Reeve, 2006; Furtak & Kunter, 2012). Furthermore, "the starting point for a controlling motivating style is the prioritization of the teacher's perspective to the point that it overruns the students' perspective" (Reeve, 2009, pp. 160-161).

Constructivist teachers utilize and foster inquiry processes; in contrast, teachers who gravitate towards passively delivering curriculum eliminate opportunities for students to construct their own knowledge (Brooks & Brooks, 2001). Previous research suggests that teachers who

implement such strategies as “Inquiry-Based learning, Project-Based Learning, Problem-Based Learning, Genius Hour, Passion-Based Learning, Personalized Learning, and Open Inquiry” share the common belief that it is critical teachers provide students with choice and autonomy in the classroom (Buchanan et al., 2016, p. 25). This pilot study contributes to these foundations an understanding of teachers’ self-ascribed value for elastic environments in their classrooms and, describes barriers they believe preclude such inquiry strategies.

Teachers often impose limitations because they follow the demands of prescribed curricula. In remaining teacher directed, they do not allow students the freedom to explore through the mode of their authentic inquiries (Stone, 2020). Despite these well-known barriers to student questioning, the literature describing teachers’ perceptions with regard to students’ authentic questioning and the construct of elasticity remains sparse.

Theoretical Foundations

This current research project is situated in a constructivist framework. Eick and Reed (2002) suggest inquiry is rooted in constructivism, and it is highly child-centered (Levy et al., 2010). Walker and Shore (2015) suggest inquiry-based learning is a key component of social constructivism and necessary for reform. Lister (2015) elaborates on this connection by suggesting that constructivism is rooted in and shaped by one’s experiences, is a personal interpretation of the world and that authentic, student-directed inquiry is the primary mode through which children construct knowledge.

Guiding Questions and Methodology

Research Questions

Based on previous literature and definitions of elasticity and inelasticity, the researchers asked the following questions:

- According to teacher perceptions of their own pedagogy and classroom environments, do their students exhibit elasticity in their questioning after teacher-directed events (lessons, teacher-directed questions, uniform assessments)?
- Are children afforded the time and resources/materials needed to explore their own questions of interest despite teacher-directed instruction, or in place of teacher-directed instruction?
- What are the teachers’ perceptions of the value of an elastic environment?
- What are the teachers’ perceptions of the barriers to an elastic environment?

Data Sources and Procedures

Data was collected through a qualitative, descriptive survey (Bogdan & Biklen, 2006). Ninety kindergarten through fifth grade teachers from three schools in two separate districts in the Southwest were asked to participate; fourteen teachers volunteered to complete the online survey.

A ten-question survey was sent to the teachers as shown in Table 1. All participation was on a voluntary basis, and teachers were given an online consent form as well as an explanation of the research in the recruitment email.

Participants were provided with a two-week period to complete the online survey. After the conclusion of the open-survey period, the researchers used the coding structures of open, axial, and selective coding to examine the descriptive data for emergent concepts and categories (Williams & Moser, 2019).

Table 1

Teacher Perceptions of Elasticity Survey Questions

1. Given the definitions and examples provided above, please describe your classroom environment in terms of elasticity/inelasticity.
2. Is your environment more or less elastic based on subject areas (math, science, language arts, social studies, arts, etc. . . .)? In other words, does the level of elasticity change with the subject? Please explain.
3. Personally, how much value do you give to students' questions?
    a. Do you feel there are any constraints that hinder students' questioning in school?
4. Please explain any barriers to students' questioning/elasticity in your classroom, if any.
5. Do you feel the need to increase or decrease the amount of time or resources available for students to pose questions, investigate, and present results or conclusions?
6. Do you feel that as the teacher, you have the freedom/autonomy to change the amount of time/number of resources you give for students' questions?
7. Do you have any further comments on the concept of elasticity?

Reliability and Validity

Internal validity was checked through a standardized survey tool sent to all participants (Bhandari, 2020). Additionally, researchers used respondents' direct language to support emergent themes. The instrument provided standardized, structured questions for all participants.

The researchers triangulated the study through the use of respondent triangulation in that teachers from two different cities, districts, and schools were surveyed with a cross-case analysis (school groups) of responses in order to confirm that the data were replicative between the two schools. Furthermore, investigator triangulation was used as the two different researchers separately confirmed the findings including coding structures and emergent themes (Bhandari, 2022). Finally, theoretical triangulation was used as the results were examined through the lens of constructivist theory and previous literature (Bogdan & Biklen, 2006; McMillan, 2012).

Barriers to Student-Directed Inquiries and Classroom Elasticity

Out of ninety surveys sent, fourteen responded for a rate of 15.5%. It is important to note that all qualified teachers at the three schools received the email link to the survey. The survey was entirely descriptive and included demographic data. Demographics included 100% Caucasian; 93% female and 7% male; 71% had six or more years teaching, 21% had four-five years of teaching, and 7% taught for one year or less.

The researchers reviewed the data and used open coding to begin looking for emergent concepts. Axial coding was used to identify relationships among the open codes. Finally, selective codes were used to find core ideas from the data (Williams & Moser, 2019). Table 2 shows the axial codes by question.

Table 2: Axial Codes by Question

Question	Axial Codes
1. Given the definitions and examples provided above, please describe your classroom environment in terms of elasticity/inelasticity.	Inelasticity; time and curriculum as barriers; science and social studies tend to be more elastic; teachers see value in elasticity.
2. Is your environment more or less elastic based on subject areas (math, science, language arts, social studies, arts, etc…)? In other words, does the level of elasticity change with the subject? Please explain.	Science and social studies have the most opportunities for elasticity, fewer opportunities for elasticity in math and ELA; curriculum, time, and standards listed as barriers.
3. Personally, how much value do you give to students' questions? a. Do you feel there are any constraints that hinder students' questioning in school?	High value was ascribed to elastic Environments; differentiated learning by interest and ability; high level of engagement in elastic environments; social learning; benefits include connections to content, high-level thinking, higher curiosity, exploration and validation, interest, engagement, discovery learning, social learning, and diverse understandings/learning.
4. Please explain any barriers to students' questioning/elasticity in your classroom, if any.	Time, curriculum, scripted materials, pacing guides, assessments, tests, teachers' stress.
5. Do you feel the need to increase or decrease the amount of time or resources available for students to pose questions, investigate, and present results or	Increase time for elasticity; interest-based learning; counteract stress of standardized

conclusions?	tests; decrease strict curriculum compliance.
6. Do you feel that as the teacher, you have the freedom/autonomy to change the amount of time/number of resources you give for your students' questions?	No freedom or autonomy; compliance; limited by large class sizes

Emergent categories provide strong evidence for curriculum-centered classrooms; responses indicate highly inelastic environments. Consistent barriers and constraints include time limits, scripted curricula, identified standards, pacing guides, mandated tests, teacher stressors, limits regarding curiosity/interest, class sizes and deficiencies in teacher knowledge to respond to students' questions. For example, one teacher noted that "state standards, district-wide curriculum…and assessments" are barriers to elasticity. However, most teachers did convey a high value for students' questions and elastic environments. Teacher respondents describe the following benefits when students freely question: connections to content, high-level thinking, higher curiosity, exploration and validation, interest, engagement, discovery learning, social learning, and diverse understandings/learning. For example, one teacher describes, "I think it is incredibly important for students' questions to be validated and to give them time to explore what questions they have." Teachers even mentioned the value for themselves by providing such an environment including the following: job satisfaction, teachers getting to be facilitators of learning, and increased teacher learning. Teachers identify science and social studies as the most elastic subjects; overall, most teachers describe highly inelastic environments across all subject areas. Twelve teachers report they would prefer an increase in time and resources available for an elastic environment. One teacher describes a preference for a decrease in time available for students' questions. Another teacher shares a level of comfort with the amount of time necessary for questioning. It is interesting to compare the two teachers who preferred no change or a decrease in time because both responded having a high value for elastic environments. Finally, most teachers discuss how they had no autonomy to change the amount of time for students' questions, and as well an inability to provide more elastic environments with two notable exceptions. For example, one teacher said, "No [I have no autonomy], but I believe most teachers do what they can to work around the system in order to teach to their students' interests." Two gifted education teachers, who were exceptions, felt they had the autonomy to make changes and increase elasticity.

The selective codes or main ideas include highly inelastic environments despite teachers valuing elasticity. Additionally, teachers report constraining factors related to a curriculum-centered culture even though they would prefer to have more autonomy and to see an increase in elasticity.

Areas for future research include observational analysis to investigate if there is any misalignment between teacher perceptions of elasticity in their own classrooms and their actual practice. Furthermore, future research could include a multi-level analysis examining elasticity from both the teachers' and students' points of view.

Discussion

These current data suggest factors inhibit teachers from implementing a child-centered, elastic learning environment. For change to occur, school personnel and policymakers will need to commit to work together to overcome barriers, so elasticity is supported in classrooms. Two of these barriers are discussed along with a description of how teachers can implement small changes to create an environment more elastic in order to enhance children's learning. First, teachers describe the value in creating elastic environments allowing for student questioning; yet they report the barrier of no perceived time during the school day to provide for this inquiry. This can be attributed to the rigorous demands compelling educators to teach to the standards, follow the curriculum with fidelity, and aim for strong test scores by adhering to a coverage mindset. Secondly, educational leaders may not support a child-centered philosophy regarding learning environments, a barrier which precludes teachers' flexibility to appropriately meet students' needs and interests.

Grounded in the research, it is imperative school personnel and policymakers advocate for the increased use of elastic environments (Aflalo, 2018; Chin & Osborne, 2008). Furthermore, most teachers in this study describe significant benefits to elastic environments including teachers experiencing higher job satisfaction as well as students developing emerging critical thinking skills, seeing connections through cross-curricular content, and showing autonomy in their learning.

However, teachers could resist transitioning from a teacher-centered approach to a child-centered environment due to a lack of self-confidence and/or self-efficacy in changing current practices and implementing a new methodology. In order to affect authentic changes, it is important to provide teachers with high quality professional development opportunities on how to best implement elasticity in their classrooms. Furthermore, it is important for administrative understanding and support to enact elastic, child-centered strategies. It is also critical policymakers understand and support inquiry-based learning. Inquiry-based learning contributes significantly to students' understandings as well as fosters their unique interests. Lastly, teacher education programs must ensure quality inquiry-based training for pre-service teachers by providing pre-service teachers with time and practice in order to build a level of comfort and a capacity for teaching in an elastic environment.

Current teachers may begin with small, manageable steps to affect change in their classrooms. For example, teachers may strategically plan a span of 30 minutes of inquiry time each day to support divergent explorations based on each student's interest. Teachers can also provide more opportunities for student-led projects using the Project Approach and create choice-based centers where students can exercise their curiosity through multiple dynamic investigations. If teachers can start small and take baby steps, they can gradually move towards a more child-centered, elastic environment that supports student voice, autonomy, and child-led inquiry-based investigations. Engaging in a constructivist approach to learning through an elastic environment, children will build their own understanding of the world.

Conclusion

Data generating from this pilot study suggest most teachers express a high level of value for elasticity in the classroom with multiple benefits for the students and the teachers themselves.

However, they also perceive a significant lack of elasticity in their own classrooms and cite multiple barriers inhibiting them from enacting a more child-centered approach. Commonly mentioned barriers and constraints include time restraints, scripted curricula, standards, pacing guides, mandated tests, teacher stressors, limits regarding curiosity/interest, class sizes and deficiencies in teacher knowledge to answer students' questions. The current data indicate a significant disconnect between teachers' perceived value for elastic investigations and the fact that their students often do not explore their own questions of interest. Based on previous literature, the benefits of authentic, student-directed inquiry remain undeniable and can lead to deeper understandings, longer retention, better connection to the material, and the formation of an academic identity that leads to future success. Significant structural barriers can be overcome with relevant training, professional development, administrative support, and policy changes that afford teachers the opportunity to employ child-centered, constructivist strategies in their classroom. This current research adds to the growing evidence for using a variety of strategies including student-directed inquiry and creating more elastic environments as they relate to constructivist theory.

References

Aflalo, E. (2018). Students generating questions as a way of learning. *Active Learning in Higher Education, 22*(1), 63-75.

Aulls, M. W., & Shore, B. M. (2008). *Inquiry in education: The conceptual foundations for research as a curricular imperative*. Routledge.

Bhandari, P. (2020, May). *Internal validity in research: Definition, threats, and examples*. Scribbr. https://www.scribbr.com/methodology/internal-validity/

Bhandari, P. (2022, January). *Triangulation in research: Guide, types, examples*. Scribbr. https://www.scribbr.com/methodology/triangulation/

Bogdan, R. C., & Biklen, S. K. (2006). *Qualitative research for education. An introduction to theory and methods*. Pearson.

Brooks, J. & Brooks, M. (2001). *In search of understanding: The case for constructivist classrooms* (2nd ed.). Pearson.

Buchanan, S., Harlan, M., Bruce, C., & Edwards, S. (2016). Inquiry based learning models, information literacy, and student engagement: A literature review. *School Libraries Worldwide*, *22*(2), 23-39.

Chin, C., & Osborne, J. (2008). Students' questions: A potential resource for teaching and learning science. *Studies in Science Education*, *44*(1), 1-39.

Crawford, B. (2015). Authentic science. In R. Gunstone. (Ed.), *Encyclopedia of Science Education* (pp. 113-115). Springer.

Greaves, M., & Bahous, R. (2020). Adapting to change; exploring early childhood educators' perceptions of a child-centered curriculum. *Early Childhood Education Journal*, *49*, 581-592.

Eick, C., & Reed, C. (2002). What makes an inquiry-oriented science teacher? The influence of learning histories on student teacher role identity and practice. *Science Teacher Education*, *86*(3), 401-416.

Fosnot, C. T. (Ed.). (2005). *Constructivism: Theory, perspectives, and practice* (2nd ed.). Teachers College Press.

Furtak, E., & Kunter, M. (2012). Effects of autonomy-supportive teaching on student learning and motivation. *The Journal of Experimental Education*, *80*(3), 284-316.

Levy, P., Little, S., McKinney, P., Nibbs, A., & Wood, J. (2010). *The Sheffield companion to inquiry-based learning.* CILASS.

Lister, C. (2015). *Constructivism: The foundation of inquiry learning*. https://christopherlister.ca/tiegrad-2/constructivism-the-foundation-of-inquiry-learning/

Luan, W., Atan, H., & Sabudin, S. (2010). Exploring teachers' perceptions of their pedagogical role with computers: A case study in Malaysia. *Procedia – Social and Behavior Sciences, 2*(2), 388-391.

McCombs, B. L., Daniels, D. H., & Perry, K. E. (2008). Children's and teachers' perceptions of learner-centered practices, and student motivation: Implications for early schooling. *The Elementary School Journal*, *109*(1), 16-35.

McMillan, J. H. (2012). *Educational research: Fundamentals for the consumer* (6th ed.). Pearson.

Patchen, T., & Smithenry, D. (2013). Framing science in a new context: What students take away from a student-directed inquiry curriculum. *Science Education*, *97*(6), 801-829.

Peters, J. M., & Stout, D. L. (2006). *Science in elementary education: Methods, concepts, and inquiries* (10th ed.). Pearson.

Reeve, J. (2006). What autonomy-supportive teachers do and why their students benefit. *The Elementary School Journal*, *106*(3), 225-236.

Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist, 44*(3), 159-175.

Rubin, C. (2018). *The curious classroom: Answers about questions*. ASCD Express. http://www.ascd.org/ascd-express/vol4/418-rubin.aspx.

Serafin, C., Dostal, J., & Havelka, M. (2015). Inquiry-based instruction in the context of constructivism. *Procedia – Social and Behavioral Sciences, 186*, 592-599.

Stone, B. (2016). Messing around in science: Whole child benefits of play-based inquiry. *International Journal of the Whole Child*, *1*(1), 6-15.

Stone, B., Lorentsen, L., & Schmidt, M. (2019). Exploring the role of free play in elementary science. In M. Han & J. Johnson (Eds.) *Play and Culture Studies V. 15: Play and Curriculum*. Hamilton Books.

Stone, B. (2020). Understanding the influence of teacher-directed scientific inquiry on students' primal inquiries in two American science classrooms. *Journal of Research in Childhood Education, 34*(4). https://doi.org/10.1080/02568543.2020.1718807

Vale, R. D. (2013). The value of asking questions. *Mol Biol Cell*, *24*(6), 680-682.

Walker C. L., & Shore, B. M. (2015). Understanding classroom roles in inquiry education: Linking role theory and social constructivism to the concept of role diversification. *Sage Open*, *5*(4).

Williams, M., & Moser, T. (2019). The art of coding and thematic exploration in qualitative research. *International Management Review*, *15*(1), 45-55.

Zion, M., & Mendelovici, R. (2012). Moving from structured to open inquiry: Challenges and limits. *Science Education International*, *23*, 383-399.

International Journal of the Whole Child
2024, VOL. 9, NO. 1

4-H Forestry: Using Nature-Based Programming to Enhance Positive Youth Development Outcomes

Amy Lang[a]

[a]University of Maryland

Amy Lang is a career educator who has facilitated programming in various settings and content fields. Amy has taught at every level of our public schools; elementary, middle, and high; and has worked with all ages in state and local parks conducting environmental education programming such as summer camps and family fun events. Amy also worked in Baltimore, and overseas in Malawi, Africa facilitating train the trainer sessions aimed at preventing the spread of HIV/AIDS. Since 2019, Amy has served as a 4-H Youth Development Educator with the University of Maryland Extension, designing and facilitating programs encouraging nature exploration and environmental science. She leads state-wide forestry, aquaculture, and pollinator programs. Amy also serves as a Thriving PYD Champion for MD 4-H. Amy is a lifelong learner and educator; and is eager to share this passion for education, particularly nature-based environmental education.

Abstract

Concerned with the ongoing youth mental crisis in the United States, researchers intentionally planned for positive youth development (PYD) practices in nature. Educators, appreciating the critical importance of youth developing relationships and a sense of belonging, may regard this model as a powerful tool to enhance existing programs. Both youth and parents report this as a high quality PYD program, resulting in thriving youth. Youth participants feel welcome, supportively challenged, and passionate about the topic; resulting in a growth mindset, hopeful purpose, and openness to challenge and discovery. The program inspired an affinity for nature in both youth participants and associated adults. 97% of youth and 95% of adult caregivers report being inspired to spend more time in nature as a result of the program. The program also inspired increased youth interest in science college and career opportunities.

Introduction: A Mental Health Crisis

For more than a decade, youth in the United States continue to experience a mental health crisis (Abrams, 2023). “National surveys show major increases in certain mental health symptoms, including depressive symptoms and suicidal ideation in youth. From 2009 to 2019, the proportion of high school students reporting persistent feelings of sadness or hopelessness increased by 40% (Children and Nature Network, 2023); the share seriously considering attempting suicide increased by 36%; and the share creating a suicide plan increased by 44%.

Between 2007 and 2018, suicide rates among youth have increased by 57%" (Office of the Surgeon General, 2021, p.8).

This mental crisis was exacerbated by the COVID-19 pandemic. Forty-two percent of high school students in 2021 reported feeling so sad or hopeless for at least two consecutive weeks in the previous year that they stopped engaging in their usual activities, an increase from 26 percent in 2009 (Stone, 2023).

In June, 2020, Czeisler et al. found…

- symptoms of anxiety disorder were approximately three times those reported in the second quarter of 2019 (25.5% versus 8.1%).
- prevalence of depression was approximately four times that reported in the second quarter of 2019 (24.3% versus 6.5%).
- suicidal ideation was approximately twice the rate seen in 2018 (10.7% versus 4.3%).

The 4-H Thriving Model: The Role of Positive Youth Development

Consistently, 4-H programs are grounded in positive youth development (PYD). This foundation perceives that youth are not problems to be solved; rather, they are powerful members of society with energy and passions that can be channeled to benefit both the youth themselves and the community at large. Youth are regarded as powerful assets. For the last century, 4-H staff has worked to develop programs that will help youth thrive.

To enhance consistent outcomes of this programming, Mary Arnold (Arnold, 2018) developed the 4-H Thriving Theoretical Model for Positive Youth Development (PYD), which outlines how PYD programs lead to thriving indicators and outcomes in youth. The key to maximizing impact lies in the quality of the program. Several ingredients constitute a high-quality youth development program including identifying and nurturing youth interests, identified as sparks in the 4-H Thriving Model; and fostering developmental relationships as well as a sense of belonging among youth participants (Arnold, 2018). As components of a high-quality PYD program, these ingredients result in thriving youth, according to Arnold. Arnold identified thriving indicators which result in PYD outcomes. Additionally, she developed evaluation tools to assess both the quality and impact of 4-H programs (Arnold & Gagnon, 2022). "The 4-H Thriving Model can be used as a lens through which 4-H educators can develop more precise goals for 4-H program activities; goals that contribute to youth thriving, and thus to enhanced PYD… the proposed model provides an "umbrella" under which local 4-H programs can be planned more intentionally to increase PYD" (Arnold, 2018, p. 154).

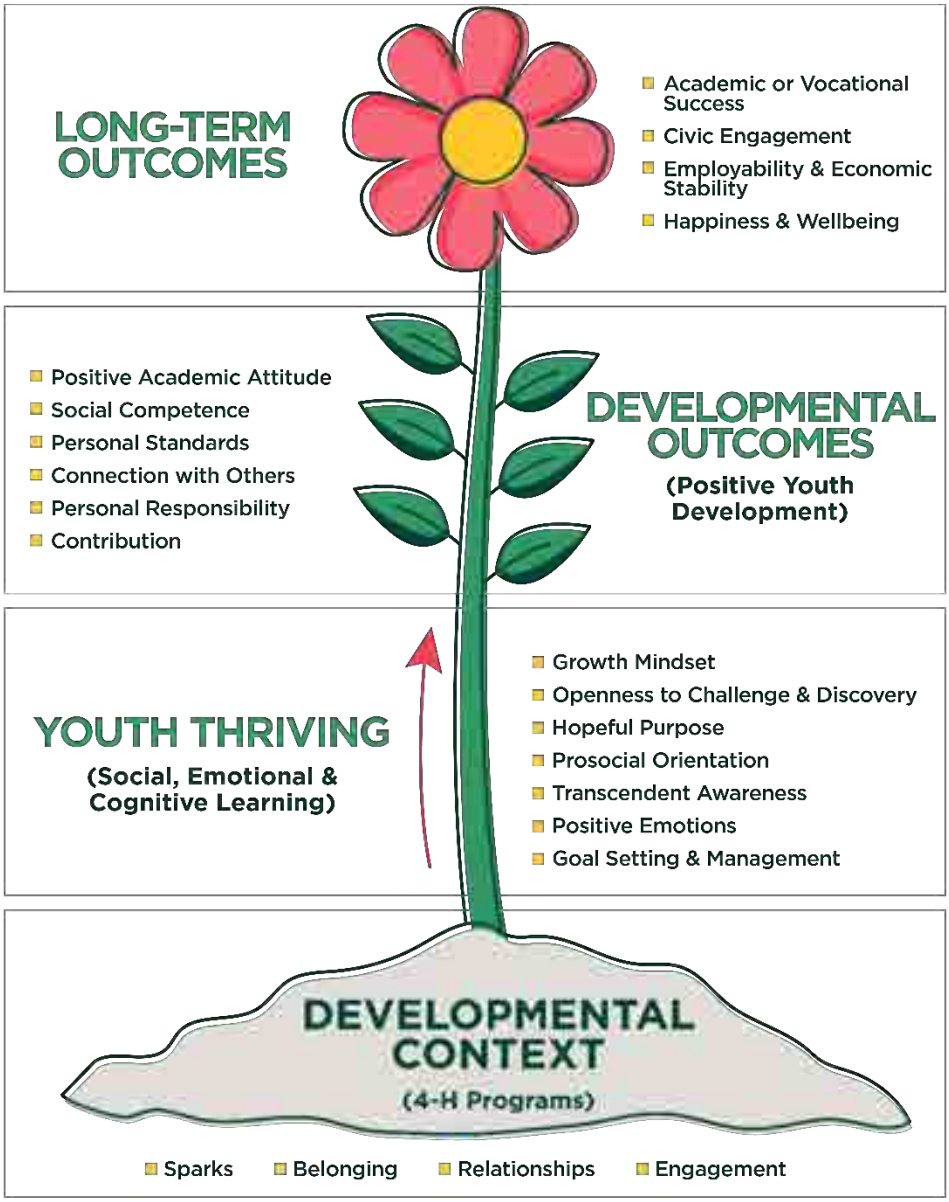


Image courtesy of 4-H Program Leaders Working Group Standing Committee on Positive Youth Development (2024), https://helping-youth-thrive.extension.org/home/

The Healing Power of Nature

There is a growing body of evidence touting the infinite benefits of time spent in natural settings. Time in nature results in increasing aspects related to physical activity, interest and enjoyment in learning as well as improving an individual's mood (Kondo et al., 2018). Additionally, time in nature correlates with reductions in body-mass index (Kondo et al., 2018), diastolic blood pressure, salivary cortisol (a physiological marker of stress), heart rate, and diabetes (Twohig-

Bennett & Jones, 2018). For children, time in nature consistently associates with improvements in self-discipline (Kuo et al., 2019), classroom engagement and levels of attention (Kuo et al., 2018). Access to natural greenspaces contributes to decreased symptoms of Attention Deficit Hyperactivity Disorder (ADHD) (Kuo & Faber Taylor, 2004). Time in nature moderates the impact of stressful events in children's lives (Corraliza et al., 2012) and associates with a reduction in violent and anti-social behavioral concerns; furthermore, time in nature relates with improvements in confidence and emotional well-being, social interactions, and peer relationships (McCormick, 2017).

