

EXPERIENCING INCLUSIVE PLAYFUL SCIENCE: CREATING MEANINGFUL ENGAGEMENTS WHILE INTEGRATING FUN AND LEARNING

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Abstract

Child development professionals, psychologists, learning scientists and other childhood experts agree that play is an essential component of healthy childhood development (Ginsburg and Committee on Psychosocial Aspects of Child and Family Health, 2007). This ethnographic research was set forth to examine and explore the practices and experiences of young learners and their educators who were participating in playful/play-based science program and how this approach influenced the collective dynamics the school that follows the principles of age-appropriate inclusive education program. Particularly, this study sought to investigate these particular research questions: 1) How do children engage in playful science?; 2) What skills were children developing in their playful science activities?; 3) What are the perceptions of teachers and parents regarding playful science?; and 4) What are the innovative teaching approaches do teachers' used in playful science activities? The partakers of the study included preschool learners, school administrator, special and general (preschool) education teachers, parents and caregivers. Data were analyzed and triangulated within multiple sources to ensure substantiation thus identifying discrepancies and commonalities specifically using in-depth semi-structured interviews and focus group discussions with administrators, teachers, parents and caregivers, playful science activities observations, document and archival exploration, portfolios and videotape analyses. Data analysis was done concurrently with data collection through an interactive, recursive and dynamic process and quotations were used for exposition and clarification of major themes. The findings of this study revealed accounts of significant harmony between families and the school at both theoretical and application levels to achieve realization of playful science. Children's interactions in playful science, with materials, peers, and adults, provided an

opportunity for children's holistic development and adults assumed roles as scaffold, facilitator and mediator while children were actively involved with a variety of strategies.

Keywords: Play, Science, Inclusive Education

Introduction

Play is so important to optimal child development that it has been recognized by the United Nations High Commission for Human Rights as a right of every child (United Nations High Commissioner for Human Rights, 1989). Current literature suggests that when children play outdoors, the opportunities for learning and skill development are endless. Children engage in social interaction with one another to work cooperatively, share ideas and solve problems (Burdette & Whitaker, 2005; Hart, 2002; Kellert, 2002; Malone, 2003; Maxwell, Mitchell & Evans, 2008; Thompson & Thompson, 2007; White & Stoecklin, 1997; Wilson, 2007). These social interactions with peers often inspire rich dialogue and complex language (Frost, Wortham & Reifel, 2001; Maxwell et al., 2008).

Children exercise mathematical and scientific thinking as they investigate patterns and sequence, explore cause and effect, and experiment with elements in the outdoor environment (Burdette & Whitaker, 2005; Hewes, 2006; Olsen, Hudson & Thompson, 2009). Children manipulate materials to learn principles – sometimes very sophisticated principles – related to construction and engineering (Derr, 2006; Lester & Maudsley, 2007; Wardle, 2000).

The opportunity for learning and skill development within outdoor play, however, depends greatly on the environment. Many “traditional” outdoor play environments designed for children are comprised of static playground equipment that limits multifaceted skill development due to the fixed, unchanging nature of the structures (Blizard & Schuster, 2004; Hart, 2002; Lester & Maudsley, 2007). Many experiences in natural play spaces are not available in traditional playgrounds (e.g., plant discovery, natural topography, messiness, wildlife) (Stephens, 2007). Safety concerns and litigation fears have resulted in the “dumbing down” of traditional playgrounds, perpetuating a growing decline of opportunities that cultivate developmental benefits (Sutterby & Frost, 2006).

Preschool Inclusive Education: The Filipino Context

Inclusion is a basic right of every Filipino child with special needs to education, rehabilitation, support services, work training and employment opportunities, community participation and independent living (Handbook on Inclusive Education, 1999). In the Philippines, the provision of inclusive education is anchored on the philosophy that all children and youth with special needs must receive an appropriate education and everything within the system (Handbook on Inclusive Education, 1999 & Camara, 2002).

Moreover, with the advent of Batas Pambansa Blg. 232 also known as Education Act of 1982, Republic Act 7277, Kindergarten Education Act of 2011, and ECCD Act of 2000 the welfare of children with special needs in the Philippines was realized. It was stated in the statutes that the State shall ensure that disabled persons are provided with adequate access to quality education and ample opportunities to develop their skills and the state shall also take into consideration the special requirements of disabled persons in the

formulation of education policies and programs (R.A. 7277, Chap.II). Additionally, B.P. 232 (Chap. II) states and defines the roles and scope of special education in the Philippine Integrated System of Education.

The status of inclusion and play strategies in the Philippine early childhood educational system, with the implementation of Philippine EFA 2015, Kindergarten Education Act of 2011 and ECCD Act of 2000, will categorically require a number of extensive changes as the focus shifts from the learners having to adjust to the demands of the system, to the system's being capable of accommodating the diverse needs of all learners as inclusively as possible even in the preschool area and utilizing play a crucial component in the delivery of curriculum. However, from the theory of educational change it is well known that at the centre of transforming the process in education is the need to change the values, understanding, and actions of individual people (Fullan & Stiegelhauer, 1991). Over the last few years in our country, many schools, both public and private, have taken up the challenge of confronting and managing the demands of diversity as the community's needs evolved and changed and a single education system put in place.

In inclusive early childhood education program, learning science concepts with play helps children weave together all the elements of life as they experience it. It allows them to digest life and make it their own. It is an outlet for the fullness of their creativity, and it is an absolutely critical part of their childhood. With creative play, children blossom and flourish; without it, they suffer a serious decline. With this, the researchers first to note this fact and adheres to the central importance of creative play in children's healthy learning and development as supported by decades of research.

And yet, the concept of inclusive education and children's play are not practiced and seriously endangered in the educational field. Increasingly, preschool and kindergarten children find themselves in school settings which feature scripted teaching, computerized learning, and standardized assessment. Physical education and recess are being eliminated; new schools are built without playgrounds. While allegedly, these approaches are providing "quality education," they trivialize and undermine children's natural capacities for meaningful and focused life lessons through creative play and this leaves many children profoundly alienated from their school experiences (Almon, 2013). This demise in the field of early childhood education urge the researchers to pursue this study for the future of early childhood development and care.

Theoretical Framework and Research Problem

According to child development theorists, play is a natural way of learning and necessary for cognitive, social, and personal development (Piaget, 1964/2003, Vygotsky 1994). Piaget's (1964/2003) theory proposes that in the construction of knowledge, assimilation is associated with play whereas accommodation involves logical or serious thinking. In Vygotsky's (1994) social constructivist theory, "in play a child always behaves beyond his average age, above his daily behavior; in play it is as though he were a head taller than himself." According to Vygotsky (1994), interaction between the child, adults, and peers accelerates or enhances the process of scaffolding. Vygotsky uses the term scaffolding to describe the assistance a teacher or peer gives to a child. In Vygotsky's social constructivist theory (1994) teacher's guidance has crucial role for learning a new or difficult concept. Severeide and Pizzini (1984) stated that science and play are complementary aspects of problem solving. The former encourages systematic behavior

while the latter encourages creative behavior. According to Laszlo (2004), one definition of science is play with ideas, a process of innovation and discovery, rather than a textbook exercise of learning definitions. Resnick (2004) applies constructivism in his Media Lab at (MIT) to create a playful learning environment which integrates play and learning for children. With this theory at hand, the integration of play and learning creates self-motivation, responsibility, and great concentration. Children are likely to learn the most and enjoy the most when they are engaged as an active participant, not passive recipient.

This paper was set forth to examine and explore the practices and experiences of young learners and their educators who were participating in playful/play-based science program and how this approach influenced the collective dynamics the school that follows the principles of age-appropriate inclusive education program. Particularly, this study sought to investigate these particular research questions: 1) How do children engage in playful science?; 2) What skills were children developing in their playful science activities?; 3) What are the perceptions of teachers and parents regarding playful science?; and 4) What are the innovative teaching approaches do teachers' used in playful science activities?