Accessible natural areas are a critical resource for mental health in our rapidly urbanizing world where more than 450 studies in the Children and Nature Network Research Library document the mental health benefits of time in nature for young people (Children and Nature Network, 2023). In a study (Bratman et al., 2015), participants took a 90-minute walk in an urban or natural setting. The nature-walk participants showed decreases in self-reported rumination (repetitive thoughts focused on negative aspects of the self), a known risk factor for mental illness, and reduced neural activity in an area of the brain (the subgenual prefrontal cortex) linked to risk for mental illness; while urban walkers showed no such effects.

A longitudinal study (Engemann et al., 2019) explored data on all persons born in Denmark from 1985-2003 alive and still living in Denmark by the age of 10 (more than 900,000 people). Children living at the lowest levels of green space demonstrated up to a 55% higher risk of developing psychiatric disorders than children living at the highest levels of green space. These data remained consistent even after adjusting for other known risk factors, such as urbanization, socioeconomic factors, family history of mental illness and parental age. These longitudinal data suggest green spaces are critical throughout childhood as they help protect individuals from psychiatric disorders during adolescence and adulthood. According to Engemann et al. (2019), integrating natural spaces into urban planning is a promising approach to improve mental health.

PYD + Nature = The "Thrive Naturally Forestry" Program for All Response

In light of the abundant evidence underscoring the countless benefits of nature and paired with the data regarding the expanding mental health crisis among youth in America, 4-H programming continues to work to do what they do best - use university research to bring solutions to communities and help youth handle stressors, both new and old. Relevant to the current project, the Thrive Naturally Forestry Program leverages both PYD and nature-based experiences as tools to help young people flourish.

Recalling the importance of building a sense of relationship with nature and one another, regional field sessions took place in local forest and park settings in order to heighten the benefits and thriving indicators that take place in high quality positive youth development experiences. Moving portions of the program to these natural settings and providing weekly practice challenges necessitating time spent outdoors were an intentional programmatic design choice aimed at enhancing the program outcomes by leveraging the social and emotional benefits of time spent in nature.

The developmental context components of the Thrive PYD model ensure a high-quality positive youth development experience. Nature-based experiences remain a powerful motivator for many youth participants, particularly including topics of resource conservation and environmental protection. Nine out of ten teens regularly think about the environment (National 4-H Council Harris Poll, 2022). Eight of ten wish that their schools provided more outdoor experiences and learning opportunities (National 4-H Council Harris Poll, 2022). Youth in the program experienced a sense of **belonging** as they interacted with peers and adult mentors with similar interests, exploring and protecting our natural resources. Participating youth were invited to engage in virtual polling and "get to know you" activities that served as a mechanism to facilitate personal interactions and bonding. In addition, time was allotted in each virtual session for participating youth and adult mentors to share their nature experiences with the group, again providing an opportunity to connect regarding shared interests and experiences. Finally, further describing the current program intervention, participating youth experienced **developmental relationships**, as they were guided by a team of adult mentors who provided content instruction and challenged youth to act upon that instruction to practice forest evaluation skills during regional field sessions and independent practices between sessions. Participating youth were further encouraged to hone and demonstrate their forest related skills during a state forestry showcase event, with the top four participants being invited to participate in the National 4-H Forestry contest.

When program planners intentionally incorporate both positive youth development (PYD) and nature, findings indicate a deepening of both positive youth development and nature outcomes (Children and Nature Network, 2017; Sethi & Eisenberg, 2019).

Current Program Goals and Methods

The current project leverages nature-based experiences to enhance PYD youth outcomes. The program goals intend to…

- provide a positive developmental context where participating youth will thrive.
- increase time spent in nature.
- increase interest in scientific college and career opportunities, particularly in the areas of forestry and natural resources.
- instill a sense of responsibility for forest ecosystems.

Participants

Youth were recruited from across a Mid Atlantic state via state and county-based marketing efforts. Enrolled 4-H youth were recruited via 4-H Online email broadcasts, and county and state social media posts. Non-enrolled 4-H youth were recruited through partner communications. The program team reached out to scouting groups and school environmental clubs to reach non-enrolled youth who may have an interest in a forestry program.

Research Program Description

Using a hybrid approach of virtual learning sessions and hands-on field practices, youth participants learned various skills including tree identification, tree measurement, forest insect

and disease identification, and as well how to safely navigate forest environments with compass orienteering, pacing, topographic maps, and GPS units. Youth participants used these skills to evaluate the health and value of forestland by synthesizing investigations of plant and animal biodiversity, soil quality, forest pests, lichen, tree and crown condition and size, regeneration, and snags. These evaluations were used to create forest management plans for select forest plots.

Youth participants were provided with necessary program resources prior to the first session. Each participant received a tree identification guide, a Biltmore stick, and a compass. Twelve hours of content were presented via virtual sessions. These sessions were conducted weekly from 7:00 p.m.- 8:30 p.m., incorporating interactive digital activities using polls, chat, Jamboard and Kahoot to facilitate youth interactions and build a sense of belonging within the group. Each virtual session concluded with a challenge for participating youth to get out-of-doors and practice their new forestry skills and knowledge independently. Opportunities to share their individual discoveries and nature experiences took place in each session. Regional field sessions met every 3-4 weeks, providing eight hours of follow up practice for the virtual content.

Program Outline

Session	Topic (s)
Virtual 1	Program Introduction and Overview
Virtual 2	Tree Identification
Virtual 3	Tree Measurement
Virtual 4	Tree Identification (ID)/Measurement Review and Practice
Field Session 1	**Field Day – Tree ID and Measurement**
Virtual 5	Compass Orienteering
Virtual 6	Topographic maps
Virtual 7	Compass and Pacing
Virtual 8	Cumulative Review Session
Field Session 2	**Field Day- Compass, Orienteering, Pacing, and Tree ID**

Virtual 9	Forest Insects
Virtual 10	Forest Diseases
Virtual 11	Forest Evaluation
Virtual 12	Program Review
Field Session 3	**Field Day – Insects, Disease, and Evaluation**
Field Session 4	**State-wide Field Session and Contest for National Team Placements**
	National 4-H Forestry Contest

Virtual and field sessions provided opportunities for participants to engage with high caliber expert presenters. Presenters included professionals in the fields of forestry, management, veterinary science, and education. These experts shared their content expertise, but equally as important their personal career journeys and experiences. This content presentation approximated twelve hours. The program culminates in state and national contests, where participating youth are encouraged to showcase the skills and knowledge gained through the program.

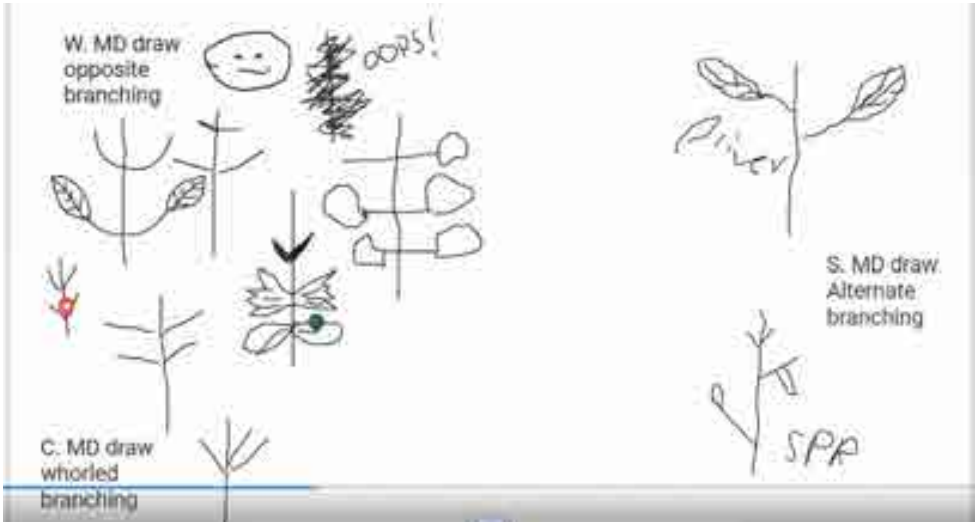


Photo Courtesy of the Author. Tools like Jamboard, Kahoot, and Zoom polls kept the virtual sessions engaging, as youth practiced new skills.

Tree Measurement with a Biltmore Stick

Tree Identification

Forest Insect Study

Photos courtesy of the author.

Fun in the Forest!

Photos courtesy of the author.

Survey Research: Program Outcomes

The Thrive Naturally 4-H Forestry Program has been successfully implemented for three seasons with 77 youth participants and 54 adult caregiver participant guides. Post program surveys were developed by selecting applicable questions from several fully vetted survey tools; the 4-H Common Measures Science Survey, the American Camping Association Affinity for Nature Scale and the 4-H Thriving Model Program Evaluation Instruments. Surveys were distributed at the State Showcase event and electronically via Qualtrics for those participants unable to attend the final session. Post surveys were completed by 33 youth and 20 caregiver participants. Data reveal positive outcomes for both youth and adult caregivers participating in the program.

2021 to 2023 Thrive Naturally Forestry Post – Survey Summary Data–
33 youth responses

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	% Agree or Strongly Agree
Nature Affinity Outcomes						
I like being in nature.				9	24	100%
I can do things to help nature.			2	12	19	94%
Nature helps me feel calm.	1	1		12	19	94%

Being in nature makes me happy.	1	1		9	22	94%
When I'm sad, I try to spend time in nature to feel better.	1	1	3	12	16	85%
Spending time in nature helps me be more active.	1	1	1	9	21	91%
I want to spend more time in nature after participating in this program.		1		6	26	97%
Science Outcomes						
I would like to study environmental science after high school.	1	1	6	9	16	76%
I would like a job that involves environmental science.	1	1	8	12	11	70%
Thriving Indicators and Outcomes						
This program gives me the opportunity to explore something I really care about.			3	11	12	88%
I feel like I matter in this 4-H program.		1	2	11	12	88%
I feel welcome in 4-H.				13	11	100%
Leaders in this program pay attention to me.				12	14	100%
Leaders in this program expect me to do something positive with my future.			1	7	18	96%
If I keep working at something I will get better at it.			1	7	18	96%
I like to try new things.		2		7	17	92%
My life will make a difference in the world.		1		7	18	96%

Content Specific Outcomes						
I want to learn more about forests.				6	21	82%
After this program, I am interested in learning more about trees and forest animals.				6	21	82%

** Note: The numbers for each item do not always add to 33 total responses, as some youth did not complete all survey questions.

2021 to 2023 Thrive Naturally
Participant Caregiver Post Program Survey - 20 surveys

	Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**	**% Agree or Strongly Agree**
Nature Affinity Outcomes					
I like being in nature			8	12	100%
I am comfortable in nature			8	12	100%
Spending time in nature is good for my child's health.			4	16	100%
Spending time in nature is good for my health.			6	14	100%
Spending time in nature helps me feel calm.			5	15	100%
Being in nature makes me happy			6	14	100%
I want to spend more time in nature after participating in this program.			4	16	100%
After this program, I am more likely to seek nature experiences for my child(ren).		1	4	15	95%

my child being more open to exploring nature.			9	11	100%
Thriving Indicators and Outcomes					
my child being more willing to try new challenges.			9	11	100%
my child being eager to learn new things.			8	12	100%
my child believing that he/she can have a positive influence on their community.			10	9	100%
my child seeing him/herself as a part of the larger world.			8	11	100%
my child caring more about nature.			8	12	100%
my child being more willing to help others.			9	11	100%
my child being able to use nature as a tool to manage emotions.		1	8	11	95%
my child being able to set and work toward goals.		1	8	11	95%
an improvement in my child's academic motivation		1	5	14	95%
an improvement in my child's academic achievement		1	3	16	95%
an improvement in my child's social interactions			9	11	100%
Science Outcomes					
an increased interest in science for my child.			6	14	100%

Survey Findings

Nature Affinity Outcomes

The program inspires an affinity for nature in both youth participants and associated adults.

- 100% of youth participants enjoy being in nature.
- 78% want to learn more about forest ecosystems after participating in the program.
- 97% of youth participants want to spend more time in nature after participating in the program.
- 95% of adult caregivers indicate that the program inspired both parents and children to spend more time in nature.

The program helps youth and adults identify the benefits of time spent in nature.

- 94% of youth participants indicate that nature helps them feel calm, and makes them happy.
- 91% of youth indicate that spending time in nature results in increased physical activity.
- 100% of adult caregivers recognize that time in nature is good for both youth and adult health.
- 95% of adult caregivers indicate that after the program their child can use nature as a tool to manage emotions.

Thriving Indicators and Outcomes

Respondents indicate that the Forestry program is a very high-quality developmental experience.

- 100% of youth participants feel welcome and paid attention to in the program (belonging).
- 96% believe that program leaders expect them to do something positive with their future (developmental relationships).
- 88% felt that the program helped them explore a topic they really care about ("spark"/youth interests).

The program resulted in thriving indicators in youth participants.

- 96% of youth participants express hopeful purpose.
- 92% report being open to challenge and discovery, eager to learn and try new things.
- 100% of adult caregivers indicate that the program resulted in increased openness to challenge and discovery, growth mindset, hopeful purpose, transcendent awareness, and prosocial orientation.
- 95% indicate increased positive emotionality, goal management, and academic attitudes in youth participants.

Science Outcomes

An additional benefit of the program is that youth were inspired to explore and consider science college and career outcomes.

- 76% of youth respondents indicated an interest in studying environmental science after high school.
- 100% of adult caregivers indicate that the program resulted in an increased interest in science for their child.

Qualitative Outcomes

Qualitative Outcomes were collected through post survey tools as well as post program email correspondence.

Youth Voices …

Participants indicate the guest speakers are one of the most beneficial components of the program. Several youth expressed that hearing how the speakers moved from being a 14-year-old youth, to a Forestry professor or logger, provided valuable insight into possible next steps beyond high school.

> "Hello ….,
> I hope you're doing well! I'm working an internship with Jefferson Patterson Park & Museum's Education Department, before heading off to Frostburg this Fall to study forestry. I'd like to thank you once again for hosting the 4-H Forestry program. It really gave me a wider understanding of forestry, and I hope youth continue to have that same opportunity."

Caregiver Voices via post program survey tools…
What do you see as the longest lasting impact of this program for your child?

- "Opening up a new career path as well as interacting with others with a similar interest."
- "Prior to this program, our son did not have a career plan. Now he would like to go to school for forestry."
- "A better understanding of nature and an opportunity to interact with other families."
- "Learning to appreciate nature"
- "a new found love for nature"
- "understand the importance of preserving nature"
- "appreciation for all that forests/woods do for us"
- "this was an experience that she can continue to grow in, and develop a lifelong interest in forestry, the environment, and science"
- "a deeper understanding of 4-H's ability to lead to career choices and options for their future"
- "this program has boosted his confidence"
- "First - thank you so much for the program offering. B's dad has a degree in forestry and we had been encouraging B in a career path that way but he wasn't interested. He LOVES the club, talks about it all the time, and now considering a career in Forestry!!!!"

What do you see as the longest lasting impact of this program for you?

- "It was a great opportunity for us to continue to get our children outside, especially during the pandemic."
- "Desire to attend college and career path"

- "Understanding our role in protecting our forests"
- "I will research more programs to catapult her to the next level of learning about forests."
- "Learning to appreciate nature"
- "Taking short hikes can improve my health"
- "I look forward to joining him more next year."

Please share anything else you'd like us to know about your child's participation in this program….

- "A… and W… enjoyed meeting new people and learning so much"
- "My child enjoyed the 4-H Forestry program so much that she's bummed that she has to wait another year to get to the next level of learning."
- "I wish the program was longer than it was."
- "thank you to all who work to inspire kids and teach them about the importance of forestry"
- "Our family enjoyed the program – hope to see it offered again in the future"
- "Thank you for allowing the younger ones to join this program"
- "The best part of the program was meeting new people, learning more about forestry, watching the youth become friends, and find joy."

Conclusion

The program has resulted in positive outcomes, with strong results for each programmatic goal…

1. Both youth and parents report that this was a high quality PYD program that resulted in thriving indicators for youth participants.
    - 100% of youth participants feel welcome and paid attention to in the program (belonging). 96% believe that program leaders expect them to do something positive with their future (developmental relationships), and 88% felt that the program helped them explore a topic they really care about (spark).
    - 96% of youth participants express hopeful purpose; 92% report being open to challenge and discovery, eager to learn and try new things. 100% of adult caregivers indicate that the program resulted in increased openness to challenge and discovery, growth mindset, hopeful purpose, transcendent awareness, and prosocial orientation.
2. The program inspires an affinity for nature in both youth participants and associated adults. 97% of youth participants want to spend more time in nature after participating in the program. 95% of adult caregivers indicate that the program inspired both parents and children to spend more time in nature.
3. Youth were inspired to explore and consider science college and career outcomes. 76% of youth respondents indicated an interest in studying environmental science after high school, and 100% of adult caregivers indicate that the program resulted in an increased interest in science for their child. Several youth participants indicate future plans to work or study in forestry related fields.
4. Youth were empowered. 94% believe they can do things to help nature.

Practical Implications and Opportunities for Future Research

The current data indicate project success. Youth participants and their adult caregivers report an increase in nature affinity and evidence of thriving indicators resulting from the intentional intersection of high quality PYD practices taking place in nature-based settings. Educators may consider this model as a simple, yet powerful tool to enhance existing programs. By using the Thriving Model as a guide to design high-quality PYD programs that incorporate youth interests, or "sparks" as they are referred to in the Thrive Model, with practices to facilitate a sense of belonging and strong developmental relationships, and by setting these programs in nature, youth benefits are amplified.

Several interesting outcomes could prompt further investigation. The researcher set out to measure impact in youth participants, but one unanticipated outcome of the program was the level of adult caregiver participation. It became evident that parents/caregivers were eager to engage in the Forestry program alongside their children. Since the regional field sessions took place in local parks and natural resource areas, a bit further from shopping and convenience centers, parents tended to stay with their children for the duration of the session. This led to a positive benefit of families experiencing nature together, with youth often teaching adults the forestry skills and knowledge they previously learned during the virtual sessions. Parent surveys were developed to capture the researcher's observations. Early data suggest an increased family bonding as parents and children experienced forest discoveries together, and positive health outcomes for parents. The researcher plans to conduct follow up surveys with parents/caregivers to determine if the initial program impacts have continued in the months following the sessions. There is a significant body of research that indicates positive outcomes when adult caregivers address their own mental health and well-being, serving as role models for their children (Office of the Surgeon General, 2021). The field could benefit from additional research around nature based PYD programming and family outcomes.

Marketing for the program has targeted the broad base of all youth, as research points to the benefits of high-quality nature-based PYD experiences for everyone. A next logical step in the research would be to refine the target audience of the program to determine if similar impacts are found across diverse segments of the youth population. Girls, LGBTQ+, and African American youth all report higher rates of depression and suicidal thoughts than the general population (Abrams, 2023; Stone, 2023). Studying the program's impacts on these sub-groups could provide vital information on how to best serve these populations.

Finally, the program was designed with the 4-H Thriving Model in mind. Given the growing numbers of mental health challenges among youth, there are a wide variety of resources and supports for adults working with youth in formal and informal education settings. Incorporating elements from programs like Mental Health First Aid (National Council for Mental Well-being, 2023) and Classroom WISE (Well-Being Information and Strategies for Educators) (Abrams, 2023; The Mental Health Technology Transfer Center Network and the University of Maryland's National Center for School Mental Health (NCSMH, 2021) could provide additional benefit for all youth participants, but especially those struggling with mental health challenges. The researcher plans to develop a more general nature-based program aimed at meeting the needs of youth struggling with mental health symptoms.

References

4-H Program Leaders Working Group Standing Committee on Positive Youth Development. (2024). Thrive model flower image. https://helping-youth-thrive.extension.org/home/

Abrams, Z. (2023). 2023 Trends report: Kids' mental health is in crisis. Here's what psychologists are doing to help. *Monitor on Psychology*, *54*(1). American Psychological Association. https://www.apa.org/monitor/2023/01/trends-improving-youth-mental-health

Arnold, M. E. (2018). From context to outcomes: A thriving model for 4-H youth development programs. *Journal of Human Sciences and Extension, 6*(1), 11. https://doi.org/10.54718/NBNL5438

Arnold, M. E., & Gagnon, R. J. (2022). The 4-H thriving model program evaluation instruments: Information and scoring guide. https://helping-youth-thrive.extension.org/wp-content/uploads/2022/02/Thriving-Model-Measurement-Instrument-Scoring-Guide.pdf

Bratman, G., Hamilton, J.P., Hahn, K., & Gross, J.J. (2015). Nature experience reduces rumination and subgenual prefrontal cortex activation. *Proceedings of the National Academy of Sciences, 112*(28), 8567-8572. https://doi.org/10.1073/pnas.1510459112

Children and Nature Network (2017). *Reaching youth's full potential through nature.* https://eadn-wc04-796033.nxedge.io/wp-content/uploads/CNN_YDN_infographic_20-11-17.pdf

Children and Nature Network (November, 2023). Adolescent mental health & nature. *November Research Digest*. https://www.childrenandnature.org/resources/type/research-digest/

Corraliza, J.A., Collado, S., & Bethelmy, L. (2012). Nature as a moderator of stress in urban children. *Social and Behavioral Sciences*, *38*, 253-263.

Czeisler, M. É., Lane, R. I., Petrosky, E., Wiley, J. F., Christensen, A., Njai, R., Weaver, M. D., Robbins, R., Facer-Childs, E. R., Barger, L. K., Czeisler, C. A., Howard, M. E., & Rajaratnam, S. M. W. (2020). Mental Health, Substance Use, and Suicidal Ideation During the COVID-19 Pandemic - United States, June 24-30, 2020. *MMWR. Morbidity and mortality weekly report*, *69*(32), 1049–1057. https://doi.org/10.15585/mmwr.mm6932a1

Engemann K., Pedersen, C.B., Arge, L., Tsirogiannis, C., Mortensen, P.B., & Svenning, J.C. (2019, March 12). Residential green space in childhood is associated with lower risk of psychiatric disorders from adolescence into adulthood. *Proceedings of the National Academy of Sciences, 116*(11), 5188-5193. https://www.pnas.org/doi/pdf/10.1073/pnas.1807504116 Epub 2019 Feb 25. PMID: 30804178; PMCID: PMC6421415

Kondo, M.C., Fluehr, J.M., McKeon, T., & Branas, C.C. (2018). Urban green space and its impact on human health. *International Journal of Environmental Research and Public Health, 15*(3).

Kuo, M., Browning, M.H.E.M., & Penner, M.L. (2018). Do lessons in nature boost subsequent classroom engagement? Refueling students in flight. *Frontiers in Psychology*, *8*, 2253. https://doi.org/10.3389/fpsyg.2017.02253

Kuo, M., Barnes, M., & Jordan, C., (2019). Do experiences with nature promote learning? Converging evidence of a cause-and-effect relationship. *Frontiers in Psychology, 10.* https://doi.org/10.3389/fpsyg.2019.00305

Kuo, F.E., & Faber Taylor, A. (2004). A potential natural treatment for attention-deficit/hyperactivity disorder: Evidence from a national study. *American Journal of Public Health, 94*(9), 1580-1586.

McCormick, R., (2017). Does access to green space impact the mental well-being of children: A systematic review. *Journal of Pediatric Nursing*, *37*, 3-7.

National 4-H Council (2022). *Environmental impact survey exploring the impact of the environment on teens.* The Harris Poll. https://4-h.org/wp-content/uploads/2023/02/21160849/4-H-Environmental-Study-2022.pdf

National Council for Mental Well-being. (2023). *Mental health first aid.* https://www.mentalhealthfirstaid.org/

Office of the Surgeon General. (2021). *Protecting youth mental health - The US surgeon general's advisory*. https://www.hhs.gov/sites/default/files/surgeon-general-youth-mental-health-advisory.pdf

Sethi, J. & Eisenberg, C. (2019). *Integrating youth development and nature: An exploration*. The Search Institute. https://www.childrenandnature.org/wp-content/uploads/youth-development-and-nature-literature-review.pdf

Stone, M. (2023, October 16). Why America has a youth mental health crisis, and how schools can help. *Education Week*. https://www.edweek.org/leadership/why-america-has-a-youth-mental-health-crisis-and-how-schools-can-help/2023/10

The Mental Health Technology Transfer Center Network and the University of Maryland's National Center for School Mental Health (NCSMH), (2021). Classroom WISE (Well-Being Information and Strategies for Educators). https://www.classroomwise.org/

Twohig-Bennett, C. & Jones, A. (2018). The health benefits of the great outdoors: A systematic review and meta-analysis of greenspace exposure and healthy outcomes. *Environmental Research, 166*, 628-637. https://doi.org/10.1016/j.envres.2018.06.030

International Journal of the Whole Child
2024, VOL. 9, NO. 1

Teacher Talk: Theory to Practice
Failing *to* Learn, Learning *to* Fail: Strategies to Create Empowered and Independent Learners

Lando Carter[a], Katie Schrodt[b], Bonnie Barksdale[c]
[a-c]Middle Tennessee State University

John Lando Carter is an Associate Professor of Education at Middle Tennessee State University and co-author of the book *Teaching Signature Thinking: Strategies for Unleashing Creativity in the Classroom*. He teaches classes in the Assessment, Learning, and Student Success Ed.D. program at Middle Tennessee State University. He also serves as the Interim Director of Teaching Excellence at MTSU.

Katie Schrodt is an Associate Professor in the Department of Elementary and Special Education at Middle Tennessee State University where she teaches undergraduate and graduate courses in literacy. Katie studies early reading and writing achievement and motivation. You can find her work in leading journals such as *Reading and Writing Quarterly* and *The Reading Teacher*. She is the director of the Middle Tennessee Writing project and a Bonnie Campbell Hill Award recipient.

Bonnie Barksdale is an Assistant Professor in the Department of Elementary and Special Education at Middle Tennessee State University where she teaches undergraduate and graduate courses in literacy. Bonnie studies early reading, adaptive literacy instruction, family literacies and writing motivation. You can find her work in leading journals such as *The Reading Teacher, Journal of Research in Childhood Education,* and *Young Children*. She is the 2023 Distinguished Professor Award recipient from Literacy Association of Tennessee (LAT) and incoming president of a local county chapter of LAT.

Introduction

It's hard to learn if we never make mistakes. The error. The stumble. The near win. These are all powerful self-teachers. Experts, in fact, guide themselves down the error-filled road to mastery. Pierce Brown (2016), in the epilogue to his novel *Morning Star*, provides a profound axiom for his readers: "Everything grand is made from a series of ugly little moments . . . All the works of people you and I admire sit atop a foundation of failures" (p. 523). This is the mindset we lose too often in the K-12 classroom. However, the culture of speed and the need to cover content persists, even in the chaotic aftermath of the recent school years where students juggled the uncertainties of in-person and remote learning. Many students navigated these experiences feeling like failures. Yet voices from inside and outside the education realm celebrate the same truth: *failure* is a key element of meaningful learning. As teachers, it is our responsibility to create learning environments that illustrate this truth in action. By using authentic examples from

real-world innovators and creators, we send signals to our students that risks are the norm, uncertainty is an opportunity, and learning is not linear. When teachers surround students with proof that failure is a powerful learning tool, students will be more likely to start the *unlearning* process and embrace *failing to learn, learning to fail* as a way to navigate themselves down new paths toward deeper learning.

The Language of Failure

Failure quote bank. A first step in creating agency and self-direction in the classroom is learning and using the language of failure. It is important for teachers to explicitly teach about the benefits of failure and actively engage students in conversations about failures. A great place to start is a bank of quotes from authors and researchers on the power of failure as a learning opportunity.

Figure 1

Failure Quote Bank Examples

"In fact, failures (both small and large) tend to make up quite a bit of the terrain on the road to discovery" (p. 172).

—Joshua Eyler (2018), *How Humans Learn*

"Any new quest, even one that is ultimately successful, is going to involve failure" (p. 162).

—Chip and Dan Heath (2010), *Switch*

"Children need to learn that no one can succeed at every attempt and that it's important to keep working" (p. 117).

—Hope and Wade King (2017), *The Wild Card*

"Failure is probably the most important factor in all of my work. Writing *is* failure. Over and over and over again."

—Ta-Nehisi Coates (2018), quoted in Eyler

Building on the examples found in Figure 1, create a gallery walk or put one quote per slide on a PowerPoint. Invite students to read quotes from multiple disciplines on how failure is the key to learning and progression, no matter the field or domain. Provide time for students to discuss and share what the quote means to them and how failure is viewed in both their academic and personal lives.

After finishing the Failure Quote Bank discussions, lead students in co-creating their own failure quote that will serve as a mantra for the class. Some examples might be: *We are strengthened by the struggle*; *We see errors as opportunities*; *Failure now means success later*. Display the class-constructed quote along with the quote bank quotes around the classroom and provide students with opportunities to be enveloped by them throughout the year. Use these as routine self-talk mantras in order to help students continuously persist through roadblocks and impasses as they take ownership of their learning.

Failure self-talk. Children's books can also serve as an effective springboard for conversations using the language of failure and changing the mindset in earlier grades. Through leveraging children's literature, the language of failure provides positive models of failure self-talk (See Figure 2). Consistent modeling that failures are indeed learning opportunities can positively impact growth and possibility (Dweck, 2016).

Figure 2

Failure Self-Talk in Children's Books

Children's Book Inspiration	**Change self-talk from this . . .**	**To this . . .**
Rosie Revere, Engineer by Andrea Beaty & D. Roberts	I messed up. It was a failure. I cannot do this.	That was a great first flop! It's time for the next. The only true failure can come if I quit.
The Thing Lou Couldn't Do by Ashley Spires	What's the point of even trying? I can't do it.	I can't *YET*. But I will try again. Maybe even tomorrow.
A Thousand No's by D.J. Corchin & D. Dougherty	Someone told me no. This is heavy. This is hard to carry. This kind of hurts.	No? Ok! Now I am curious! I wonder how this *no* will help my idea grow and change.

Failure Indices

Another way to get students to embrace error and guide their own growth is to bank their errors and near-hits in *failure indices*. Sawyer (2013) reveals that errors create bookmarks in our minds that become helpful guides during the next try. Physically keeping and cataloging these missteps while tinkering and iterating is crucial because we may never know when an idea—even one that didn't quite work or fit at the time—will be of value throughout the *zig-zag* nature of self-directed learning. According to Sawyer, "If you're never failing, you're never storing failure indices, and that probably means you're playing it too safe" (p. 220). Keeping this bank of errors may feel strange to students at first, so it is crucial that teachers model the process alongside students.

This error-keeping process can look differently depending on the discipline. In a STEM class, create a space for students to display half-built prototypes that did not quite work or have them store computer code that was riddled with errors. In an ELA class, have students create and keep running lists of story ideas or potential titles for a poem or paper. Having these ideas on file and readily accessible may operate as a catalyst for future learning by returning periodically to our "what-ifs" and guesses.

In early childhood education, displaying a Brave Spellers chart (Figure 3) could help young children be bold enough to take writing risks, sounding out words beyond the safety of consonant-vowel-consonant (Schrodt et al., 2020). This risk-taking allows young children to have the power and freedom to write about any topic they want, without feeling limited by the pressure of spelling every word to perfection. Empirical studies show this mindset in young writers can increase academic achievement in young children (Schrodt et al., 2019). At the end of the writing time, celebrate these brave spelling attempts as a class and focus on the incremental growth across time.

Figure 3

Brave Speller Chart Sample

Student Name	**Conventional Word Attempt**	**Brave Spelling**
Tomas	invisible	nvezobl
Leo	stitches	sisches
Adriana	suddenly	sudnle

Leaning into the *failing to learn (F2L)* process as teachers is crucial to the implementation of this approach to self-regulated learning. One of the best ways for teachers to practice storing failure indices is through reflective journaling that captures their own prototypes, sketches, "what-ifs," and guesses. These reflections could be professional—focused on the craft of teaching and the domain under study—or personal, including risks and tinkerings in our real lives. When students see teachers storing up failures and half-built ideas and then sharing them openly, students will be more apt to demonstrate that same vulnerability. Moreover, keeping failure indices reminds students that getting something right the first time is actually quite odd. Eyler (2018) notes that there are "more ways to fail than to succeed. Success, by definition, should be very limited. Failure is the default" (p. 172). When teachers store their failure indices alongside students, whether in the form of half-finished prototypes or in reflective journals, we model *failing as learning* and empower students to own and then learn from their mistakes.

Got It, Getting It, Gonna Get It

Perhaps the greatest challenge to implementing *F2L* is the traditional gradebook found in K-12 classrooms, which too often prioritizes speed. For students to truly feel safe taking risks and directing their own learning, they must be able to try and try again. Pink (2009) notes that mastery is an *asymptote*, meaning that it's something we never quite reach. If experts are continually chasing mastery, then we should honor that quest in the classroom.

One of the easiest ways to make this happen is through using the Got It, Getting It, and Gonna Get It card sorters (See Figure 4). Inspired by the Leitner box strategy as detailed in *Make it Stick* (Brown et al., 2014), these cards operate as ever-shifting formative assessments that allow students to be right or wrong depending on where they are in that very moment of the learning process. The Got It card is for when students know the term or concept without hesitation; they can retrieve it without prompting or prodding because it has stuck. The Getting It card is for when students hesitate, retrieve, and then conjure part of the answer or a half-correct answer of the concept under study. This card is a goldmine for teachers because cognitive science research (Agarwal & Bain, 2019; Brown et al., 2014; Willingham, 2021) reveal that when students struggle to remember and then correct themselves, they will remember the concept longer.

Figure 4

Got It and Gonna Get It Card Sorters

This is the power of retrieval practice in a safe environment that encourages error and self-correction. The best failures, however, come from the Gonna Get It card where students are struggling through what Brown et al. (2014) call *desirable difficulties*. When students truly don't know or haven't grasped the concept at all and have permission to place that term or concept card in the Gonna Get It stack, they know that they are on their way to learning and are empowered to self-monitor in an environment that welcomes another attempt. No matter the grade level, the cards provide feedback that is in-the-moment and future-oriented, allowing students to "see themselves as the owners of their own learning" (Hattie, 2012, p. 132).

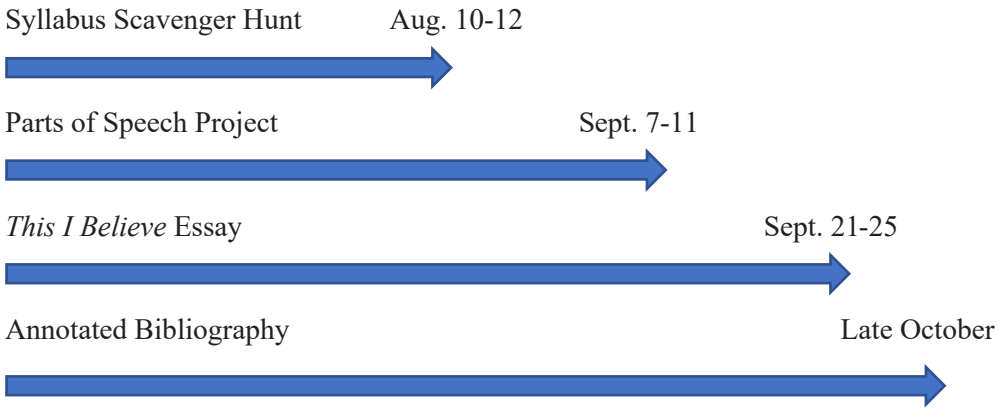
Due Date Windows

Once students are acclimated to the notion that it is normal to not get things right the first time, they are ready to embrace the notion of due date windows for larger projects and tasks with multiple layers or components. Like the preceding card sets, the due date windows push back against the culture of speed and instead advocate for self-regulation, self-assessment, and self-correction. This small pivot can help students embrace the *F2L* mindset at any grade level.

Instead of major tasks and assignments having a specific due date—set oftentimes alongside penalties for lateness—the due date window approach allows teachers and students to co-construct a range for when a robust project or assignment will be due (Figure 5).

Figure 5

Due Date Window Example



(Carter & Tipton, 2020)

As the image shows, teachers and students in this 8th grade ELA class work collaboratively to build the timelines for specific projects but also for longer spans of learning such as a nine-weeks or quarter grading period. When students see the ranges for project completion they helped determine, they are empowered to zig and zag through those timeframes, all while knowing their teacher and their peers are there to help them as they tinker, reflect, and make key adjustments. The due date window concept echoes Fisher and Frey's (2015) argument for self-efficacy and self-monitoring among students: "Collaborative learning arrangements prepare students to demonstrate independence in their learning. By that, we don't mean solitary activities but rather self-directed ones. There's a tremendous amount of self-regulation necessary to be more independent…As students master shorter collaborative learning events, they steadily build their skills and stamina for engaging in inquiry and project-based learning" (p. 10).

As students guide themselves through the windows, they are invited to make mistakes and then capitalize on the learning those mistakes provide. Sawyer (2013) notes that "exceptional creators think differently about failure. Instead of waiting until the end of a project to judge 'success or failure,' they make critical decisions throughout the creative process—every minute, every day, every week" (p. 175). The due date window approach provides grace to students when they take risks and stumble because the window itself *promotes* failure as a way to regroup, recover, and *learn* from failure.

Conclusion

The chaos of the recent school years, coupled with the uncertainties of what the future will bring, have left teachers wondering how to best prepare students to be self-directed, self-motivated, and

self-empowered learners. Many of these key qualities surround the crucial skills of self-regulation and self-assessment. According to Stronge (2018), "self-regulation is widely recognized as a hallmark of 21st century learning and of lifelong learners" (p. 151). Frey, Hattie, and Frey (2018) stress the importance of creating *assessment-capable learners*. This important suite of skills can be developed through a welcoming of *failing to learn* and *learning to fail* strategies. Teachers and students alike are pressured to perform and perform quickly in K-12 schools, and taking the time to slow down, dabble, chase detours, and reflect upon and learn from mistakes is no easy proposition; it is a risk in itself that will result in missteps and miscues. However, adopting and embracing *F2L* is a small step in the quest to create empowered, independent learners.

References

Agarwal, P. K., & Bain, P. M. (2019). *Powerful teaching: Unleash the science of learning*. Jossey-Bass.

Carter, J. L., Tipton, J. C. (2020). *Classrooms built for belonging: Three keys to building reciprocal relationships in middle school classrooms. Promoting positive learning experiences in middle school education* (pp. 100-125). IGI Global.

Brown, P. (2016). *Morning Star*. Del Ray.

Brown, P. C., Roediger, H. L., & McDaniel, M. A. (2014). *Make it Stick: The science of successful learning.* Belknap Press of Harvard University Press.

Dweck, C. S. (2016). *Mindset: The new psychology of success*. Ballantine Books.

Eyler, J. R. (2018). *How humans learn: The science and stories behind effective college teaching*. West Virginia University Press.

Fisher, D., & Frey, N. (2015). *Unstoppable learning: Seven essential elements to unleash student potential.* Solution Tree.

Frey, N., Hattie, J., & Fisher, D. (2018). *Developing assessment-capable visible learners grades K-12: Maximizing skill, will, and thrill*. Corwin Literacy.

Hattie, J. (2012). *Visible learning for teachers: Maximizing impact on learning.* Routledge.

Pink, D. (2009). *Drive*. Riverhead.

Sawyer, K. (2013). *Zig-Zag: The surprising path to greater creativity*. Jossey-Bass.

Schrodt, K. E., Elleman, A. M., FitzPatrick, E. R., Hasty, M. M., Kim, J. K., Tharp, T. J., & Rector, H. (2019). An Examination of mindset instruction, self-regulation, and writer's workshop on kindergarteners' writing performance and motivation: A mixed-methods Ssudy. *Reading & Writing Quarterly, 35*(5), 427–444. https://doi-org.ezproxy.mtsu.edu/10.1080/10573569.2019.1577778

Schrodt, K., FitzPatrick, E., & Elleman, A. (2020). Becoming brave spellers. *The Reading Teacher, 74*(2), 208–214.

Stronge, J. H. (2018). *Qualities of effective teachers* (3rd ed.). ASCD.

Willingham, D. T. (2021). *Why don't students like school? A cognitive scientist answers questions about how the mind works and what it means for the classroom*. Jossey-Bass.

Quote Bank References

Coates, Ta-Nehisi, as quoted in Eyler, J. R. (2018). *How humans learn: The science and stories behind effective college teaching*. West Virginia University Press.

Eyler, J. R. (2018). *How humans learn: The science and stories behind effective college teaching*. West Virginia University Press.

King, H., & King, W. (2017). *Wild Card: 7 steps to an educator's creative breakthrough*. Dave Burgess Consulting.

Heath, C., & Heath, D. (2010). *Switch: How to change things when change is hard*. Broadway Books.

Children's Literature

Beaty, A., & Roberts, D. (2013). *Rosie Revere, Engineer (The Questioneers)* (Illustrated ed.). Harry N. Abrams.

Corchin, D. J., & Dougherty, D. (2020). *A thousand no's: A growth mindset story of grit, resilience, and creativity* (Illustrated ed.). Sourcebooks Explore.

Spires, A. (2017). *The Thing Lou Couldn't Do* (Illustrated ed.). Kids Can Press.

International Journal of the Whole Child
2024, VOL. 9, NO. 1

Tech Talk
Screen Time: Issues and Recommendations

Nancy Caukin[a]

[a]North Greenville University

Nancy Caukin, Ed.D. is the Associate Dean and full professor in the College of Education at North Greenville University where she prepares future educators for the classroom. She serves as the Tech Talk editor for the *International Journal of the Whole Child*. She began her career in outdoor education before her fifteen-year tenure as a high school science teacher. She has been a teacher educator in higher education since 2013.

Abstract

Picture this: Students fully engaged in class activities on their laptops with instructions projected digitally at the front of the room. Meanwhile, some students are discreetly texting on their phones - three devices vying for attention and requiring focus. We often hear about the drawbacks of spending too much time in front of screens, commonly known as screen time. However, what constitutes screen time? Are all forms of screen time equal or detrimental, or are there benefits? What recommendations exist, and how can parents and teachers mitigate the adverse effects of excessive screen exposure? Exploring these questions will yield insights and recommendations.

Types of Screen Time

When considering screen time, it is essential to differentiate between the different forms—passive, social/communication, educational, interactive, and creative. Passive screen time is characterized by simply watching screens like televisions, laptops, phones, and tablets/notebooks. Passive screen time is the earliest and most common form of screen time that most people experience. Social/communication screen time involves using social media, sending texts, and managing emails. People spend many hours on social media, texting, and reading and responding to emails. Educational screen time involves academic pursuits like research and schoolwork on digital platforms. This type of screen time impacts school-age children and adults and has increased dramatically over the last several years. Interactive screen time is evident in video gaming and engaging with learning-oriented games. Many hours are spent in front of a screen by "gamers." Finally, creative screen time involves designing and crafting in digital spaces. This form of screen time is becoming more common and quite popular (Resnick, 2018; Sanders et al., 2019).

Detriments of Too Much Screen Time

According to the American Academy of Child & Adolescent Psychiatry (2020), children between the ages of eight and twelve spend four to six hours, and teens up to nine hours each day in front of a screen. Furthermore, adults may not know what content children are engaged with when in front of a screen or how many hours they spend. Children can be exposed to sexual content, violence, substance abuse, negative stereotypes, and misleading or false information. Many problems have been linked to the type of content and excessive screen time, including lack of physical activity, health issues, interrupted sleep, behavior problems, poor self-image, poor body image, and even violence (AACAP, 2020; Armitage, 2022; Christensen, 2021).

Typically, time spent on a screen is time not spent on physical activity, and lack of physical activity contributes to obesity, a significant health problem among children and adults. Children who spend hours in front of a screen are more likely to be influenced by junk food advertisements, eat fewer fruits and vegetables, prefer fast food, and overeat while watching a screen (Christensen, 2021; Robinson et al., 2017). Additionally, watching more television as children could result in being overweight and obese as adults. Moreover, excessive screen time is associated with hypertension, elevated cholesterol levels, insulin resistance, elevated inflammation, and metabolic syndrome (a cluster of conditions that increase the likelihood of heart disease, stroke, and Type 2 diabetes) (Robinson et al., 2017).

Sleep interruption is another significant detriment to too much screen time. Blue light emitted from devices may interrupt the circadian rhythm, resulting in later bedtimes and less sleep. Additionally, sleep deprivation has been associated with less physical activity and greater snacking outside of mealtimes. Lack of sleep can contribute to a lack of concentration, weight gain, obesity, and other health issues (Christensen, 2021; dos Santos et al., 2024; Robinson et al., 2017).

In addition to adverse health outcomes from excessive screen time, negative behaviors have been exhibited, including impulsive behaviors, aggressive thoughts, and actions, and even violence due to desensitization, overexposure to violence, and lack of intervention (Christensen, 2021; Ricci et al., 2023; Sanders et al., 2019). Excessive screen time can also result in emotional instability and a deficit in social skills, resulting in difficulty establishing relationships (Ricci et al., 2023). Additionally, the more time spent in front of a screen, the less time spent with family, in outdoor physical activity, and schoolwork (Armitage, 2022).