Methodology

Research Design

Ethnography was the method was used in this study. Ethnography is defined as prolonged observations over time in a natural setting within a bounded system. The observational method is the chosen method to understand another culture whereas, the case study is used to contribute to our knowledge of individual, group, organizational, social, political, and related phenomena (Yin, 2003). Using the ethnographic method allowed for exploration of actions and events over three cases of children with disabilities over a prolonged number of time in natural setting; providing a deeper understanding of their school placement in an inclusive school.. The observational method is the chosen method to understand another culture whereas, the case study is used to contribute to our knowledge of individual, group, organizational, social, political, and related phenomena (Yin, 2003). Using the case study method allowed for exploration of actions and events over the participants over prolonged number of time in natural setting; providing a deeper understanding of their student teaching life (Yin, 2003).

Setting

This study took place in an inclusive school in Roxas City, Philippines that has included children with special needs since 1997. The school has been continuously permitted to function and since 1993 and nationally recognized in 2003. For school year 2014-2015, the school provides services to 148 children ages 1.5 years old through 6th grade. There are 21 teachers and is adhering play-based curriculum with lessons, activities and programs designed for children to use their creativity while developing their imagination, dexterity, and physical, cognitive, and emotional strength and integrates principles from the latest in education research such as, among others, Whole-Brain Learning, Multi-Grade Program, Socio-Emotional Learning, Multiple Intelligences Theory, Learning Styles, and Environment-based and Culture-based education, eventually resulting to a curriculum tailored to each child's uniqueness. The school provides special education services and refers related services; paraprofessionals'/caregivers' training, parent education program and in-service personnel development are part of the school's services.

Participants

Learners, Teachers, Parents/Guardians. A total 16 participants were involved in the study –6 parents/guardians (with and without a child with special needs), 5 teachers and five learners (with and without special needs). All of the participating adults represented a broad range of capability and were exposed to inclusive education system. Five of the parents were mothers with one father and five teachers were female and worked on a regular basis in the school. Moreover, five learners were casually observed and interviewed in the course of the study. These learners were a combination of children with and without disabilities.

The partakers were purposively chosen for the study for the reason that they are particularly useful in the context of the study and are the major stakeholders who are involved in designing, giving, receiving, or administering the program being deliberate (Given, 2008).

Data Collection Procedures and Analysis

In-depth and semi-structured interviews with study participants, on-site observations, focus group discussions, document and archival exploration were used during the span the student teaching period to craft communal and substantive accounts grounded on the stories of those who are deeply involved in the inclusive programs of both schools. Qualitative analysis was comprised of analysis of similarities and differences, coding and categorizing, and constant comparison (Lunenberg and Irby, 2008). Creswell (2007) divides data analysis in an ethnographic case study into five parts: 1) data managing, 2) coding and developing themes, 3) describing, 4) interpreting, and 5) representing. The researcher engages in the process of moving in analytic circles that spiral upward, in a process that allows him or her to produce a continually more detailed analysis. The researchers enter with data as text and exits with an account or narrative (Creswell, 2007). This analytic process contrasts with the more linear line of reasoning found in quantitative analysis.

Findings and Discussions

Children engagement in playful science.

“We will dig in this area, maybe the fossil is in here!” – Child with Autism

“Exploration igniting the five senses”

Data revealed that children explore through their senses – touching, smelling, tasting, listening and looking – anything and everything is fun. Children’s curiosity is endless and being in natural spaces and materials stimulate children’s limitless imagination and serve as the medium of inventiveness and creativity that arouses and intense desire to explore, create a high level of curiosity and excitement. Outdoor class activities are opportunities where they explore and play while allowing them to learn.

“Hypotheses Testing in a Fun and Collaborative Way”

The collated data showed that young children work hard at play. Work hard in the sense that they exhibit problem-solving skills in the most candid and untiring way coupled with fun and excitement. They invent scenes and stories, solve problems, and negotiate their way through social roadblocks. They know what they want to do and work diligently to do it. They consistently find diverse ways in tackling challenges along their science

activities in socially acceptable manner with their peers. These young children are born with a most wonderful urge to grow and learn, and as observed continually develop new skills and capacities, and if allowed with a bit of help from peers or from the teacher they will work at all this in a playful and tireless way. Because their motivation comes from within, they learn the powerful lesson of pursuing their own ideas to a successful conclusion with sheer determination.