In addition to adverse health and behavior issues, cognitive functioning can suffer because of excessive screen time. A decrease in verbal intelligence related to language skills and a diminished growth in the part of the brain associated with language processing, attention and executive functioning, and emotions and reward are associated with too much screen time (Takeuchi et al., 2018). Moreover, early exposure to devices may affect children's ability to develop reading stamina, which develops over time into automaticity when children learn to focus on letters and the sounds they make. Because screen time is quick, easy, and overstimulating, it can be difficult to ignore (Heubeck, 2024).

Benefits of Screen Time

While excessive screen time may have numerous adverse effects, screen time can offer benefits if appropriately utilized. Developing healthy screen time habits are essential for families and will serve children well.

Dr. Jason Yip, Associate Professor at the University of Washington Information School, who studies technology's role in families to support collaboration and learning, asserts that the quality of screen time is more important than the quantity of screen time. Adjacent to this is that children will learn more from their time using technology if spent with a parent or adult. Playing digital games, exploring content, and talking about what they are experiencing fosters relationship-building and learning. The key is that the adult becomes a learner with the child (Milne, 2023). Others tout that educational screen time could benefit school achievement and persistence, assist in specific subjects like mathematics, and help with problem-solving skills (Ricci et al., 2023; Sanders et al., 2019). Additionally, there are benefits to young children, including promoting creativity, strengthening eye-hand coordination, and social development (Ricci et al., 2023).

Recommendations for Screen Time

The American Association of Child & Adolescent Psychiatry (2020) recommends the following regarding screen time. For children 18 months and younger, screen time should be limited to brief video chats. Between 18 and 24 months of age, watching educational programming with an adult is an appropriate use of screen time. For children, three to five years of age, non-educational screen time should be limited to one hour on weekdays and three hours on weekends. Screen time should be monitored for children six years and older and encouraged to adopt healthy screen time habits. Turning off screens during mealtimes, family time, and about an hour before bedtime is recommended.

Jill Christensen (2021), certified nurse practitioner and author of the Mayo Clinic Health System article "Children and Screen Time: How Much is Too Much?" provides several recommendations for children and screen time. For one, do not have a TV on in the background as it can draw children's attention to it; no TVs in the bedroom since children watch more if there is a TV there; do not eat in front of a screen since it promotes mindless munching and can increase screen time; plan what children watch by previewing shows and incorporate parental controls; watch with children, discussing what is seen, including advertisements; record and watch later in order to fast forward past commercials; and encourage active screen time, meaning incorporating movement while in front of a screen, such as yoga. The Mayo Clinic (n.d.) offers a free two-month program designed to decrease screen time called "Slim Your Screen Time." This program provides many ideas for engaging in activities that replace screen time. Participants are encouraged to try at least 30 during the two months.

Ricci and colleagues (2023), in their article "Impacts of Technology on Children's Health: A Systematic Review," recommend that parents be deeply connected to what their children are doing on screens by monitoring what they view and how much time they spend. They indicate a link between parental awareness and participation and reduced adverse effects, particularly from

a social standpoint. Additionally, they promote being cognizant and understanding of children's feelings regarding screen time.

Dr. Robinson and his team (2017), authors of "Screen Media Exposure and Obesity in Children and Adolescents," recommend no screen time for infants and young children, as children need face-to-face time with parents and family members. They remind that cyberbullying, body shaming, pornography, predation, and inappropriate advertising are possible encounters when children receive a cell phone. They recommend phone-free activities, phone-free spaces, and the use of parental control apps.

Common Sense Media (2022), in their digital article titled "Be A Role Model: Four Ways to Balance Screen Time Around Children," provides several recommendations for screen time for adults. First, set device-free times and zones. It is crucial to be a role model by not bringing the phone to the dinner table and not multitasking while on the phone. Second, set personal screen time goals. Be mindful of when and why the phone is being used and adhere to personal goals. Third, keep distractions to a minimum. Turn off notification alerts and turn on "Do not disturb." Fourth, watch and play movies, shows, and games with children. Ask them questions to promote their thinking, understand their interests, and build deep and lasting connections.

Ways to Manage Screen Time

Managing screen time takes work and effort. Adults need to monitor their children's screen time and their own. Common sense media (n.d.) promotes the importance of discussing screen time expectations with the family and using a Family Tech Planner on their Make Screen Time Safe and Positive website. They provide planners for families with children two to eight years old, nine to twelve years old, and thirteen years old and older in English and Spanish.

Apple (2024) has Screen Time as a feature on their phones, iPads, and iPods, which has many uses. For example, schedule downtime, add app time limits (all or select apps), determine which apps are allowed and prohibited, monitor screen distance, set communication limits (with whom and whether during screen time or downtime), select communication safety (detects inappropriate content before the child can view it), and set content and privacy restrictions (block content, purchases, and downloads). Adults can view reports on how much time has been spent and on what apps, what notifications came through, and even how many times the phone was picked up. Parents can also lock Screen Time settings so children cannot change them. Apple also provides child safety resources to better educate parents on keeping children safe online. Thorn for Parents (2024) is available on phones and online to assist parents in having conversations with children about what they are or may experience as screen users.

Google (n.d.) also provides safety features for Android 7 and higher and Chromebooks when a Google account is set up in Family Link platform. Time limits with time left notifications are provided, and children cannot unlock them once the device is locked. Some apps or contacts can always be made available if chosen. Additionally, Google provides digital guidebooks for adults to help them navigate Family Link and connect with valuable resources.

Bark (bark.us) is a paid service that helps parents monitor content accessible on devices. It can help parents track location, manage screen time, filter content, block websites, and send out alerts 24/7. Unlike the abovementioned resources, Bark can pause the internet on children's devices. An easy solution to keep children from being on their phones at night is to collect them before bed.

Conclusion

Screens are not going away, and neither are the inherent risks associated with them. It is imperative to be aware of the dangers of excessive screen time for children and adults and mitigate those risks by being informed and proactive. Mitchel Resnick (2018), part of the MIT Media Lab that created Scratch, the largest coding community for children, recommends engaging students in creative screen time rather than minimizing screen time, focusing on quality rather than quantity, and getting involved in your child's screen time. Why not make screen time a safe, healthy, enjoyable, and collaborative experience for everyone?

References

American Academy of Child & Adolescent Psychology (2020). Screen time and children. https://www.aacap.org/AACAP/Families_and_Youth/Facts_for_Families/FFF-Guide/Children-And-Watching-TV-054.aspx

Apple (2024). Use Screen Time on your iPhone, iPad, or iPod Touch. https://support.apple.com/en-us/108806

Armitage. H. (December 9,2022). Screen time: The good, the healthy, and the mind-numbing. SCOPE Beyond the Headlines. Stanford Medicine. https://scopeblog.stanford.edu/2022/12/09/screen-time-the-good-the-healthy-and-the-mind-numbing/

Christensen, J. (May 28, 2021). Children and screentime: How much is too much? Speaking of Health. Mayo Clinic Health System. https://www.mayoclinichealthsystem.org/hometown-health/speaking-of-health/children-and-screen-time

Common Sense Media (October 14, 2022). Be a role model: 4 ways to balance screen time around children. https://www.commonsensemedia.org/articles/be-a-role-model-4-ways-to-balance-screen-time-around-children

Common Sense Media (n.d.) Make screen time safe and positive. Family Tech Planners. https://www.commonsensemedia.org/family-tech-planners

dos Santos, A.B., Prado, W. L., Tebar, W. R., Ingles, J., Ferrari, G., Morelhão, P.K., Borges, L.O., Ritti Dias, R.M., Beretta, V. S., Christofaro, D.G.D. (2024). Screen time is negatively associated with sleep quality and duration only in insufficiently inactive adolescents: A Brazilian cross-sectional school-based study. *Preventative Medicine Reports, 37*, 1-5. https://www.sciencedirect.com/science/article/pii/S2211335523004709

Google Guidebooks (n.d.) Family Link. https://guidebooks.google.com/family-link?utm_source=hc_butterbar&utm_medium=hc&utm_campaign=familylink_guidebook

Heubeck, E. (January 15, 2024). Is too much screen time, too early, hindering reading comprehension? *Education Week*. Reading and Literacy. https://www.edweek.org/teaching-learning/is-too-much-screen-time-too-early-hindering-reading-comprehension/2024/01?utm_source=nl&utm_medium=eml&utm_campaign=tl&M=8793229&UUID=4363e7be89561e25502c7ea41dab7b1d&T=11641856

Mayo Clinical Health Systems (2024). Slim your screen time. https://www.mayoclinichealthsystem.org/wellness/slim-your-screen-time#:~:text=Slim%20Your%20Screen%20Time%20is,your%20mood%20and%20mental%20health.

Milne, S. (August 22, 2023). Q&A: As AI changes education, important conversations still happen off-screen. Information School University of Washington. https://ischool.uw.edu/news/2023/08/qa-ai-changes-education-important-conversations-kids-still-happen-screen

Resnick, M. (2018). Screen time? How about creativity time? *Medium*. MIT Media Lab. https://medium.com/mit-media-lab/screen-time-how-about-creativity-time-928528c0214

Ricci, R. C., Ribeiro, I. C., Aprile Pires, L. S., Leite Facina, M. E., Cabral, M. B., Parduci, N. V., Spegiorin, R. C., González Bogado, S. S., Sergio Chociay, J., Carachesti, T. N., &

Larroque, M. M. (2023). Impacts of technology on children's health: A systematic review. *Revista Paulista de Pediatria*, *41*. https://doi.org/10.1590/1984-0462/2023/41/2020504

Robinson, T. N., Banda, J. A., Hale, L., Lu, A. S., Fleming-Milici, F., Calvert, S. L., & Wartella, E. (2017). Screen Media exposure and obesity in children and adolescents. *Pediatrics*, *140*(Suppl 2), S97. https://doi.org/10.1542/peds.2016-1758K

Sanders, T., Parker, P., del Poco-Cruz, B., Noetel, M., Lonsdale, C. (2019). Type of screen time moderates effects on outcomes in 4013 children: Evidence from the longitudinal study of Australian children. *International Journal of Behavioral Nutrition and Physical Activity, 16* (117). https://ijbnpa.biomedcentral.com/articles/10.1186/s12966-019-0881-7

Takeuchi, H., Taki, Y., Asano, K., Asano, M., Sassa, Y., Yokota, S., Kotozaki, Y., Kawashima, R. (2018). Impacts of frequency of internet use on development of brain structures and verbal intelligence: A longitudinal study. *Human Brain Mapping, 39*(11), 4471-4479. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6866412/

Thorn for Parents (2024). https://parents.thorn.org/?gad_source=1&gclid=Cj0KCQiAz8GuBhCxARIsAOpzk8wF4RQsg1Gkl15gpPe1QSULc6x_AKeswxp3nx6Tk-C36QP-IABKgb4aAkjdEALw_wcB

International Journal of the Whole Child
2024, VOL. 9, NO. 1

Science, Technology, Engineering, Art, and Mathematics: STEAM
The Impact of Authentic Early Childhood STEM Experiences on Cognitive Development

Brian Stone[a]

[a]Northern Arizona University

Dr. Brian Stone is an Assistant Professor at Northern Arizona University. He is the faculty lead for the Professional Development School program and the Museum of Northern Arizona Partnership program at NAU. He received his doctorate in curriculum and instruction with a content concentration in science and math education. He also holds two master's degrees, one in elementary education, and another in World War II studies. He teaches both undergraduate and graduate courses, including courses in the doctoral program. Dr. Stone specializes in science education, but also teaches methods courses in social studies, math, literacy, and assessment. While at NAU, Dr. Stone has led multiple study abroad trips all around the world to study multiage education and integrated curriculum. He has taken students to New Zealand, Australia, the United Kingdom, Ireland, Germany, Austria, Switzerland, and France. Dr. Stone also serves as the editor for the STEAM section of the International Journal of the Whole Child. He is a Play Ambassador and recurring Expert Contributor for the Genius of Play (a non-profit website devoted to play advocacy), which is a part of The Toy Association. Dr. Stone has many areas of expertise and interests including scientific inquiry, play, integrated curriculum, and multiage education. Prior to teaching in higher education, Dr. Stone served as a 4th, 5th, and 6th grade multiage teacher. He was the lead multiage teacher in his school and helped other multiage teachers in their implementation of multiage strategies in the classroom. He also works as an educational consultant, traveling all over the United States and around the world helping schools with multiage programs. Dr. Stone has authored many peer-reviewed journal articles and book chapters in the aforementioned areas.

Abstract

Early experiences in STEM education can contribute to positive cognitive development in young children. When students have the opportunities to play, inquire, follow their interests/curiosities, develop STEM identities, be creative, and operate within concrete/contextualized STEM explorations, they will experience expansive cognitive growth. Cognitive benefits include expanded thought capacity, increased creativity, better problem-solving abilities, a developing capacity for research, better exploration processes, and better observational powers. Implications for practice and recommendations for educators are discussed.

Keywords: STEM, Child Development, Cognitive Development, Early Childhood, Play, Inquiry

Introduction

The general development of a child is a complex, dynamic process that is interdependent on several factors. According to Richter et al. (2019), experiences in a child's early years can significantly "shape biological and psychological structures and functions in ways that affect health, well-being and productivity throughout the life course" (para. 1) Strong child development across general domains, which include the cognitive, social, emotional, and physical realms is crucial for long-term academic success, individual thriving, and social/emotional maturity (US Department of Health and Human Services, 2022; Diamond, 2010). Though a healthy general development is critical to a child's future success, experiences in STEM, especially during the vital early period of neuroplasticity (first 2-3 years of life), can serve as a catalyst for expansive cognitive growth. Ulu and Kiraz (2014) suggest that not only do early experiences in STEM provide opportunities for expanding thought capacity and creativity, but these experiences can foster the child's capacity for problem-solving, researching, exploring, and observing through a child's own unique engine of curiosity. A child's interests are the key to unlocking these critical developmental pathways (Neitzel et al., 2019). Furthermore, future curriculum in STEM areas can be built directly from a child's original interests and inquiries while promoting exploration, experimentation, and STEM learning (Guarrella et al., 2022).

Due to the importance of quality initial STEM experiences in a child's cognitive development, stakeholders, including parents and early childhood educators, need to consider the axiological characteristics for high-impact pedagogical approaches and experiential activities. In other words, what constitutes quality or authentic STEM experiences, and how will those experiences maximize a child's cognitive development? Furthermore, how can educators and parents prioritize/foster these experiences? The purpose of this paper is to explore the factors that impact healthy development through STEM activities while also providing recommendations for educators and parents. Since authentic STEM experiences are an important early pathway for constructive cognitive development, stakeholders must be aware of the critical significance of play, interest-based/child-led inquiry, identity development, creativity, and concrete/contextualized activities. These traits, when fostered in early childhood STEM experiences can lead to increased observational capacity, divergent thinking and creative innovation, problem-solving, critical thinking, engagement in science and engineering practices, conceptual development, and meaningful retention (Firdaus & Rahayu, 2019, Stone et al., 2019). In addition, these types of holistic, child-centered, inquiry and play-based activities will foster healthy cognitive development, increase STEM engagement and identity, and create pathways for future STEM success.

Factors that Promote Positive Cognitive Development through STEM Activities

Play represents a strong mode for positive, general development across all domains. According to Yogman et al. (2018), play is essential to development as it "enhances brain structure and function and promotes executive function" (para. 2) Furthermore, play is necessary for the development of problem-solving skills, collaboration, creativity, and prosocial behaviors (Yogman et al, 2018). However, the role that play performs in STEM is not as well researched as its general benefits to the developing child. The literature is clear that play in STEM areas affords children the opportunities to increase their imagination as it relates to STEM subjects,

ponder new meanings and possibilities, engage in STEM talk, and increase the capacity for authentic inquiry (Vartianinen & Kumpulainen, 2020). Furthermore, both unstructured and structured play in STEM are critical components of impactful instructional models that will foster meaningful and relevant learning experiences (Kennedy & Tunnicliffe, 2022). Play in STEM promotes high-level engagement, inclusion, and holistic skill development through activities that promote joy, meaning, and intrinsic motivation (Parker et al., 2022). Play also offers pathways for children to build their understanding of STEM concepts as they engage with materials in divergent ways while exercising their authentic inquiry (Stone et al., 2019). For example, children playing with magnets can discover concepts like attraction and repulsion, and they can discover that magnets will stick to metals. This process can occur holistically and organically through their free play and the employment of their personal inquiries. Play opportunities in STEM should involve plenty of time and materials for free explorations, questioning, investigation, and the testing of hypotheses.

Early experiences in STEM should also be driven through the natural engine of a child's curiosity. Harackiewicz et al. (2016) suggest that a child's interest is one of the most "powerful motivational process that energizes learning," and it is particularly needed in STEM subjects that often do not capitalize on students' interests (para. 1). Interest is also crucial for healthy cognitive development. McIntyre et al. (2021) suggest that interests are a significant factor in cognitive processes and that it is possible to dramatically increase STEM engagement and learning by making the content "interest relevant" (para. 12). In terms of cognitive development, interest plays a key role. When a child's interest is piqued, they have an elevated awareness that drives further investigation, and increases the construction of new knowledge while facilitating positive cognitive ontogenesis (Van Aswegen & Pendergast, 2023). For parents and early childhood educators, the goal is to create the right circumstances and contexts where children will develop interests in STEM areas. Creating these environments that foster interest include triggering situational interest through new experiences, maintaining situational interest through relevant connections, encouraging emerging individual interests through independent inquiries and choice, and aiding an enduring/well-developed interest that is deeply connected to identity in STEM (Renninger & Hidi, 2015; AIR, 2024). In one major study, relevance of the STEM content and the agency of the child were found to be significant factors in children developing situational and individual interest (AIR, 2024). Curiosity is an innate and powerful mechanism that can and should be fostered in the early STEM experiences of children. Curiosity represents the pathway for children to explore their interests in individual, dynamic ways.

Closely related to interest, authentic inquiry in STEM areas will provide children an opportunity to explore and investigate through meaningful activities. These inquiries are crucial to children's work as scientists, engineers, and mathematicians. As children actively engage in exploring the world through inquiry, they come to better understand it, and therefore the child is a scientist, even from birth (Shrager & Carver, 2012; NRC, 2012). Inquiry processes, especially in developing young minds involve observations, wonder about the world, process-oriented explorations, questioning, investigations, identifying patterns, working collaboratively, and sharing ideas (Worth, 2010). Furthermore, inquiry approaches will foster critical thinking, communication, collaboration, and creativity (Spector & Ma, 2019). Perhaps most importantly, the self-creation of knowledge through independent and individually owned explorations "can activate deeper cognitive processing and improve long-term retention compared to the passive

reception of information" (Kaiser et al., 2018, para. 1). Further supported by research in cognitive psychology, maximum open-endedness (of the inquiry activities) and high self-creation (of the child) have been demonstrated to benefit long-term learning (retention) and application (Kaiser et al., 2018). Inquiry process is deeply active and should naturally involve engagement through science and engineering practices. Furthermore, inquiry provides opportunities for organic/meaningful integration. Inquiry is most potent when the questions and processes belong to the individual child and are driven by their curiosity.

In addition to play, interest, and authentic inquiry, cognitive development through STEM activities is influenced by the creation of a positive identity in STEM subjects. STEM identity is a key to building a strong scientific literacy (Brown et al., 2005). Not surprisingly, interest is a significant attribute in constructing a robust STEM identity, as children begin to feel a sense of belonging through their interest-driven activity (Kim, Sinatra, & Seyranian, 2018). Furthermore, the lack of a STEM identity can lead to disengagement, which weakens future prospects and activity in STEM areas (National Inventors Hall of Fame, 2024). According to one study, students develop metacognitive awareness through a strong STEM identity, and opportunities for experiential, open-ended STEM explorations contribute to students' strong problem-solving skills in STEM contexts (Huvard et al., 2020). Moreover, a sense of belonging and STEM identity are crucial factors in students developing a high motivation, practical STEM skills, and future success in STEM careers (Mulvey et al., 2023). In order to develop a strong STEM identity, young children need plenty of opportunities to engage with STEM toys, play and imagine, authentically inquire, explore through their curiosity, investigate their interests, and operate in carefully designed STEM contexts that promote open-ended explorations with educators as a guide and facilitator of meaningful processes. Children also need opportunities to think critically, innovate, think divergently, problem-solve, and persist through challenges. By developing a positive identity and a strong sense of belonging, children will not only learn to persevere through challenges, but they will cling to STEM as a defining trait of their existence.

Creativity and its link to STEM experiences, though not substantially researched, is an emerging factor in cognitive development and future STEM success. In one study, children who were engaged in STEM activity, and who enjoyed STEM experiences, demonstrated a significantly higher level of creativity than students who were not engaged or did not enjoy STEM (Borg Preca et al., 2023). Furthermore, when students are engaged in project-based STEM activities, they operate in the creative realms of adventurousness, curiosity, imagination, resolution, elaboration, and novelty (Hanif et al., 2019). These realms are integral to healthy cognitive development. According to Khalil et al. (2019), creative cognition is rooted in executive functioning and positive moods increase creative thinking. Furthermore, healthy development is dependent on cognitive, motivational, and emotional traits that support creative ideation (Khalil et al., 2019). This study is highly interrelated to the aforementioned work on play and identity in that play specifically provides opportunities for executive functioning, and identity development helps individuals attach positive moods/motivational elements to STEM activities. When considering that STEM is a highly creative set of interrelated fields, and that its progress relies heavily on the imagination and the creativity of its pupils (Morgan et al., 2023), it is of the utmost importance that young children have the opportunities to engage creatively within STEM. However, STEM teaching and learning experiences have often been reduced to a rigid, positivistic system of prescribed endeavors that preclude students' creativity and dynamic

cognition. Therefore, it is necessary to shift away from or greatly reduce STEM methods that favor memorization and convergent activity. Instead, young children need to engage creatively within STEM experiences, and they can do so by operating as innovators, imaginers, and players within their own internally created representations of STEM concepts. Here, the teacher or parent can operate as a guide and facilitator but must resist becoming the giver of knowledge. The capacity to think limitlessly through play, especially, can have a profound impact on the direction and success of the child.

Finally, STEM education should be context-driven and utilize concrete experiences to engage learners. Concrete experiences in STEM offer opportunities for children to see concepts represented through experiments, manipulations, and investigations that favor direct activity rather passivity. Furthermore, concrete explorations demonstrate the concept through physical knowledge involving visual/spatial representations, touch, and the ability of the learner to work through the concept using physical (concrete) media. These experiences are most effective when they allow the child to build from previous knowledge and fit within Dewey's principle of interaction which states that external factors need to align with internal factors (Baroody, 2017). In other words, the context must be meaningful and relevant to the individual child, interest is a significant factor, and the experience must be concrete and tied to the student's level of familiarity. According to Piaget's theory of cognitive development, "problem solving and cognitive development progress from establishing object permanence, causality, and symbolic thinking with concrete (hands-on) learning to abstract thinking and embedding of implicit to explicit memory development" (Malik & Marwaha, 2023, para. 7). There is a continuum of learning and development that varies by child, and the capacity for abstraction is built over time from the operation of the individual in the concrete realm and the development of symbolic thinking first. It would belie the generally accepted belief that students can learn effectively through whole-group (often abstract) instruction when context, interest, and individual readiness are such significant factors in the learning process and can vary widely from individual to individual. Furthermore, STEM activities must involve a relevant context through which students engage in problem-based or project-based learning, inquiry, and design through real-world examples (Sutaphan & Yuenyong, 2019). The isolated, discrete, sterile environments where STEM concepts are efficiently delivered through a prescribed curriculum and standardized teaching disallow the flexibility for individual, context-driven explorations that are highly divergent and dependent on the learner's interests/understandings.

Discussion and Implications

Authentic STEM learning should be characterized by frequent opportunities for unstructured play (in STEM domains), capitalize on a child's natural engine of curiosity to explore the world, foster the child's unique interests, allow for multiple authentic inquiries and engagement in science and engineering practices, create a strong STEM identity, promote creativity and creative thinking, and be characterized by meaningful, relevant, concrete, and context-driven explorations. When young children operate in authentic STEM experiences, they have the opportunity for expansive cognitive growth and development. Children increase observational capacity, divergent thinking and creative innovation, problem-solving, critical thinking, engagement in science and engineering practices, conceptual development, and meaningful retention. Early childhood educators and parents should be aware that an overly academic focus

on STEM, meaning strict programs that emphasize content knowledge memorization, are too limiting. In fact, they can be detrimental not only to the child's development of a STEM identity, but to their cognitive development. Even programs that are active (hands-on) can be ineffective if they are too teacher-directed with little to no opportunity for children's authentic inquiry, play, creativity, and connections to personal relevance. From an early age, the child should be immersed in STEM materials, toys, language, and contexts (e.g. trips to the science museum or space center, etc....). The child should have complete control over the direction and magnitude of their wonder with the adult(s) serving as a guide only. Educators and parents should recognize the interests of the child and foster those interests through material and experiential activities. Potential barriers for formal STEM programs include a standardized curriculum program, standards, a lack of teacher training/understanding, and a lack of adequate materials for exploration and investigation.

Conclusion

STEM learning is too often characterized by teacher-directed, overly content-oriented, prescribed procedures that are derived from standardized curricula. In these types of environments, young children are often not afforded the opportunities to play, authentically inquire, follow their interests, or develop conceptual understandings through concrete, context-driven explorations. Based on emerging research in cognitive development, a more holistic, child-led STEM approach is recommended, especially for early childhood programs. Children should have freedom and plenty of time/resources to freely play with STEM materials (obviously in a safe manner). Through their play, they will discover certain concepts, build foundations for future instruction through personally relevant experience, exercise inquiries and scientific process, and develop a potentially strong identity in STEM. Furthermore, by fostering a more child-centered STEM approach, children will have opportunities to engage and progress cognitively by expanding thought capacity and creativity and increase their capacity for problem-solving, researching, exploring, and observing. Quality STEM experiences in early childhood can provide pathways for children to develop STEM understandings, build strong foundations for constructing future knowledge, create a robust identity in STEM, and lead to future success in their academic and career endeavors. Educators and parents should be aware of the nature of the impact of these types of authentic experiences and advocate for better practice.

References

American Institutes for Research. (2024). *STEM interest and engagement (STEM IE) study*. https://www.air.org/project/stem-interest-and-engagement-stem-ie-study

Baroody, A. (2017). The use of concrete experiences in early childhood mathematics instruction. In J. Sarama et al., (Eds.) *Advances in Child Development and Behavior* (Vol. 53), (pp. 44-87). Elsevier.

Borg Preca, C., Baldacchino, L., Briguglio, M., & Mangion, M. (2023). Are STEM students creative thinkers? *Journal of Intelligence, 11*(6). https://doi.org/10.3390/jintelligence11060106

Brown, B., Reveles, J., & Kelly, G. (2005). Scientific literacy and discursive identity: A theoretical framework for understanding science learning. *Wiley InterScience*. https://onlinelibrary.wiley.com/doi/pdf/10.1002/sce.20069

Diamond, A. (2010). The evidence base for improving school outcomes by addressing the whole child and by addressing skills and attitudes, not just content. *Early Education and Development*, 21(5), 780-793.

Firdaus, A., & Rahayu, G. (2019). Effect of STEM-based learning on cognitive skills improvement. *Elementary School Forum*, 6(2), 198-207.

Guarrella, C., van Driel, J., & Cohrssen, C. (2022). Science education in early childhood education-Are we approaching a cure for the state of chronic illness? *Research in Science Education*, 52, 37-45.

Hanif, S., Wijaya, A., & Winarno, N. (2019). Enhancing students' creativity through STEM project-based learning. *Journal of Science Learning*, 2(2), 50-57.

Harackiewicz, J., Smith, J., & Priniski, S. (2016). Interest matters: The importance of promoting interest in education. *Policy Insights from the Behavioral and Brain Sciences*, *3*(2) 220-227. http://dx.doi.org/10.1177/2372732216655542

Huvard, H., Talbot, R., Mason, H., Thompson, A., Ferrara, M., & Wee, B. (2020). Science identity and metacognitive development in undergraduate mentor-teachers. *International Journal of STEM Education*, 7(31). https://doi.org/10.1186/s40594-020-00231-6

Kaiser, I., Mayer, J., & Malai, D. (2018). Self-generation in the context of inquiry-based learning. *Frontiers in Psychology*, 9. https://doi.org/10.3389/fpsyg.2018.02440

Kennedy, T., & Tunnicliffe, S. (2022). Introduction: The role of play and STEM in the early years. In S. Tunnicliffe & T. Kennedy (Eds.) *Play and STEM Education in the Early Years* (pp. 3-37). Springer.

Khalil, R., Godde, B., & Karim, A. (2019). The link between creativity, cognition, and creative drives and underlying neural mechanisms. *Frontiers in Neural Circuits,*13. https://doi.org/10.3389/fncir.2019.00018

Kim, A., Sinatra, G., & Seyranian, V. (2018). Developing a STEM identity among young women: A social identity perspective. *Review of Educational Research*, 88(4), 589-625. https://doi.org/10.3102/0034654318779957

Malik, F. & Marwaha, R. (2023). Cognitive development. *StatPearls*. https://www.ncbi.nlm.nih.gov/books/NBK537095/

McIntyre, M., Gundlach, J., & Graziano, W. (2021). Liking guides learning: The role of interest in memory for STEM topics. *Learning and Individual Differences,* 85. http://dx.doi.org/10.1016/j.lindif.2020.101960

Morgan, R., Kneebone, R., Pyenson, N., Sholts, S., Houstoun, W., Butler, B., & Chesters, K. (2023). Regaining creativity in science: Insights from conversation. *Royal Society Open Science*. http://dx.doi.org/10.1098/rsos.230134

Mulvey, K., McGuire, L., Mathews, C., Hoffman, A., Law, F., Joy, A., Hartstone-Rose, A., Winterbottom, M., Balkwill, F., Fields, G., Butler, L., Burns, K., Drews, M., & Rutland, A. (2023). Preparing the next generation for STEM: Adolescent profiles encompassing math and science motivation and interpersonal skills and their associations with identity and belonging. *Youth & Society,* 55(6), 1207-1230. http://dx.doi.org/10.1177/0044118X221085296

National Inventors Hall of Fame. (2024). What is a STEM identity? https://www.invent.org/blog/trends-stem/stem-identity

National Research Council. (2012). *A framework for K-12 science education*. National Academies Press.

Neitzel, C., Alexander, J., & Johnson, K. (2019). The emergence of children's interest orientations during early childhood: When predisposition meets opportunity. *Learning, Culture and Social Interaction*, 23. http://dx.doi.org/10.1016/j.lcsi.2019.01.004

Parker, R., Thomsen, B., & Berry, A. (2022). Learning through play at school-A framework for policy and practice. *Frontiers in Education*, 7. https://doi.org/103389/feduc.2022.751801

Renninger, K., & Hidi, S. (2015). *The power of interest for motivation and engagement*. Routledge.

Richter, L., Black, M., Britto, P., Daelmans, B., Desmond, C., Devercelli, A., Dua, T., Fink, G., Heyman, J., Lombardi, J., Lu, C., Naicker, S., & Vargas-Baron, E. (2019). Early childhood development: An imperative for action and measurement at scale. *BMJ Global Health*. http://dx.doi.org/10.1136/bmjgh-2018-001302

Shrager, J., & Carver, S. (2012). *The journey from child to scientist: Integrating cognitive development and the education sciences*. American Psychological Association. https://doi.org/10.1037/13617-000

Spector, J., & Ma, S. (2019). Inquiry and critical thinking skills for the next generation: From artificial intelligence back to human intelligence. *Smart Learning Environments,* 6(8). https://doi.org/10.1186/s40561-019-0088-z

Stone, B., Lorentsen, L., & Schmidt, M. (2019). Exploring the role of free play in elementary science. In M. Han & J. Johnson (Eds.) *Play and Culture Studies V. 15: Play and Curriculum*. Lanham, MD: Hamilton Books.

Sutaphan, S. & Yuenyong, C. (2019). STEM education teaching approach: Inquiry from the context based. *Journal of Physics: Conference Series*. http://dx.doi.org/10.1088/1742-6596/1340/1/012003

Ulu, E., & Kiraz, A. (2014). Science education and cognitive development in updated 2012 pre-school curriculum. *Procedia – Social and Behavioral Sciences,* 136, 438-451.

US Department of Health and Human Services. (2022). Office of Early Childhood Development. *About section*. https://www.acf.hhs.gov/ecd/about

Van Aswegen, E., & Pendergast, D. (2023). The impact of interest: An emergent model of interest development in the early years. *Early Child Development and Care,* 193(13-14), 1335-1349. http://dx.doi.org/10.1080/03004430.2023.2245575

Vartiainen, J., & Kumpulainen, K. (2020). Playing with science: Manifestation of scientific play in early science inquiry. *European Early Childhood Education Research Journal,* 28, 490-503.

Worth, K. (2010). *Science in early childhood classrooms: Content and process*. Collected Papers from the SEED (STEM in Early Education and Development) Conference May 2010, University of Northern Iowa.

Yogman, M., Garner, A., Hutchinson, J., Hirsh-Pasek, K, Golinkoff, R. Baum, R., Gambon, T., Lavin, A., Mattson, G., Wissow, L., Hill, D., Ameenuddin, N., Chassiakos, Y., Cross, C., Boyd, R., Mendelson, R., Moreno, M., Radesky, J., Swanson, W., & Smith, J. (2018). The power of play: A pediatric role in enhancing development in young children. *Pediatrics,* 142(3) https://doi.org/10.1542/peds.2018-2058

International Journal of the Whole Child
2024, VOL. 9, NO. 1

Families and Children: Health and Wellness
The Role of Coaches in the Mental Health of Youth Athletes

Chandler Coley[a], Tiffany Wilson[b]

[a-b]Middle Tennessee State University

Chandler Coley is a graduate student pursuing his Ed.S. in Professional Counseling at Middle Tennessee State University. He is completing his Clinical Mental Health Counseling internship at Branches and plans to graduate in August of 2024. In the future, he plans to utilize his background in sports and the skills he has acquired as a counselor in training to work with athletes at the collegiate and professional level.

Dr. Tiffany Wilson currently serves as an Associate Professor and School Counseling Program Coordinator in the Professional Counseling Program at MTSU. Prior to joining the MTSU faculty, Dr. Wilson worked as a high school counselor and a licensed career development coordinator in North Carolina public schools. She also worked as a therapist in various clinical settings. In addition to being a Licensed Clinical Mental Health Counselor and Licensed School Counselor, Dr. Wilson is also a National Certified Counselor, a Certified Clinical Trauma Professional, a Board Certified Tele-mental Health Professional, and a Qualified Supervisor.

Introduction

It is no secret technology has had a profound impact on shaping the twenty-first century. Computers are thinner, TVs are bigger, and shopping can be done from the comfort of one's living room. Despite all these changes, one thing that has remained constant is people's love of sports. Whether it was to watch the game, the commercials, or the halftime shows, the 2024 Super Bowl set the record as the most viewed telecast of all time with the 2023 Super Bowl being the previous record holder. Among these viewers were children across the country with dreams of playing in their own Super Bowl, World Series, WNBA/NBA Finals, or World Cup. To achieve these dreams, coaches can play a significant role in helping youth athletes develop mental and physical stamina to compete in sports at the highest level.

In 2020, the U.S. Department of Health and Human Services reported that 54.1% of children aged 6-17 had been involved in sports within the past year (Black et al., 2022). Despite minor differences between gender, the study indicated that over half of the youth population in America was involved in some form of organized athletic activity (Walton et al., 2022, p. 119). In theory, these statistics are encouraging as there are many psychological, biological, and social benefits associated with sport participation. Furthermore, these settings can foster important developmental skills such as responsibility, communication, and emotional regulation (Walton et

al., 2024). Unfortunately, there are also unique challenges and stressors accompanying these benefits that negatively impact a young athlete's mental health if left untreated.

A study conducted by Walton et al (2024) took a closer look at some the primary factors afflicting this population. Immense pressure to perform can lead to perfectionistic tendencies and self-criticism (ps. 120-123). Burnout, which is marked by "physical and emotional exhaustion, can lead to a reduced sense of accomplishment, and sport devaluation" (p. 123). Symptoms of burnout have been heightened by the increase in sport specialization at a young age. In addition, youth athletes are under pressure from interpersonal conflict stemming from both parents and peers. Finally, abuse/maltreatment, injury and concussion, body image and weight concerns, and disrupted sleep are causes for concern as well (p. 123-124).

Role of Coaches

It is important to note that nearly 50% of all psychological disorders begin before one reaches fourteen years old. Within this group of adolescents, over a third never pursue professional help (Ferguson et al., 2018, p. 236). This is primarily due to a lack of awareness and the negative stigma surrounding mental health services. While these statistics pertain to the youth and adolescent population, athletics present a golden opportunity to serve over half of these young Americans. Coaches can play a significant role in supporting the mental health of young athletes. If coaches are given the right tools and training, they have the capacity to facilitate change in a profound way on a national level. Fortunately, many coaches have already accepted and acknowledged the responsibility to promote and support the mental health of their athletes (Elliott et al., 2023, p. 2).

The first step towards cultivating a healthier environment for young athletes is increasing the mental health literacy of coaches. In a study conducted by Ferguson et al. (2018), they noted that "in most cases coaches were unsure of *what* help was necessary and unsure of *how* to provide that help" (p. 247). Furthermore, some coaches were hesitant to address mental health-related issues due to the negative stigma and corresponding player reactions. As it stands, some coaches in the study reported they would never use the words "mental health" to address concerns because players would "shut down" (p. 243). This kind of response is to be expected of a population whose environment so highly rewards values like mental fortitude and the concept of never showing weakness (Watson, et al., 2022, p. 125). This kind of mentality, be it overt or covert, teaches young athletes to downplay their emotional struggles or hide them completely (p. 125).

To combat the existing stigma, a greater emphasis must be placed on awareness and normalization. As it turns out, coaches already have ideas on how this can be accomplished. Those who participated in Ferguson et al. (2018)'s study suggested that a social media campaign could increase mental health awareness (p. 244). In addition, posters/flyers positioned in frequently traveled places had the capacity to garner attention. Furthermore, coaches determined that having mental health-related information readily available on a club or organization's website would be a simple and easy way for young athletes and their parents to access information when needed. Finally, the authors of the study suggested an increased emphasis on utilizing professional athletes to decrease the stigma towards mental health (p. 247). These ideas

have the capacity to take the burden of broaching the topic off coaches' shoulders by evoking change on a societal level and making the topic of mental health in athletic settings less taboo.

Beyond advocating for awareness and being receptive to conversations from players surrounding mental health, the next step for coaches is education. It stands to reason that coaches desire players to trust them with their psychological struggles, they must first strive to ensure they themselves are not the primary stressors. If used inappropriately, a coach's position of power can have a profoundly negative impact on the lives of their players. Issues like neglect, maltreatment, and abuse by coaches can result in depression, anxiety, PTSD, and eating disorders (Walton et al., 2024, p. 124). Furthermore, the athletic arena can also be a breeding ground for "sport-specific forms of abuse such as body shaming, and encouragement to dope, cheat, or play when injured/concussed" (p. 122). Accountability, awareness, and a focus on coaches' own mental health may serve to minimize these risks.

Trauma-Informed Coaching

In addition to eliminating more obvious behaviors, there is also a movement for coaches to begin adopting a trauma-informed coaching style. SAMHSA defines trauma as "a physically or emotionally harmful event that deleteriously impacts individuals' physical and mental health" (Hussey et al., 2023, p. 29). These events, especially repeated events or exposure occurring in childhood, can result in a plethora of mental health problems such as substance abuse, depression, heart disease, low self-esteem, trouble in relationships, and more (Hertzler-McCain et al., 2023, p. 1). Furthermore, they can negatively affect youth development via behavior, impulse control, attachment, and cognitive functioning (Hussey et al., 2023, p. 29). While traumatic events may not occur on the field, coaching with a trauma-informed lens has the potential to radically benefit the mental health of young athletes (p. 30).

One study conducted by Hussey et al. (2023) discussed the benefits of incorporating five trauma-sensitive principles that are tailored to youth athletics. They include "physical and emotional safety, long-term engagement, attachment focus, supportive organizational structure, and integration with local cultural practices" (p. 30). To implement these principles, a myriad of steps was suggested such as coach education, cultivating supportive and safe environments centered around relationship development, and autonomy. The results of the study generated a myriad of ideas and insights related to the implementation of these principles.

To create a safe and supportive environment, concepts like consistency and predictability were prioritized within scheduling and routines (p. 33). In addition, facilitators called for the restructuring of some of the conventional sport practices to decrease the risk of traumatization. For example, children living in a neighborhood where gun violence is prevalent may be triggered by the shooting of a gun to signal the start of a race. Changes like this can go a long way in fostering a more trauma-informed environment for youth athletes. Facilitators also described an emphasis on creating meaningful relationships that were consistent, stable, and long-lasting (p. 33). Unfortunately, these changes may be more difficult to come by as many youth coaching volunteer their time or coach specific age brackets.

Findings from the study also outlined the importance of giving a voice to young athletes (p. 35). Having more decision-making power allowed for athletes to have more of a say in the kind of warm-ups they participated in and helped to reduce the perceived authoritative power of the coaches. Coaches in the study recognized the positive impact it had on the weighted power dynamic, and stated a focus should be placed on finding areas to give athletes a choice without undermining their position as a coach. Moreover, while many of the needs addressed in the study were tailored to the pandemic, coaches discussed the importance of providing tangible assistance like information regarding transportation, internet access for homework, meals, and equipment.

Hertzler-McCain et al., (2023) also conducted a study around the effects of trauma-informed coaching on athletes at the college level. Ninety-one athletes participated in the study, with 52.7% having experienced one or more traumatic events in their life (p. 8). This is on par with national statistics, with research indicating 50% - 80% of individuals experiencing at least one trauma by the time they reached adulthood (p. 1). The most common form of trauma experienced by the athletes in the study was unwanted sexual contact, followed by witnessing a situation where someone was or could have been killed or significantly injured (p. 8). Other forms of trauma present in the study included witnessing the death or serious injury of another, risk of personal injury or death, physical attack/mugging, punishment/abuse as a minor, major natural disasters, serious accident, and threatening illness or injury (p. 8). While the participants' age range were outside the scope of our target population, the authors of the study support the notion of interventions being beneficial at the youth level (p. 3).

In the study, various therapeutic techniques were used with the aim of helping athletes "work on skills to cope with stress, regulate their emotions, and build concentration that they can use in sports and in life" (p. 2). Specifically, the trauma-informed coaching techniques used included, but were not limited to, encouraging progress over performance, time for personal and group reflection, abstaining from yelling at athletes, being receptive to input from athletes, and coaching in pairs permit individual support (p. 2). Some of the techniques implemented were already set in place; of the ten new techniques, the athletes in the study expressed a desire for eight of them to be administered to their team (p. 9),

The results of the study indicated that the two most coveted techniques to be implemented were player input (86.1%), reframing mistakes in a constructive way (80%), and coaches being available for players before or after practice (77.3%), with the latter two having already been implemented (p. 9). All 17 coaches in the study strongly agreed or somewhat agreed with reframing mistakes in a productive fashion, and 15 of them agreed that trauma-informed coaching is needed at the collegiate level (p. 9). While some techniques were less desirable for coaches, the majority of the techniques were viewed favorably. Most importantly, they study show both coaches and athletes were receptive to establishing trauma-informed coaching techniques at their program.

Despite the evidence to support trauma-informed coaching and an increased focus on the mental health of young athletes, issues regarding instillation, training, and unanimous adherence to agreed upon changes still remain. Coaches involved in Ferguson et al. (2018)'s study expressed a desire for a face-to-face educational setting followed by an optional online workshop to receive further information. Moreover, they reported wanting in-person sessions to be less than 90

minutes and trainings to be divided by sport to avoid inattentiveness towards information unrelated to their own sport. Even if these workshops were made mandatory, continued success would require financial backing and extensive collaboration with community partners (Hussey et al., 2023, p. 36).

Conclusion

In conclusion, sport environments are fertile grounds for positively impacting the mental health of many young Americans (Walton et al., 2024). Coaches perceived roles as motivators, educators, confidants, and mentors make them ideal vehicles for delivering this change (Ferguson et al., 2018). There are still logistical issues surrounding the delivery of these services, but the potential benefits they stand to provide are evident. Coaches may not have the capacity and training to treat or cure mental health problems, but the title they hold, and the trust given to them by players gives them a unique position to recognize symptoms and reduce the chances of re-traumatization (Hertzler-McCain et al., 2023). The blueprint of delivery has yet to be created, but the ideas of how to create a lasting positive impact on the mental health of young athletes have already begun to take shape.

References

Black, L., Terlizzi, E., & Vahratian, A. (2022). Organized sports participation among children aged 6–17 years: United States, 2020. *NCHS Data Brief*. https://doi.org/10.15620/cdc:119026

Elliott, S., Petersen, J., Drummond, M., Prichard, I., Drummond, C., Crossman, S., & Bramley, O. (2023). What are the perceived barriers for building and maintaining a culture of mental health support in Australian Competitive Youth Sport? *Journal of Applied Sport Psychology*, 1–23. https://doi.org/10.1080/10413200.2023.2274460

Ferguson, H. L., Swann, C., Liddle, S. K., & Vella, S. A. (2018). Investigating youth sports coaches' perceptions of their role in Adolescent Mental Health. *Journal of Applied Sport Psychology*, *31*(2), 235–252. https://doi.org/10.1080/10413200.2018.1466839

Hertzler-McCain, E. A., McQuillen, A., Setty, S., Lopez, S., & Tibbetts, E. (2023). Trauma prevalence and desire for trauma-informed coaching in collegiate sports: A mixed methods study. *Social Sciences*, *12*(10). https://doi.org/10.3390/socsci12100550

Hussey, K., Blom, L. C., Huysmans, Z., Voelker, D., Moore, M., & Mulvihill, T. M. (2023). Trauma-Informed Youth Sport: Identifying Program Trauma-Informed Youth Sport: Identifying Program Characteristics and Challenges to Advance Practice Characteristics and Challenges to Advance Practice. *Journal of Youth Development*, *18*(3). https://doi.org/https://tigerprints.clemson.edu/jyd/vol18/iss3/4 https://ir.lawnet.fordham.edu/cgi/viewcontent.cgi?article=2941&context=ulj

Super Bowl LVIII is most-watched telecast in history: NFL Football Operations. Super Bowl LVIII is Most-Watched Telecast in History | NFL Football Operations. (2024, February 13). https://operations.nfl.com/updates/the-game/super-bowl-lviii-is-most-watched-telecast-in-history/

Walton, C. C., Purcell, R., Henderson, J. L., Kim, J., Kerr, G., Frost, J., Gwyther, K., Pilkington, V., Rice, S., & Tamminen, K. A. (2024). Mental Health Among Elite Youth Athletes: A narrative overview to advance research and Practice. *Sports Health: A Multidisciplinary Approach*, *16*(2), 166–176. https://doi.org/10.1177/19417381231219230

Walton, C. C., Rice, S. M., & Purcell, R. (2022). Mental health in youth elite athletes. *Mental Health Care for Elite Athletes*, 209–213. https://doi.org/10.1007/978-3-031-08364-8_22

International Journal of the Whole Child
2024, VOL. 9, NO. 1

Play Therapy: Development, Learning, and Therapy
Changing Students' Belief in a Just World: In-Class Simulations as Effective Pedagogy

Susan Elswick[a], Peter A. Kindle[b], David H. Johnson[c], Brooke Blaalid[d], Laura Brierton Granruth[e], Elena Delavega[f], Michael Burford[g], Jeffrey Thompson[h]

[a]University of Memphis, [b]University of South Dakota, [c]Millersville University, [d]University of South Dakota, [e]Millersville University, [f]University of Memphis, [g]East Tennessee State University, [h]Austin Peay State University

Susan Elswick, PhD, LCSW, RPT-S is a Professor of Social work at the University of Memphis, a national trainer, and supervisor for several evidence-based modalities and trauma-based interventions. At the University of Memphis, she is the Faculty Director for three programs: The Interprofessional Community Health Clinic, the Institute for Interdisciplinary Memphis Partnerships to Advance Community Transformation, and the Supporting Mental Health Access to Resources through Telehealth. She is the author of over thirty-five peer reviewed journal publications, two monographed books, and served as the editor for one book publication. Her research interests include the use of evidence-based behavioral interventions for addressing client's needs, supporting schools in developing effective school-based mental health programs that are trauma-responsive, the use of expressive art therapies and experiential therapies in the field of social work practice, and the use of informatics and technology in the field of social work.

Peter A Kindle is retired. He worked in the Department of Social Work, University of South Dakota where he taught an introductory course in social work, research methods, statistics, social welfare policy, and electives in mental health and financial empowerment for social work practice. He co-founded the Social Welfare Research Consortium in 2012 to research the effects of taking a social welfare policy course. Our most recent study assessed attitudinal change toward wealth and taxes.

David Johnson passed away before publication. Dr. David Johnson, a/k/a "Mudcat," was an Associate Professor at Millersville University. A native of Kingsport, Tennessee, and a Longhorn, he was a licensed social worker in Pennsylvania where he landed in 2009 after completing his doctorate at the University of Texas at Austin. Dr. Johnson taught primarily in the policy sequences of the BSW program at Millersville University and in the macro practice and HBSE sequences of the joint Millersville-Shippensburg MSW program. He was a mediator certified to practice before the Texas courts and has developed electives in mediation at both the undergraduate and graduate level at Millersville. He was also responsible for developing the economics boot camp and the government boot camp for the MSW program, as well as developing the Social Welfare Policy and Economics class for the BSW program.

Brooke Blaalid achieved her doctorate from the University of South Dakota and currently serves as the Associate Director of Policy for Blue Star Families. She is community focused and visionary leader with a passion for influencing organizations to drive missions aligned with data-driven decisions.

Dr. Granruth teaches across the curriculum and in the BASW, MSW, and DSW programs at Millersville University. She currently serves as the coordinator of the MSW Program and was the DSW Coordinator from 2018-2020. Dr. Granruth's areas of focus in social work are policy, policy analysis and advocacy, and political social work. She has been a Board Member for Influencing Social Policy since May 2018. Dr. Granruth is Research Fellow with Millersville University's Center for Public Scholarship and Social Change (CPSSC). Through CPSSC she collaborates with her social work and university colleagues on community-based research to include social isolation and the development of social connections between students and participants in a local anti-poverty organization. Dr. Granruth also is a member of the Leadership Team for the Opioi Workforce Expansion Program with responsibility for research.

Elena Delavega, PhD, MSW is Professor of Social Work at the University of Memphis. Her research focuses on poverty and economic justice. She utilizes gamification extensively in teaching and research. She is the author of over 35 peer-reviewed articles, over 100 other reports and publications, a TEDx talk, and the Memphis Poverty Fact Sheet (updated yearly), and Memphis Since MLK, published by the National Civil Rights Museum. She is a research collaborator of the Benjamin L. Hooks Institute for Social Change at the University of Memphis and has edited Volumes II to IX of the Hooks Policy Papers. Her current work involves the testing of the Blame Index, which she developed in 2017, and poverty simulations and games.

Michael Burford is an Associate Professor at East Tennessee State University in the Department of Social Work. His areas of interest include clinical social work, existential theory and existentially based psychotherapy, and upward socio-economic mobility via education in Appalachia.

Dr. Thompson has a diverse background of occupation, starting out in youth ministry, pastoral ministry, and inner-city ministry in North Philadelphia, PA. Dr. Thompson transitioned to social work in 2007 and worked for Big Brother/Big Sisters of Florence, Alabama and Sheffield Housing Authority in Sheffield, Alabama. Dr. Thompson joined the Social Work Department at Austin Peay State University in 2012 and attained tenure and Associate Professor status in August 2020. Currently, Dr. Thompson serves as the Chair of the Social Work Department at APSU and teachers in both the bachelors and maters programs.

Abstract

Cognitive dissonance is an important element in adult learning in that it challenges previously held ideas in favor of new knowledge. In-class simulations and game-based learning are used as innovative and effective pedagogical tools in challenging adult learners and enhancing the students' ability to think critically about larger societal needs. This paper will review the literature relevant to cognitive dissonance, adult learning, and game and simulation practices in

higher education. The authors present the results of one simulation activity in a quasi-experimental non-random comparison group conducted across five universities within multiple undergraduate and graduate level social work policy courses. Findings of this research on the use of simulations in social work policy courses can be used to guide other social work programs with embedding this effective educational practice into their programs. Institutions of higher education, specifically within the discipline of social work, can play an important role in continuing the research and evaluation of this effective pedagogical practice through measuring outcomes on student critical thinking and changes in student beliefs and biases.

KEY WORDS: Game-Based Learning, Simulations, Social Policy, Pedagogical Practice

Introduction

In 1966, researchers Lerner and Simmons originally identified the concept of Belief in a Just World (BJW). This construct indicated that people have a need to believe that we live in a just world, that things are fair and natural, and that the world makes sense (Jost, Glaser, Kruglanski, & Sulloway, 2003). The foundation of this construct is based on the premise that individuals get what they deserve; whenever this belief system is threatened for any reason, such as by the presence of innocent suffering, then individuals will attempt to preserve their belief in a just world by assisting the victim. If the individual is unable to assist the victim, the individual or group will often blame the victim for their outcomes (Lerner and Simmons, 1966). Additionally, this construct of a belief in a just world fulfills people's need to live in a predictable environment, i.e., an environment in which people who work hard are able to gain and obtain what they deserve (Lerner and Simmons, 1966). Furthermore, the construct also alludes to the fact that individuals who are not hard working or productive citizens within the community often do not receive rewards or the positive benefits of life (Dalbert, 2001). Although much research and work has been done to disprove that the world is just, BJW appears to continue to be a stable construct within today's society, particularly among conservatives (Jost et al., 2003). One of the roles of higher education is to challenge common thoughts, beliefs, and biases within the student population in order to create cognitive dissonance (Gorski, 2009); pedagogy itself (or more accurately, andragogy) is fundamentally based in the creation and resolution of cognitive dissonance (Taylor & Hamdy, 2013). Cognitive dissonance is defined as the mental discomfort experienced by a person or student who holds two or more contradictory beliefs or values simultaneously. Cognitive dissonance exists in the brain when two ideas held at the same time are contradictory to each other, and creates discomfort (like hunger is uncomfortable), which as a result should "impel a person to change his opinions and his behavior" (Festinger, 1962, p. 93). This mental discomfort usually develops in a situation where a previous belief or personal value is in direct contradiction to another individual's beliefs and ideas (Alfnes et al., 2010, p. 147). Cognitive dissonance can be used effectively in the classroom setting by intentionally creating discomfort through exposing individuals to conflicting knowledge about specific ideas and perceptions that challenge their historically held personal beliefs (Harmon-Jones et al., 2009). Cognitive dissonance has been linked to student enlightenment and evident changes in student perceptions, biases, and attitudes (Festinger, 1957). Learning new concepts or ideas challenges the learner who then creates new schemas (Taylor & Hamdy, 2013), but sometimes the individual feels such great discomfort that rather than learning new ideas, resolves the issue by devaluing or discarding the conflicting ideas and knowledge (Cooper, 2007; Harmon-Jones et al.,

2009) because they are too painful. This is particularly true for individuals with low tolerance for uncertainty because uncertainty prevents predictability and thus safety (Jost et al., 2003). As a result, students' perception of BJW is not readily amenable to change through standard lecture or discussion-based pedagogy as confirmed in two prior years of testing. This matters to social work because an individual who perceives the world to be just will necessarily reject change toward social justice. If the world is fair, why change it? If one believes that the world is just, then one must necessarily believe that poverty is deserved and thus blame the poor. Standard 6.04, Social and Political Action, of the NASW Code of Ethics mandates that "(a) Social workers should engage in social and political action . . . should advocate for changes in policy and legislation to improve social conditions" and "(d) Social workers should act to prevent and eliminate domination of, exploitation of, and discrimination" (NASW, 2018). The implementation of these standards requires the recognition that the world is not just, that changes are required, and that domination, exploitation, and discrimination do exist.

As pedagogical practitioners in social work, it is our responsibility to ensure our students are exposed to concepts and knowledge that will challenge their personal biases, particularly when those biases are in direct conflict with the Code of Ethics of the profession. Many students have individual biases that can affect their ability to display professional values that are expected and evident within the field of social work practice. Additionally, students who maintain specific biases struggle when interacting with marginalized groups in social work practice (Whaler, 2011). While traditional social work policy courses often address how specific policies impact the community based on culture, societal structure, and economic development, many students struggle with developing critical thinking skills and altering the biases they may have about specific social policies and their significance within our communities. As indicated in previous research, one of the main constructs that social policy courses should address is the societal construct of BJW (Cooper, 2007; Harmon-Jones et al., 2009). Although BJW is a construct often seen in the literature as a way in which to measure student bias and evaluate knowledge obtained within a social policy course, the typical activities and learning processes used within the course may not yield large changes in student bias and perception. A major responsibility rests with schools of social work to prepare undergraduate and graduate students to facilitate and promote social justice, think critically, and to be culturally responsive in their future practice, which includes being aware of one's own biases and perceptions of the world.

Practitioners' self-awareness is an essential skill that needs to be developed during their educational journey. Developing personal self-awareness involves students being knowledgeable of their own cultural heritage and the potential effects that history has on their work with clients (Sue, 2001). One way in which to challenge student's personal bias is through classroom-based experiential activities that create opportunities for cognitive dissonance. When looking at specific classroom-based activities that could enhance cognitive dissonance and challenge student biases within social work courses, there is a growing area of research about the use and effectiveness of class-based simulations and game-based activities.

Application to Children

Cognitive dissonance has been found to appear as early as two years of age **(**Grosse Wiesmann, et al., 2022). Children have been found to be subject to cognitive dissonance and the drive to reduce it, most particularly in "justification of effort" (Alessandri et al., 2008). All humans have a need to reduce the discomfort caused by cognitive dissonance and this has important implications for the formation and change of attitudes (Egan et al., 2007) and as a result, behaviors. According to Piaget, children as young as twelve are capable of abstract and critical thinking, and this has relevance for adolescent attitudes and behaviors, as well as the formation of thinking patterns into adulthood (Malik & Marwaha, 2023). The game described in this article can have important implications for the teaching of critical thinking in adolescents and preadolescents and can be a useful aid in therapeutic interventions and behavioral change.

The following paragraphs will review a small sample of research focusing on class-based simulations that have been proven to be effective in pedagogical practices.

Literature Review

In-class simulations and game-based learning are used as an effective pedagogical practice in education to enhance classroom learning and increase students' ability to think critically about larger societal needs (Anderson et al., 2009; Angelini, 2016). Most often used and researched in primary and secondary education, in-class simulations and game-based learning processes utilize technology-based or interactive problem-solving activities within the classroom setting (Yang, Chen, & Jeng, 2010; Connolly et al., 2012). Although these practices are typically seen in primary and secondary education settings, the concept of classroom simulations and game-based processes can be utilized within higher education as a novel approach to teaching critical thinking skills (McLoughlin & Lee, 2008; de Smale et al., 2015; Backlund & Hendrix, 2013). Games, and the process of gamification -which is understood as creating a game out of an activity that may not usually be game such as lecture content and typical coursework, can be used in higher education to stimulate student socialization, collaboration, and engagement in higher education while making the material seem more engaging, interesting, and relevant (Young, 2016).

One example of the use of game-based learning to enhance student skill level and knowledge was evident in an article by Young (2016). This article reviews the use of game-based activities within on campus library learning. Young (2016) investigated game and corresponding interactive activities used to increase undergraduate and graduate students' interest in the library services available on campus. Findings indicated that higher education games should include specific learning objectives and should be easily implemented, understood, and replicated. Young (2016) mentioned that classroom-based games and activities do not need to be overly complicated simply because it is targeting a higher learning bracket, and actually quite the opposite. Research indicated that the games in higher education settings should be low in frustration but high in participation, should be motivating, and should be engaging. Students should be aided by the activities to connect to the content in a meaningful and relevant way, while also learning the skills needed to meet the set course learning objectives. Young (2016) summarizes that the sample games used in higher education increased their undergraduate and

graduate students' use of on campus library facilities and improved the research products of students who participated in the game activities.
Ariffin, Oxley, and Sulaiman (2013) investigated whether game-based activities took into consideration culture, ethnicity, and native language and how those games affected an individual's performance and motivation to learn within the study. Findings indicated that when game-based learning processes are used, students in higher education are more likely to buy into the game, improve academic performance, and gain knowledge about the course content.

Zosky and Thompson (2012) looked at the effects of simulation activities on social work undergraduate students and their knowledge and understanding of poverty. The study was conducted to examine the effects of a simulated intervention where social work students role played being an individual from a low-income family where they had to participate using fake money, props, fictional timelines, and experiences as if they were actually living in poverty. Results of the study included qualitative feedback that measured student's pre and post simulation views and knowledge of poverty. Results indicated positive outcomes on the effects of educating students on the stereotypes and biases held by society regarding low-income families. The results of this research indicated that simulation-based educational activities influenced and yielded positive outcomes for students in higher education, and additionally provided evidence that learning provided on an experiential level compared to learning provided on a cognitive level only allowed students to have meaningful experiences that influence their capacity for critical thinking (Zosky & Thompson, 2012). The study also found that allowing the students to experience the potential outcomes and impacts of poverty on citizens allowed the students to reflect on their own experience and develop empathy for the populations affected by poverty.

Due to the extant literature on the effectiveness of simulations in higher education and the proven effectiveness of activities that include situations that create cognitive dissonance and experiential opportunities for students, this manuscript will explore the use of simulation-based activities within social work policy classes. This current study uses a quasi-experimental non-random comparison group to explore a specific in-class simulation's effectiveness in changing students' perceptions of BJW in a single semester utilizing pretest and posttest comparisons.

Method

Participants and Procedures

The Social Welfare Research Consortium is a voluntary association of social work educators who teach policy at the BSW level or the generalist (foundation) MSW level. In the 2016-2017 academic year, nine instructors teaching in five different CSWE accredited programs participated in the data collection. Geographically, the programs range from the upper Midwest, to the Great Lakes region, mid-Atlantic, and the Mid-South. After purchasing the product, five of the instructors made use, in at least one class, of a commercial in-class simulation game called StarPower® with permission from the company. The other four participating instructors did not utilize the product in class, creating non-equivalent intervention and comparison groups (see Table 1 for demographic comparisons between the groups).
StarPower®

The game takes place in the context of a semester-long policy course in social work. It takes one three-hour session or two hour and fifteen minutes class sessions where the game is played over one session and the debriefing and discussion take place over the next class session. All students enrolled in the course take part in the game, although not every student participates in the research survey. Students are simply told that they will play a game and the basic instructions for the game, but no details about the real purpose of the game or the biases introduced are shared with students until the debrief session. The basic instructions for the game are described here. For more detailed instructions, see http://www.simulationtrainingsystems.com/schools-and-charities/products/StarPower/. The game consists of tokens (or chips) in five different colors, paper bags, posters with "rules" of the game and point values, and pin buttons labeled with either green triangles, red squares, or blue circles. Each color token is assigned a value. The highest-value tokens are worth 8 points each, while the lowest-value tokens are worth 1 point each. Players can also get bonus points by obtaining more than four low-value tokens of the same color. Before the game starts, the instructor prepares three opaque paper bags with varying amounts of tokens of different values so that the chances of getting a high-value or a low-value token are predetermined although participants do not know this; participants then pick five tokens at random from one of the bags and hide the tokens from others. To play StarPower®, students or any group of participants or players are told that the purpose of the game is to conduct trading and to trade in such a way as to obtain a high score per the values assigned to the tokens in the point value poster. There are a number of rules such as "players must hold hands in order to speak and to conduct a trade" that are designed to introduce complexity and distractors to the game. After the first round, participants get a pin button with a red square if they are in the highest-scoring group, a blue circle if they are in the middle-scoring group, or a green triangle if they are in the lowest-scoring group. The game is repeated a couple of rounds while the instructor surreptitiously makes sure that participants pick tokens from the same biased bags. Participants are instructed to add their point totals after each round to further insure people stay in the same groups. After a couple of rounds, the instructor then praises high-point "earners" and instruct them to create a new set of rules for the game, since they are "so good at trading" and "so smart" and the "best" students. Students come up with rules which usually benefit those who make them. At the end of the game, there is a debriefing session where students are asked what happened and confronted with the fact that the game was not fair but rigged from the start. Various elements are discussed such as the role of distractors and the addition of points at each round, which preserves the advantage of the initial high-scorers.

After obtaining IRB approval at each institution, pretest, and posttest responses ($N = 305$) to an online SurveyMonkey questionnaire were collected in the first four weeks of instruction (pretest) in the relevant semester and near the end of the term (posttest) as directed by each instructor. Informed consent information as approved by each institution was provided as the first page of the questionnaire. Student email addresses were used to match pretest and posttest responses, but all identifying information was omitted from the data set once the final data set was completed. Instructors were never apprised of the specific responses of any of their students except for the instructor coordinating the online data collection. At instructors' discretion, extra credit equal to at most 5% of the course grade was offered for student participation. The overall response rate was 63.1% with significant variation by instructor. Two instructors had a response rate less than

50%, but the rest ranged from 54.4% to 100%. Data was downloaded electronically and merged to create a single data set for analysis which was conducted utilizing IBM SPSS Statistics v. 25.

Table 1
Respondent Demographics (N = 305)

	Intervention Group			Comparison Group		
Variable	*n*	%	Mean (SD)	*n*	%	Mean (SD)
Biological sex:						
Male	20	13.0		13	8.6	
Female	134	87.0		138	91.4	
Age (% of total respondents) **	153	50.3	28.90 (10.99)	151	49.7	26.20 (7.80)
Marital status:						
Single, no relationship	65	42.2		48	31.8	
Single, relationship	40	26.0		56	37.1	
Married, formerly, cohabiting	49	31.8		46	30.4	
Other				1	0.7	
Race/ethnicity: *						
African American	77	50.0		12	7.9	
Asian American	2	1.3		2	1.3	
White	69	44.8		122	80.8	
Latina/Latino	3	1.9		10	6.6	
Native American	3	1.9		3	2.0	
Other				2	1.3	
Program level:						
BSW	110	71.4		99	65.6	
MSW	44	28.6		52	34.4	
Where you grew up: *						
Rural	55	35.7		56	37.1	
Urban	54	35.1		34	22.5	
Suburban	45	29.2		59	39.1	
Other				2	1.3	
Mother's education:						
No high school degree	16	10.4		10	6.6	
High school degree	32	20.8		47	31.1	
Some college	43	27.9		43	28.5	
College degree	48	31.2		40	26.5	
Graduate degree	15	9.7		11	7.3	
Free or reduced lunches as child? *						
Yes	69	44.8		51	33.8	
No	85	55.2		100	66.2	
Income in comparison with others? *						
Far below and below average	53	35.0		64	42.4	
Average	81	52.6		58	38.4	
Far above and above average	19	12.3		29	19.2	

Variation in frequencies due to missing data. "Other" responses excluded from Chi square tests. * - $p < .05$ in Chi square test. ** - $p < .05$ in *t*-test.

Instrumentation

In addition to the demographic questions summarized on Table 1, respondents completed the 13-item Belief in a Just World Scale (Dalbert, 1999) at both pretest and posttest. This 6-point summative Likert sale does not make use of reverse coding, and we were unable to confirm Dalbert's two factor structure in preliminary analysis. A stronger belief in a just world is indicated by higher scores with adequate internal consistency in this sample at pretest ($\alpha = .811$) and posttest ($\alpha = .861$). The minimum possible score, indicating belief that the world is completely unjust, is 13 and the maximum possible score, indicating that the world is completely just, is 78. A score of 39 would indicate belief that the world is somewhat unfair, and a score of 52 would indicate that belief that the world is slightly fair. At both pretest and posttest, normativity and variability were adequate (pretest Mean = 48.16, SD = 8.52, skew = -.483), and (posttest Mean = 47.91, SD = 9.61, skew = -.354). Other preliminary analyses conducted included linearity, assessed with scatterplots; homogeneity of variances, assessed with Levene's Test of Equality of Error (p=.209); and normality with Kolmogorov-Smirnov (0.069, p=.069)**.** Because individual teaching differences may be relevant and because the game was a small part of the semester, we also conducted ANOVA, ANCOVA, and regression.

Results

Bivariate analyses indicated that there were significant differences between the intervention and control groups. Specifically, the intervention group was older (28.9 years to 26.2 years [$t(274.342) = -2.476$, $p = .014$] , and accordingly to Chi square tests, less likely to be White (44.8% to 80.8%) with an urban rather than suburban background. As children, the intervention group was more likely to have received free or reduced lunches (44.8% to 33.8%), and they were more likely to report average or higher current incomes in comparison to others (64.9% to 57.6%). There were also statistically significant differences in age (t=-2.439, p=.016) between minority students (mean (SD)=29.4 (11.4447) who tended to be older than non-minority students (mean (SD)=26.4(8.1838). There were no reported significant differences in marital status, program status, or mother's level of education (a proxy for socioeconomic status).

The dependent variable of interest, BJW, did not produce significant change between pretest and posttest for either group; however, the intervention group did report a decline while the comparison group reported an increase in belief in a just world. Independent *t*-test comparison indicated that this change in belief in a just world was statistically significant with a modest effect size. However, t-test analyses indicated statistically significant differences on the BJW by minority status at pretest (mean (SD), minority=45.2(8.2536), non-minority=49.92(8.2043), t=4.864, p=.000) and at posttest (mean (SD), minority=44.9(9.4843), non-minority=45.2(9.2718), t=4.284, p=.000). Following these analyses, significant results were found on ANOVA conducted to explore the differences among instructors at pretest F(5, 299)=6.118, p=.000) and posttest (F(5, 299)=3.834, p=.002). The means and standard differences on BJW at pretest and posttest are listed on table 2.

Table 2

Means and Standard Deviations by Instructor and by Intervention or Comparison Group

		Pretest		Posttest	
	N	Mean	Std. Deviation	Mean	Std. Deviation
Total Participants	305	48.2	8.5237	47.9	9.6149
Intervention	154	47.8	8.9995	46.5	9.5890
Intervention Group 1	23	53.7	8.0760	50.7	9.6588
Intervention Group 2	42	45.0	8.6361	43.9	9.8515
Intervention Group 3	74	46.6	8.2810	45.9	9.1605
Intervention Group 4	7	55.0	9.0921	50.3	11.2948
Intervention Group 5	8	51.0	10.0143	49.1	6.1047
Comparison	151	48.5	8.0240	49.4	9.4439
Comparison Group 6	29	49.7	7.4205	49.7	7.5871
Comparison Group 7	62	47.2	8.0641	48.4	10.7371
Comparison Group 8	24	47.4	8.8210	49.5	8.7278
Comparison Group 9	21	48.1	7.2683	48.7	8.9730
Comparison Group 10	15	53.8	7.0933	53.7	8.4976

Further analysis consisting of ANCOVA, conducted to investigate the change at posttest while controlling for BJW score at pretest, indicated statistically significant change from pretest to posttest on BJW. After adjustment for pretest BJW scores, there was a statistically significant difference in the BJW posttest between the intervention and comparison groups ($F(1,302)=7.855$, $p=.005$, partial η^2 . Data are adjusted mean ± standard error. Mean BJW scores at posttest are lower for intervention group at posttest (46.681 ± .622) than for comparison group (49.160 ±.628). Regression analyses indicated that the demographic variables were statistically significant predictors of the change in belief in a just world that explained a very small proportion (2.9%) of the variance. Only two predictors, participation in an intervention group and age, were statistically significant in the regression (see Table 3). As age increased, there was a modest tendency to resist the decline in belief in a just world, partially reversing the effect of participation in the intervention group since the intervention group was significantly older at the outset of the study.

Table 3

Predictors of Change in Belief in a Just World

	Change BJW	95% CI
Constant	7.273	[-.90, 15.4]
Intervention (no – 0, yes – 1)	3.027**	[1.06, 5.00]

Race (White – 0, other – 1)	-1.256	[-3.55, 1.04]
Marital status (married – 0, other – 1)	.383	[-2.11, 2.87]
Urban (1), non-urban (0)	1.662	[-.49, 3.81]
Age in years	-.126*	[-23, -.02]
Free/reduced lunch (yes – 1, no – 0)	-.399	[-2.62, 1.82]
Current income (1 – lower to 3 – higher)	.260	[-1.13, 1.65]
Mother's education (1 – no high school to 5 – graduate degree)	-.350	[-1.22, .52]
Biological sex (0 – male, 1 – female)	-2.178	[-5.15, .79]
Program level (0 – BSW, 1 – MSW)	.292	[-1.71, 2.29]
Adjusted R^2	.029	
F	1.918*	

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

Discussion

Even though the change between pretest and posttest is small, more important than the small percent of change is the direction in which change occurred. Those classes in the intervention group obtained a lower mean score on the BJW at posttest than the comparison group and a lower mean than at pretest, and the comparison group reported a higher mean than the intervention group and that at pretest (see Table 2), with the result that those in the intervention group perceived the world as less just after the intervention than those who did not receive the intervention. The results of the ANCOVA suggest that the StarPower® simulation was an effective tool in changing students' perceptions of BJW. While the η^2 indicates a small effect size, StarPower® consisted in less than three hours of class time, about 7% of the course, but all classes that participated in StarPower® obtained lower scores at posttest than at pretest, and that all of the classes in the control group either had higher scores at posttest than at pretest or no change. It is important to understand BJW in the context of the maximum score. Mean scores at pretest suggest that all students perceived the world to be slightly fair. Interestingly, the mean score of minority students at pretest was lower than for non-minority students, which makes sense given the racial disparities and discrimination minority students will have experienced. It is logical that somebody who has faced more barriers and thus sees herself as a scrappy little fighter would understand that the world is not fair and so would score lower on BJW naturally than someone who has not had to face as many barriers. This makes sense in light of cognitive dissonance theory (Festinger, 1957), as individuals who have benefitted from the existing system would need to justify it more than those who have not (Jost, et al., 2003). On the other hand, the

small effect of the intervention is consistent with a reaction to cognitive dissonance described by Festinger (1962, p. 93) in which people presented with two potential gifts tended to like them equally but upon receiving one of the two, adjusted their perception to like that one best. That effect described by Festinger would suggest that people come to see the world that's fair simply because it is so, and thus seen as unavoidable, with the result that even people who have been marginalized would believe the world is fair. Viewing current conditions as acceptable or even desirable is a strong coping mechanism born out of powerlessness (Festinger, 1962). Since that seems inevitable, and since cognitive dissonance is so painful, then people delude themselves that they are happy, that they prefer the *status quo*, and that the world is just and fair (Festinger, 1957; 1962). The results of this study appear to suggest that it takes a strong dose of cognitive dissonance to change one's mind. It may take a truly earth-shattering event such as almost dying in a car accident or a terrorist attack to impel people to recognize the reality of the situation.

To the degree that people accept the dominant culture in the United States, and to the degree they accept the idea that hard work will result in success (Jost et al., 2003), it will be difficult to change social work students' BJW. What is fascinating in this study is that StarPower® challenges BJW in a way that students who were not exposed to the game/simulation are not challenged. In view of all of this, we interpret the results of this study to be quite extraordinary in that all participants in the game moved their scores in the desired direction. It bears repeating that the simulation game was but a small part of an entire semester in which many other activities occurred and in which the simulation was delivered by a large and varied group of instructors.

The other factor to consider in attempting to explain why the change was small is loss aversion. Loss aversion is a powerful drive that impels individuals to try to protect from losses rather than promote gains because losses are much more painful than gains are pleasurable (Abdellaoui, Bleichrodt & Paraschiv, 2007; Hobfoll, 1989; Kahneman & Tversky, 1979). Loss aversion may thus drive people to accept an unfair system in which they are surviving because the loss of that survival is twice as scary as potential gains (Abdellaoui et al., 2007). This would suggest that those who have nothing to lose are much less loss averse, that is, if people have something to lose, then they are more likely to want to keep it. At the same time, then, it makes sense that those who have more to lose would be more likely to see the world as fair, again because they benefit from existing structures. Loss aversion increases with age (Johnson, Gaechter & Herrmann, 2006), possibly as a result of an increase in resources, and this is consistent with our findings that age increases resistance to change in BJW. Loss aversion is such a strong force that it leads to the justification of a world that is not fair. If even in an unfair system people have something to lose, they will then resist change even when the change is for their benefit. That mechanism partially explains how conservative ideology operates (Jost, et al., 2003), and explains why it is so very difficult to change students' perceptions of BJW.

Future research should replicate the current research with children as young as twelve years of age. Teaching critical thinking and the recognition of cognitive dissonance are important in a world in which young people are bombarded with sources of information that may not all be accurate. Gamification has been shown to be an effective way to teach a variety of skills to young people (Ellison et al., 2016; Junco, 2014; Kersánszki et al., 2023), and has practical applications in teaching concepts that are often hard to grasp.

There are a few limitations to this research that should be identified for preparation of future replications of this study. One such limitation could be within the actual preparedness of the StarPower® facilitators for the classroom simulation and implementation. The previously reported results may have been somewhat muted by the lack of experience most of the social work policy educators had with the StarPower® class-based activity. StarPower® is an effective classroom simulation, but it does require some preparation and experience in administering for the effect of the simulation to be seamless. For future research and replications, a competency-based pre-training process would benefit the pedagogical practitioners in administering the StarPower® program with ease and fidelity.

Another potential threat to the validity of the research outcomes could be found within the intervention group's mean age and their slightly higher affluence than that of the comparison group. Research conducted by Authors (2019), indicated that higher reports on SES factors appear to resist change in the constructs of BJW. These findings indicate that these slightly higher means on age and SES may have affected the overall research outcomes. Future replications of this research should include larger sample sizes, population samples with equal cohorts of traditional and non-traditional students, and samples with more diverse student bodies to address this limitation.

Conclusion

It is important to challenge the passive acceptance of the world as it is and as fair in social work education. The first step in seeking change is the recognition that the world is not as it should be, and that the conditions and inequities are the result of unfairness and of a biased system that benefits some and punishes others. No change is possible if the world is seen as fair, because under fair circumstances no change is desirable. If the world is fair, why would we want to change it? Only a strong realization that there are profound injustices in the world, strong enough to overcome fear and loss aversion will lead social work students to become agents for change and advocates for social justice. Game simulations such as StarPower® are a good tool for educating social workers who will work to change the world.

References

Abdellaoui M., Bleichrodt H. & Paraschiv C. (2007). Measuring loss aversion under prospect theory: a parameter-free approach. *Management Science, 53*, 1659-1674.

Alessandri, J., Darcheville, J. C., & Zentall, T. R. (2008). Cognitive dissonance in children: justification of effort or contrast?. *Psychonomic bulletin & review*, *15*(3), 673–677. https://doi.org/10.3758/pbr.15.3.673

Alfnes, F., Yue, C., Jensen, H.H. (2010). Cognitive dissonance as a means of reducing hypothetical bias. *Eur. Rev. Agri. Econ. 37*, 147-163.

Anderson, E.F., McLoughlin, L., Liarokapis, F., Peters, C., Petridis, P., & Freitas, S.D. (2009). *Serious games in cultural heritage*. In M. Ashley & F. Liarokapis (Eds.), VAST 2009: 10th International Symposium on Virtual Reality, Archaeology and Cultural Heritage, 22-25 (pp. 29-48). St. Julians, Malta: Eurographics Association.

Angelini, M.L. (2016). Integration of the pedagogical models "simulation" and "flipped classroom" in teacher instruction. *SAGE Open, 6*(1). doi: 10.1177/2158244016636430.

Ariffin, M., Oxley, A., & Sulaiman, S. (2013). Evaluating game-based learning effectiveness in higher education. *Social and Behavioral Sciences, 123*, 20-27.

Backlund, P. & Hendrix, M. (2013). Educational games-are they worth the effort? A literature survey of the effectiveness of serious games. *Games and virtual worlds for serious application (VS-GAMES), 5,* 1-8.

Connolly, T.M., Boyle, E.A., MacArthur, E., Hainey, T., & Boyle, J.M. (2012). A systematic literature review of the empirical evidence on computer games and serious games. *Computers & Education, 59*, 661-686.

Cooper, J. (2007). *Cognitive dissonance: 50 years of a classic theory*. Los Angelas, CA: Sage.

Dalbert, C. (1999). The world is more just for me than generally: About the Personal Belief in a Just World Scale's validity. *Social Justice Research, 12*(2), 79-98.

Dalbert, C. (2001). *The justice motive as a personal resource: Dealing with challenges and critical life events*. New York, NY: Kluwer/Plenum.

de Smale, S., Overmans, T., Jeuring, J. & van de Grint, L. (2015). The effect of simulations and games on learning objectives in tertiary education: A systematic review. *Games and Learning Alliance 4th International Conference*, GALA, Rome.

Egan, L.C., Santos, L.R., & Bloom, P. (2007). The Origins of cognitive dissonance: Evidence from children and monkeys. *Psychological Science, 18*(11), 978-983.

Ellison, T.L., Evans, N., & Pike, J. (2016). Minecraft, teachers, parents, and learning: What they need to know and understand. *School Community Journal, 26*(2), 25-43.

Festinger, L. (1957*). A theory of cognitive dissonance*. Stanford, CA: Stanford University Press.

Festinger, L. (1962). Cognitive dissonance. *Scientific American, 207*(4), 93-106.

Gorski, P.C. (2009). Cognitive dissonance as a strategy in social justice teaching. *Multicultural Education 17*(1) 54-57.

Grosse Wiesmann, C., Kampis, D., Poulsen, E., Schüler, C., Lukowski Duplessy, H., & Southgate, V. (2022). Cognitive dissonance from 2 years of age: Toddlers', but not infants', blind choices induce preferences. *Cognition*, 223, 105039. https://doi.org/10.1016/j.cognition.2022.105039

Harmon-Jones E., Amodio D. M., Harmon-Jones C. (2009). Action-based model of dissonance: A review, integration, and expansion of conceptions of cognitive conflict, in *Advances in*

Experimental Social Psychology, 41, ed Zanna M. P., editor. (Burlington, MA: Academic Press),119–166.

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist, 44*, 513-524.

Johnson, E., Gachter, S., and Herrmann, A. (2006). Exploring the nature of loss aversion. *IZA Discussion Paper No. 2015*. Available at http://dx.doi.org/10.2139/ssrn.892336

Jost, J.T., Glaser, J., Kruglanski, A.W., & Sulloway, F.J. (2003). Political conservatism as motivated social cognition. *Psychological Bulletin 129*, 339-375.

Junco, R. (2014, April 28). Beyond "screen time": What Minecraft teaches kids. *The Atlantic*. Retrieved from http://www.theatlantic.com/technology/archive/2014/04/beyond-screentime-what-a-good-game-like-minecraft-teaches-kids/361261/

Kahneman, D., Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, 47*, 263-291.

Kersánszki, T., Holik, I., & Márton, Z. (2023). Minecraft game as a new opportunity for teaching renewable energy topics. *International Journal of Engineering Pedagogy* (iJEP), *13*(5), 16–29.

Lerner, M. J., and Simmons, C. H. (1966). Observer's reaction to the "innocent victim": Compassion or rejection? *J. Pers. Soc. Psychol. 4*: 203–210.

Malik, F., Marwaha, R. (2023, April 23). Cognitive development. In: *StatPearls* [Internet]. Treasure Island, FL: StatPearls Publishing. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK537095/

McLoughlin, C., & Lee, M.J.W. (2008). The three P's of pedagogy for the networked society: Personalization, participation, and productivity. *International Journal of Teaching and Learning in Higher Education, 20*(1), 10-27.

National Association of Social Workers [NASW]/ (2018). Code of Ethics. Retrieved from https://www.socialworkers.org/About/Ethics/Code-of-Ethics/Code-of-Ethics-English

Sue, D.W. (2001). Multidimensional facets of cultural competence. *The Counseling Psychologist, 29*, 790–821.

Taylor D.C.M., & Hamdy, H. (2013) Adult learning theories: Implications for learning and teaching in medical education: AMEE guide no. 83. *Medical Teacher, 35*, e1561-e1572.

Whaler, E. (2011). Identifying and challenging social work students' biases. *Social Work Education. 31*(8), 1-13.

Yang, J.C., Chen, C.H., & Jeng, M.C. (2010). Integrating video-capture virtual reality technology into a physically interactive learning environment for English learning. *Computers & Education, 55*, 1346-1356.

Young, J. (2016). Can library research be fun? Using games for information literacy instruction in higher education. *Georgia Library Quarterly, 53* (3).

Zosky, D., & Thompson, J. (2012). Poverty simulation: An experiential learning tool emphasizing economic justice content. *The Journal of Baccalaureate Social Work, 17*.

International Journal of the Whole Child
2024, VOL. 9, NO. 1

Education by the Numbers
Post Secondary Education

Donald Snead[a]

[a]Middle Tennessee State University

Donald Snead (B.S.in Natural Science, M.A. Teaching in Curriculum & Instruction, Ed.D. Curriculum & Instruction in Science Education) is the Department Chair and Professor in the Educational Leadership Department at Middle Tennessee State University. Committed to a social constructivist philosophy, he teaches courses in curriculum, leadership, and research methods. Dr. Snead is an inductee into the Kentucky Distinguished Educators Cadre. His research interests focus on improving learning for all students.

Education has been an important part of the United States history. In the 17th century, the Puritans insisted that each town create a school. Thomas Jefferson advocated the idea that a democratic society needs educated residents. Education reform dates back to the 1800s when there was an increased demand for skilled workers. Education reformers have recently been pushing to provide educational opportunities for all citizens. It is documented that an educated citizenry is needed to help society thrive and improve social mobility, economic growth, and equity (Unauthored, 2010).

Tennessee Score (Mansouri, 2023) released data from a study advocating for training or education beyond a high school diploma. This report indicated that some education beyond high school is needed to prepare students for a career. Postsecondary education has become an important issue because of the growing need for competent workers for the job-market, for promotions or progress in a present role, and in general improving a person's quality of life (Rehman, 2022).

Postsecondary education refers to all education that takes place after completion of high school. This includes two-year or four- year universities and colleges, vocational, and trade schools. Postsecondary educational institutions can be privately funded, or state funded. Some institutions are small religious affiliate organizations while others could be secular, rural, urban, or suburban. Postsecondary education ends with a diploma, certification, or academic degree (Staff Writers, 2023).

Degrees Conferred by Postsecondary Institutions

Degrees conferred by postsecondary institutions, by control of institution, level of degree, and state or jurisdiction: Academic year 2020-21 (U.S. Department of Education, 2022).

	Pubic				Private non-profit				Private for Profit			
Type	1	2	3	4	1	2	3	4	1	2	3	4
United States	918,657	1,385,237	405,209	95,816	50,880	579,167	391,235	89,133	66,894	102,041	70,450	9,110
Alabama [a]	11,017	27,921	11,488	1,983	209	3,638	1,068	777	1,671	3,262	2,160	43
Arkansas [a]	9,363	14,500	5,255	1,118	286	2,585	521	229	25	16	18	0
Georgia [a]	17,879	43,382	14,787	2,789	993	11,244	5,015	1,873	1,094	1,888	1,442	240
Florida [a]	78,566	84,649	20,439	5,080	12,053	23,415	13,737	3,871	6,377	6,138	2,254	6
Kentucky [a]	10,827	18,351	6,009	1,898	297	5,038	8,104	773	1,046	862	157	70
Louisiana [a]	5,905	19,444	8,366	1,641	227	3,984	2,072	940	442	53	0	0
Mississippi [a]	13,326	14,803	3,531	1,156	34	2,500	2,075	401	11	16	12	0
N Carolina	32,969	44,349	13,306	2,810	664	14,132	6,992	2,479	318	404	266	15
S Carolina [a]	9,518	21,006	5,411	1,608	393	5,887	1,427	241	249	283	188	209
Tennessee [a]	13,532	23,135	6,041	1,949	1,161	11,762	5,903	2,420	1,614	629	294.	182
Virgina [a]	18,927	40,302	11,768	3,450	1,549	18,289	13,491	3,217	3,272	3,020	1,347	23
W Virgina [a]	3,262	9,145	2,660	1,303	185	1,314	371	117	4,119	7,202	2,948	0

This data report postsecondary degrees conferred by institutions, level of degree, in the United States and the nine South East States.

Level of degree: Associate degree (1), Bachelor's Degree (2), Master's Degree (3) Doctor's degree (4). States represented in this sample are group as the Southeast Region of the United States (U.S. Department of Education, 2022).

References

Mansouri, D. (2023). Score survey: The value of postsecondary education in Tennessee. https://tnscore.org/postsecondary-education-has-strong-value-in-tennessee-but-more-work-is-needed-to-connect-education-to-workforce-and-career-pathways/

Rehman, M. (2022). What is post-secondary education and why is it important? https://educationplannet.com/what-is-post-secondary-education/#google_vignette

Staff Writers (2023). The power of knowledge: What is a post-secondary education? https://robertsmith.com/what-is-a-post-secondary-education/

U.S. Department of Education. National Center for Education Statistics (2022). Postsecondary:Academic year 2020-21. Digest of Education Statistics, Table 319.10.

Unauthored (2010). A brief History of Education in the United States. In Sociology: Understanding and Changing the Social World. University of Minnesota Libraries Publishing. https://open.lib.umn.edu/sociology/front-matter/publisher-information/

International Journal of the Whole Child
2024, VOL. 9, NO. 1

Education: Words and Meanings
Multiage: Words and Meanings

Sandra Stone[a]

[a]**Northern Arizona University**

Dr. Sandra J. Stone is Professor Emeritus at Northern Arizona University and founder of the National Multiage Institute at NAU. Her research and publication interests include multiage education, early childhood, play, and literacy. She consults nationally and internationally. Dr. Stone has served as the Editor of the *Journal of Research in Childhood Education*, and currently serves as a reviewer for several education research journals. Dr. Stone is the author of *Creating the Multiage Classroom* (2004, GoodYear Books) and co-author of *Understanding Multiage Education* (Stone/Burriss, Routledge, 2019).

Multiage – The Word

Education: Words and Meanings is designed to clarify certain words often used in educational texts. Clarifying the meanings of these words gives depth to the reader's understanding.

The word "multiage" is a word frequently used throughout educational communities. But what does it mean? In an educational context, *multiage* is simply defined as a grouping of mixed-aged children which stay with the same teacher for several years (Stone & Burriss, 2019). However, this simple definition does not bring the depth of *meaning* necessary to understand the word *multiage,* as an educational system.

In education, multiage is a unique system of education, differing from the current graded system of education, which groups children by *same ages*, not mixed ages, whereas multiage education is designed and implemented intentionally with mixed ages, in order to create a family of learners who all benefit from a whole child learning approach. As Stone and Burriss (2019) note, "Many schools have adopted the term "multiage," but in actuality, have not implemented a change from a graded philosophy to a multiage philosophy" (xi).

Let's consider the graded system first, as the multiage system is in direct contrast to the predominant graded system in the United States. Multiage, as a different system of education, gives new meaning to how we educate children.

Graded System

In the late 1700s, the Industrial Revolution, first in England and then throughout Europe, led the world in engaging in a factory model of mass-producing goods. Eventually, this industrial organization was applied to how we school children. Schools, in order to reach the masses, were being designed around successful manufacturing practices (Cremin, 1957; Rippa, 1997; Robinson, 2015; Stone & Burriss, 2019). By the 1860s, in the United States, the graded system was being used by most public and private schools. Currently, the graded system is the dominant system in the United States.

Same-age groupings. Traditionally, the graded system is organized *intentionally* by age supposing that same-age children are similar and can be taught the same curriculum. Thus, in the graded system, children are grouped by the same age within a grade (i.e., Kindergarten (age 5), grade 1(age 6), grade 2 (age 7), grade 3 (age 8), etc.). Interestingly, even though children are the same age at the beginning of the school start date, it is important to note that age within the grade may vary by 1 month to 11 months, depending on the birth day of the child.

Graded school characteristics. The graded system is defined by some of the following characteristics as addressed by Stone and Burriss (2019):

- Children may advance to the next grade level based on their performance such as meeting grade-level expectations, standards, and/or standardized tests.
- Traditionally, teachers "teach" the grade-level curriculum and/ or grade-level standards from a *behaviorist* perspective, most often using lesson plans based on an objective, practice, and testing to see if the objective is met.
- Children's performance is evaluated by meeting or not meeting the grade-level expectations or standards. If a child meets the expectations/standards, the child is promoted to the next grade level. If the child does not meet expectations/standards, the child is retained in order to repeat the grade level again.
- Letter grades, number grades, or scales (indicating if the child is meeting, not meeting, or exceeding expectations) are used to report to the child and parents (guardians) to indicate how the child is performing on the grade-level curriculum/standards.

Thus, the organization of the graded system is based on, and a remnant of, the industrial revolution, which first introduced an efficient, mechanical, factory model to manufacturing, and then, with efficiency in mind, organized schooling for children around the factory model which is currently called the graded system (Abeles, 2016; Robinson, 2015, Thompson, 2014). The purpose of the graded system is to offer an education system which moves children along a "conveyor belt" of grade-level curriculum where, if they are successful along the way, the children will be considered "educated."

Multiage System – The Meaning

Mixed-age groupings. First, multiage is a school grouping of *mixed-aged* children, thus the name, *multi-age*. Multiage classrooms may differ from age groupings of two ages, three ages, four ages, or even more. Multiage schools do not group children by grade in school.

Typically, the ages are mixed-age groupings of young children which vary from "1) two-year groupings such as two-three-year-olds, three-four-year-olds, four-five-year-olds, and five-six-year-olds to 2) three-year groupings such as two-three-four-year-olds, three-four-five-year-olds, four-five-six-year-olds, or five-six-seven-year-olds" (Stone, 2022, p. 3). Groupings continue through various ages with older children such as eight-nine-year-olds, eight-nine-ten-year-olds, or even nine-ten-eleven-year-olds, and so on. A multiage elementary school, for example, has several groupings of mixed-ages from early childhood groupings, primary groupings, to intermediate groupings.

Multiage Characteristics. However, it is important to understand that not all mixed-aged groupings are multiage in practice. To understand the *meaning of Multiage*, it is important to consider the framework of the multiage education system which is entirely different from the graded system of education.

Multiage, as an exceptional system of education, values and supports every child, and is defined by some of the following characteristics (Stone & Burriss, 2019).

Multiage:

- Is a mixed-age family grouping, where the children stay with the same teacher for several years. For example, in a primary three-year grouping mixed-age class of potentially 24 children, the class may have eight five-year-olds, eight six-year-olds, and eight seven-year-olds, give or take. At the end of the first year, the eight-year-olds, who are now turning nine, will move on to the next multiage three-year classroom grouping with another teacher. The seven-year-olds will become the eight-year-olds, the five-year-olds will become the new six-year-olds, and a new group of five-year-olds will join the grouping. Keeping in mind the *age differences by months* for all children in the mixed-age grouping, children spend three years with the same teacher no matter their specific age by years or months.
- Uses a developmental view of learning from a *constructivist*, whole child approach, valuing the development of the whole child.
- Uses a process approach to learning, through strategies (not lesson plans) and flexible groupings based on children's needs and interests, not by age; uses developmentally appropriate practices.
- Supports learning that is child-centered, not curriculum-centered. Each child learns at his or her own individual pace of understanding, personalizing learning for each child.
- Promotes social, cross-age learning. Multiage naturally enhances how children of different ages learn from each other, socially, emotionally, physically, and cognitively (Katz et al., 1993).
- Uses a variety of authentic assessment tools, often daily, to support and nurture each child's growth across whole child development.
- Promotes autonomous learning by children through choice, honoring and valuing the uniqueness of each child's development; engages mixed-ages in choice-based play, open-ended centers, and projects.
- Uses narrative reporting systems which describe the on-going growth and development of each child and identify next possible growth steps, creating a portfolio of documented growth for every child.

Since the multiage classroom does not operate under the graded system parameters, the multiage approach **does not**:

- Label or group children by age or grade.
- Promote or retain children.
- Adhere to grade-level expectations or standards.
- Use traditional letter/number grades or report cards.
- Teach the curriculum through lesson plans, rather multiage supports every child's learning development across multiple areas of the whole child, by using learning strategies.

Multiage teachers:

- Are *facilitators of learning* for every child in the mixed-age grouping, using multiage strategies to support every child's ongoing development.
- Use an integrated curriculum model, providing rich learning environments in literacy, math, science, social studies, art, music, technology, physical education, etc. where children can follow their interests, use their imaginations, invent, and create. As Pink (2009) suggests, "For artists, scientists, inventors, schoolchildren, and the rest of us, intrinsic motivation – the drive to do something because it is interesting, challenging, and absorbing – is essential for high levels of creativity" (p. 45). Multiage teachers engage in providing learning environments that benefit children of all ages.

Some of the benefits for children educated in multiage classrooms, as noted by Stone and Burriss (2019), include how mixed-age children:

- See themselves as successful learners.
- Have the "gift of time" to develop at their own pace.
- Are encouraged to follow their interests and passions.
- Become a "family of learners."
- Provide models for each other, giving temporary support by scaffolding and enhancing learning.
- Increase "cognitive conflict" by compelling each other to explain their perspectives which often results in children resolving their conflicting views.
- Engage in more and varied literacy and math experiences.
- Participate in more divergent thinking, problem-solving, and creative experiences.
- Use more advanced social skills to engage one another.
- Exhibit more prosocial behaviors such as caretaking, helping, and kindness.
- Develop long-lasting friendships among mixed-age children.
- Engage in rich, cross-age learning within the mixed-age grouping.
- Develop leadership skills.
- Learn how to socially engage one another as they work and play with each other which prepares them for their future in a mixed-age, democratic society.

Katz et al. (1993) focuses on the benefits of mixed-age schooling by stating how multiage is "intended to optimize what can be learned when children of different – as well as the same – ages and abilities have opportunity to interact" (p. 1). As Stone and Burriss (2019) suggest, "Multiage education takes the best of what we know about children and learning, and facilitates the process through a system which capitalizes on these positive attributes" (p. 41). The multiage system provides an exceptional model of education which supports the well-being of children and where mixed-age children thrive in all areas of whole child development as they engage and

learn together (Goodlad & Anderson, 1987; Gray, 2011; Stone & Burriss, 2019). Katz et al. (1993) ask, "Are children losing something valuable by having limited opportunity to interact with older and younger children?"

Precursors to the Current Multiage (mixed-ages and multiage philosophy)

British Primary School

Today's multiage education has strong philosophical roots in the British Primary Schools which were established after World War II in the mid-1940s (Rogers, 1970). During World War II, children were protected from the bombing in the cities in England by sending them to the safety of the countryside. However, when the war was over, the educators decided to provide a nurturing school environment for the children because of the emotional harm children suffered from the war. The educators invented British Primary Schools which provided mixed-age "family groupings" rather than separating children into a same-age graded system based on a factory model. The British Primary Schools provided the basis of today's multiage education approach. A family grouping of mixed-age children stayed with the same teacher for several years where the children in family groupings were valued as human beings, not products, as often indicated in the early years of the graded system based on the factory model (Blackie, 1971; Stone, 2004, 2010).

British Primary School educators were "committed to the idea that children are the most important component, the vital raw material, of a primary school and that they are to be heard, cared for, consulted, and respected" (Rogers, 1970, p. v). Thus, the British Primary School considered the developing child, seeing each child as an individual, and supporting each child's unique growth and development within the learning process. Educators focused on the *process of learning* rather than on the product of teaching. Within the process, mixed-age children engaged in self-directed, choice learning opportunities, where they could enjoy a sense of autonomy in an environment that provided positive affect and where their individual competency was valued (Eisner, 1974; Gray, 2014; Rogers, 1970).

Today's multiage embraces the budding philosophy of the British Primary Schools from the 1940s. Then and now, differences in children's ages, abilities, and interests are normal and respected and celebrated (Stone & Burriss, 2019). Eisner (1974) shares how children in the British Primary Schools were excited to go to school every day and reluctant to leave when school was over for the day. The same is true for today's multiage children.

Non-Graded Primary and Ungraded Primary

Some schooling approaches have mixed-age groupings, use a multiage philosophy, but are called different names. Two examples are:1) the non-graded primary, and 2) the ungraded primary. The non-graded primary and the ungraded primary are precursors to today's multiage.

Non-graded Primary. The non-graded primary in the late 1950s and early 1960s was a schooling reform movement seeking changes to the graded system. Goodlad and Anderson (1987) proposed a nongraded approach to education instead of segregating children by age and grade. Goodlad and Anderson wanted to unshackle "educators and children from the graded system,"

believing this move would create changes away from our educational graded system of instruction (Stone & Burriss, 2019, p. 269). Just as the British Primary Schools were the beginning of the multiage movement, the non-graded primary was another pioneer in establishing the current multiage system today.

Ungraded Primary. In the 1990s, a number of states in the United States began exploring multiage education for primary classrooms. Beginning with Kentucky, its state legislature mandated ungraded primary schools throughout the state. Florida, Louisiana, and Oregon also explored ungraded primary schools, now called multiage education. However, the Standards Movement in the 2000s moved schooling more to the graded system and away from a child-centered, multiage approach. However, multiage education is still continuing to thrive in many schools throughout the United States and in other countries as well (Stone & Burriss, 2019).

Graded System Approach: Mixed-ages, but not Multiage Philosophy

Some schooling approaches have mixed-age groupings but are not multiage in philosophy. Two examples are:1) the one-room schoolhouse, and 2) a combination class. Even though these approaches have mixed-age groupings, they fit under the graded system. The following are examples of schooling which are mixed-ages *by convenience or necessity*, but are not identified as multiage based on an understanding of the multiage philosophy of education:

One-Room School

In the early years of education throughout the United States (approximately 1800s-1900s), small, rural communities set up schools as one-room schoolhouses which contained mixed-ages, and mixed-grade children. However, mixed-ages were an act of necessity in order to educate the community's children because there were not enough children to create a graded school approach. As the graded system became more dominant in the United States in the 1860s, the one-room school, although mixed ages, were really mixed-grade which followed a curriculum-centered approach established by the graded system. Children were labeled and promoted by grade level. However, because the children were mixed ages, children often learned independently, helped each other, were able to listen in on varied lessons of the older children, and were more engaged socially. The teachers generally used a graded curriculum across varied subject areas (i.e., McGuffey Readers), and children often memorized and recited lessons (One-Room School, 2024; Stockton, 2023). Some schools offered children a rich experience, yet, in some schools, children endured strict, and/or physical punishment (Teaching in a One-Room Schoolhouse, 2018). Today, the one-room school still exists in some rural areas, although few and far between; most follow a graded approach and some are quasi-multiage in approach.

Combination Classrooms

Combination classes also contain *mixed ages*, but do not fit in the category of multiage education. Combination classes have occurred within the graded system throughout the existence of the graded system as a *necessity or convenience* rather than an intentional change in educational philosophy (Stone & Burriss, 2019).

Schools often create "combination classes," because they don't have enough children to create a single first grade of six-year-olds and a single second grade of seven-year-olds, so they combine two grades/ages into one class and may incorrectly call it a multiage class when in actuality the class, for example, is a combined first/second grade class, or a combined third/fourth grade class. Combination classes are often mixed-ages by necessity but are not generally multiage in philosophy.

In a combination class, teachers usually adhere to the curriculum for each grade level within the class. For example, in the area of math, a combination class teacher works with the first graders, teaching them the first-grade curriculum(standards) and then works with the second graders, teaching them the second-grade curriculum (standards), alternating time with each graded grouping during the instructional day.

Combination classrooms most often follow a graded system approach, not a multiage approach. Combination classrooms:

- Use the graded curriculum for each grade level.
- Do not integrate curriculum.
- Do not commonly promote cross-age learning through choice-based centers and projects.
- Follow the traditional graded system approach to using grades, tests, and promotion/retention procedures.

As Stone (2002) suggests, "the true multiage classroom takes down the barriers of 'gradedness' and seeks something different – it seeks to truly benefit children by fitting the school to their needs, instead of trying to fit the children to the school" (p. 40). Unfortunately, a combination class, while mixed-ages, adheres to the constructs of the graded system. Stone and Burriss (2019) advise educators to "guard against using combination classrooms under the guise of multiage education" (p. 55).

Quasi-multiage Programs

Some schools may call themselves "multiage," adhering to multiage philosophy and practices for a portion of the day, and then divide the children into same-age groupings to teach some subject areas by grade-level curriculum (i.e., reading, math). Depending on the organization of the school, a school could be considered as offering a *quasi-multiage program*, providing some multiage system philosophy components, yet also providing some graded system organization. Ultimately, these schools would not fit the definition of a true "multiage education."

Multiage Education	**Mixed Ages, but not Multiage**	**Graded Education**
Children learn in *mixed-age groupings* under a child-centered, whole child, *constructivist* philosophy of learning, directed by learning strategies, goals, and authentic assessment based	**One-room school** (1800's -) Traditional graded education but with mixed-ages/multiple grades by necessity.	Children learn in *same-age groupings* under a curriculum-centered, *behaviorist* philosophy of education, directed by lesson plans, objectives/standards, and

on child development where mixed-age children are engaged with each other in self-directed, choice-based experiences through open-ended centers and projects, thus maximizing the benefits of mixed-ages learning from each other.	**Combination Classroom** (1860s -) Traditional graded education, but with two grades/ages by necessity.	tests where children are teacher-directed through lessons, assignments, worksheets, and often rubric-designed projects. Graded education homogenizes groupings of children by using age in grade in order to minimize differences, thus making it easier for teachers to deliver a singular, grade-level curriculum.
Examples: **British Primary Schools** (1945 -). *Precursor to multiage* **Non-graded Primary Schools** (1950 -). *Precursor to multiage* **Ungraded Primary Schools** (1990 -). *Precursor to multiage* **Multiage** Multiage schools/classrooms (1990 -). *Current*		Example: **Traditional Graded Schools** (1860 - present)

Conclusion

In our education world, words and how we use them are important. As noted, *Education: Words and Meanings* is designed to clarify certain words often used in educational texts. Clarifying the meaning of words gives the reader a greater depth of understanding and discernment. *Multiage* is a word that may be used to cover a myriad of educational groupings that may or may not exemplify the framework of multiage education and its meaning.

For example, one may hear someone sharing about a visit to a “multiage” classroom. However, upon listening to the description, the listener discerns that the classroom is not truly a multiage classroom, but rather a class of mixed ages that follows the graded system parameters. Contrasting the meaning of multiage education with the graded system broadens the meaning of both systems. Understanding words and their meanings such as “multiage” provides clarity necessary for deeper understanding.

References

Abeles, V. (2016). *Beyond measure: Rescuing an overscheduled, overtested, underestimated generation*. Simon & Schuster.

Blackie, J. (1971). *Inside the primary school*. Schocken Books.

Cremin, L.A. (1957). *The republic and the school: Horace Mann on the education of free men.* Teachers College Press.

Eisner, E. (1974). *English primary schools*. National Association for the Education of Young Children (NAEYC).

Goodlad, J., & Anderson, R. (1987). *The non-graded elementary school*. Teachers College Press.

Gray, P. (2011). *Free to learn*. Basic Books.

Gray, P. (2014). School overload. *Education Canada, 54*(2), 9-11.

Katz, L., Evangelou, D., & Hartman, J. (1993). *The case for mixed-age grouping in early education*. National Association for the Education of Young Children (NAEYC).

One-Room School. (2024, March 2). https://www.thehenryford.org

Pink, D. (2009). *Drive*. Riverhead Books.

Rippa, S. (1997). *Education in a free society*. Longman.

Robinson, K. (2015). *Creative schools*. Penguin Publishing Group.

Rogers, V. (1970). *Teaching in the British primary school*. MacMillan.

Stockton, S. (2023, August 21). *The one room schoolhouse approach*. https://classicalconversations.com.

Stone, S. J. (2002). Defining the multiage classroom. In P. S. Crawford & K. G. Burriss (Eds.), *It's elementary! Topics in elementary education* (pp. 39-40). Association for Childhood Education International (ACEI).

Stone, S. J. (2004). *Creating the multiage classroom.* GoodYear Books.

Stone, S. J. (2010). Multiage: A model of education reform – or invention? *Journal of Multiage Education, 4*(1), 13-18.

Stone, S. J. (2022). Creating multiage groupings for the well-being of children. *ChildLinks (*Barnardos/Ireland), *1*, 2-8.

Stone, S. J., & Burriss, K. G. (2019). *Understanding multiage education*. Routledge.

Teaching in a One-Room Schoolhouse. (2018, February 15).https://westervillelibrary.org.

Thompson, S. (2014). A paradigm for learning in a world of continuous change. *Educational Technology, 54*(3), 7-11.

International Journal of the Whole Child
2024, VOL. 9, NO. 1

Pictures for Reflection
Growing Up is a Playful Way to Go!

Kathy Burris[a], Larry Burris[b]

[a-b]Middle Tennessee State University

Kathy Burris (B.A. and M.Ed. Elementary Education, Ed.D. in Early Childhood Education) taught diversity, research, and curriculum courses in the Department of Elementary and Special Education at Middle Tennessee State University. She remains an advocate for children's play, outdoor activity, and multiage learning.

Larry L. Burris (bachelor's and master's degrees in broadcast journalism, master's degree in human relations, Ph.D.in communication, as well as a law degree) is a professor in the School of Journalism and Strategic Media at Middle Tennessee State University where he teaches Introduction to Mass Communication, Media Law, Mass Media & National Security, and Quantitative Research Methods. Dr. Burris retired from the U.S. Air Force as a lieutenant colonel.

Through a playful behavior, children imitate, rehearse and practice a variety of different life roles. During play, children challenge and extend their abilities as well as explore their personal comforts and interests. Remember, play belongs to the children. As adults, consider what materials, opportunities, and models we provide.

International Journal of the Whole Child
2024, VOL. 9, NO. 1

Page Turners: Books for Children

Michelle J. Sobolak[a], Patricia Crawford[b], Maria Genest[c], Katrina Bartow Jacobs[d], Carla K. Meyer[e]

[a]University of Pittsburgh, [b]University of Pittsburgh, [c]Endicott College, [d]University of Pittsburgh, [e]Duquesne University

Agatha May and the Angler Fish
Written by **Nora Morrison & Jessie Ann Foley**
Illustrated by **Mika Song**
Dial Books for Young Readers (Penguin Random House), 2022
ISBN: 9780593324752

This beautifully written and charmingly illustrated text shares the tale of Agatha May, who struggles with organization and cleanliness and often is picked last in science class. But while Agatha May has trouble showing her talents in traditional ways, her chance to shine comes when she gets to prepare and present on the angler fish - a creature as fascinating, odd, and unique as Agatha May herself. Filled with interesting facts about the angler fish and told in a lilting rhyme pattern, this book will delight children and everyone who roots for the underdog. This book is an excellent cross between nonfiction and storytelling and reminds everyone to keep searching for ways to light up their dreams. Ages 4-7.

BIG
Written and illustrated by **Vashti Harrison**
Hachette Book Group, 2023
ISBN: 9780316353229

This book, a recent Caldecott and Coretta Scott King winner, shares the sad but true story so many young women face -- that big is beautiful and strong, until it isn't. Following the growth of a young black girl with beautiful and poignant illustrations, the book reveals how the small shames and thoughtless words can leave lasting impacts on children whose bodies do not match perceptions of beauty. Particularly striking is the way the author uses illustrations to illuminate how painful and restrictive the boxes society puts us in, as well as the limits we set for ourselves. Ultimately a story of self-discovery and pride, *BIG* addresses the ways that the world can judge larger girls, especially those of color. But it also shows how we can teach our children to rise up and reclaim their own image as one of beauty and strength. Ages 5-10.

Hello, Puddle!
Written by **Anita Sanchez**
Illustrated by **Luisa Uribe**
Clarion Books, 2022
ISBN 9780358381440

This story follows a young girl watching a nearby puddle throughout the seasons The reader learns about the many different animals, insects and birds that use the puddle for a myriad of reasons This enchanting text helps young readers learn about an overlooked habitat in nature as they see the puddle being used as a home, a drinking hole, a bath, a place for seeds to germinate, a feeding spot and much more The puddle shrinks and grows throughout the seasons illustrating the ways that weather impacts our environment Beautiful, colorful illustrations accompany the simple text to help the reader have a window into this world Resources are provided at the end of the text to help readers explore the wildlife around them, create their own puddle and learn additional facts about the many animals in the text. Ages 4-7.

Kitty
Written and illustrated by **Rebecca Jordan-Glum**
Roaring Book Press, 2022
ISBN 9781250768049

This comical tale allows readers to follow the adventures of Granny when she is cat-sitting for her family's pet Granny thinks this job will be very easy until she loses her glasses and the antics begin After accidently letting the cat out and a raccoon in, Granny is in for a wild night. The engaging text is coupled with colorful illustrations that help bring the story to life and includes many action words that make this an exciting read aloud. This story is sure to delight young children who will relish in knowing Granny's mix-up and watching the chaos unfold. Ages 4-7.

The Last Stand
Written by **Antwan Eady**
Illustrated by **Jarrett and Jerome Pumphrey**
Alfred A. Knopf, 2024
ISBN 978-0-593-48057-1

Papa Earl has the last remaining stand at the farmer's market. Each Saturday, Papa and his grandson, Little Earl, harvest peppers, plums, pumpkins, and eggs, and pack them in the truck. They head off to the market, where a cast of friends and regular customers gather. One Saturday Papa finds himself unwell. Little Earl steps up to fill the gap. He harvests all the goods and transports them to the market in his wagon. The concerned customers miss Papa. While Little Earl sells all the wares, he returns home with a still full wagon, filled with luscious treats that friends have made from Papa's produce. Most Saturdays are for harvesting, but this Saturday is for gathering and feasting. This sensitive story is a delight for the senses. Don't miss the detailed illustrations, end pages, author's notes, land under-the-dust jacket cover to find additional insights about Papa's advocacy for Black farmers and the power of intergenerational relationships. Ages 4-10.

Oh, Panda
Written and illustrated by **Cindy Derby**
Alfred A. Knopf, 2023
ISBN 978-0-593-5642-1

On a wintry day, Panda encounters a beautiful butterfly. He wants to play, but the butterfly soars up, up, up–right over a snowy mountaintop. Panda tries to follow, but the mountain is too cold, too icy, and too high. An unseen narrator tries to distract Panda, reminding him he is "still a bit too small" to take on the mountain. However, Panda is a tenacious little bear who will not be dismayed. He persists. Using every possible resource, Panda overlooks problems and false starts. He tries again and again until he does indeed reach the peak of the mountain. When he looks down the other side, he finds warmth, sun, and a whole world of butterflies. The sparse text and whimsical watercolor with gouache illustrations convey a story of determination, innovation, and grit. This would be an excellent text to model growth mindset principles. Ages 3-8.

Rabbit, Duck, and Big Bear
Written by **Nadine Brun-Cosme**
Illustrated by **Olivier Tallec**
Random House Studio, 2023
ISBN 9780593486986

Rabbit, Duck, and Big Bear are three friends living in the forest who do everything and go everywhere together, except down the long, winding path. They each have their reasons for not wanting to journey down that path together and this beautifully illustrated text celebrates the friendship between them on every page, highlighting the joys of the adventures and activities they do undertake, from decorating the forest with garlands and lanterns to playing in the autumn leaves. The long and winding path is ever present, however, and young readers will appreciate finding out that each friend has a special relationship with it and where it leads. This endearing book gently discusses the need for all of us to be with friends at times, and alone at times. Ages 4-8.

What's Inside a Caterpillar Cocoon? (And Other Questions about Moths and Butterflies)
Written and illustrated by **Rachel Ignotofsky**
Crown Books for Young Readers, 2023
ISBN 9780593176573

This stunningly illustrated informational text (one of the *What's Inside* series by the author) focuses on the similarities and differences between moths and caterpillars at every stage of their life cycles. It is filled with interesting and engaging facts about both, and Ignotofsky intentionally includes caterpillar and moth species that are less common but strong examples of the characteristics she eloquently describes. The illustrations are intricate and young readers will enjoy poring over the pages to catch each detail. There is much to learn about these fascinating insects from this book and the author also includes additional educational resources to launch children's interest in this topic. This nonfiction text would be an excellent read-aloud and worthwhile addition to any classroom library. Ages 4-7.

Freaky Heart
Written by **Lori M. Jones**
Independently published, 2024
ISBN: 979-8876853783

As a parent of children with disabilities and an academic with a disability, I find far too often books about children with differences fall into stereotypical disability troupes. *Freaky Heart* provides a refreshing take about what it means to grow up different. Annalise, born with half a heart and dependent on a pacemaker to stay alive, has always felt different. Multiple operations and hospital stays have only added to Annelise's sense of alienation. As a middle-school student, Annalise desperately wants to be normal, but she believes her peers see her as a "freak." An accident at school sends Annalise back to the hospital, meanwhile she must address the life challenges of a typical middle schooler. These challenges give her a new way of seeing herself, which is the beauty of the story. It centers on Annalise's humanity, not her differences. This book gives the child with a disability the opportunity to claim power back by using words that were intended to harm, such as freak. The author uses humor and real-life experiences to develop a compelling story that would benefit all middle-grades students to read. Ages 10-15.

International Journal of the Whole Child
2024, VOL. 9, NO. 1

Updates

Thank you for your continued support of the International Journal of the Whole Child and our commitment to holistic learning and to the development of the whole child. The submission deadline for the Fall 2024 is September 30th. The Fall 2024 issue will be published in December 2024. Thank you again for your continued support. We look forward to seeing you in Fall 2024.