Skills that children developed in their playful science activities.

“They kept asking questions, giving their own ideas and comments towards the activity.”
– Teacher

“The 4 C’s”

Critical Thinking, Collaboration, Communication and Creativity. Teachers and parents were observed to give arrangement to children’s activities that enhances their curiosity by guiding them through different investigations and explorations in either in school or at home. With this, children can learn in an optimum level about their environment through play and also develop skills such as observing, classifying, experimenting, changing variables, investigating, and concluding. It was discovered that children, with playful science environment, were highly collaborative in nature. Children worked always in groups by sharing what they discovered and investigated. By sharing what they discovered, this promotes communication skills development which are developmentally appropriate to their level. And looking to the whole picture of collaborating and communicating of what they have experienced and explored, they spontaneously analyze, synthesize and evaluate the findings of their peers and eventually create something novel to any given opportunity as facilitated by the teacher or parent.

Perceptions of teachers and parents regarding playful science.

“The experiences of my child with natural ecosystems enhance his understanding of food system and the effects food consumption and behavior. When he ask specific questions about vegetables, fruits, etc. in relation to the science theme being explored; for me, as a parent, helps my child develop environmental attitudes and behaviors and that’s experiential learning!” – Parent

“Builds Competence and Deeper Understanding of Real World Situations”

During activities, children enjoy what they are doing, and they become highly motivated and engaged in the learning process and there’s evident change of attitude and pride in their finished tasks. Such activities require and build resilience, immediacy, presence, and the ability to focus and act with intention even while the outcome may remain unknown. These actions produce a greater sense of competence in children.

Playful science created a desire in children to want to re-experience whatever feelings and thoughts they have while doing it. Although sometimes there’s a feeling of frustration when they couldn’t see the results that they expected, yet whatever result these explorations or testing bring, there are still evidence of awe and wonder, there’s a desire to share what they have learned or discovered, the level of frustration and disinterest has lessened and is replaced by curiosity and enthusiasm. It gives all children opportunities to

use all of their senses and instigate investigation and learning. Playful science provides a superior learning environment that goes beyond specific evidencebased learning. This gives insight to the complementary value of real, hands-on learning.

Innovative teaching approaches do teachers' used in playful science activities

"We do our science concepts through play, hands-on activities, field trips, experiential learning and experimentation." – Teacher

"Multi-strategic and Cross-Cutting"

Parents and teachers do agree that there's an increased mastery of science concepts; enhanced cooperation, conflict resolution skills, gains in self-esteem; in positive environmental behavior, in problem solving, motivation to learn and classroom behavior. These outcomes are also represents other disciplines may it be academic in nature or socio-cultural. As noted, children develop power when they build relationships with peers and the activity/materials at hand. When children have the chance to notice, collect, and sort materials, and when teachers, parents and peers respond to their ideas, the children become artists, designers, and engineers. When children are simply given activities/strategies which are worthwhile and with developmentally-appropriate materials to use with the chance to explore and understand them, the experience in borderless and cuts across life and education.

Given varied multi-strategic instructions, as also explained in earlier themes, children's explorations come with collaboration and communications and from these come the next activities, investigations, and discoveries leading to critical thinking skills and creativity; thus, a natural consequence that children naturally want to talk about— and maybe draw about – their discoveries. Hence, teachers and parents promote language, literature, mathematics, and science through creative exploration.

Conclusion

There are many benefits to children from early experiences in doing playful science. Creativity, physical competence, social skills, environmental knowledge, confidence, and problem solving ability are among those benefits to children's development. Given the important role of the adults in taking children into the outdoors for playful science, the attribute of the experiences those adult mentors provide are also vital. By providing and exposing exploratory environments to children, adults paved way in the authentic learning of caring for the land as a limited resource, disapproving of destructive practices, loving nature, and fascination with the details of other living thing sand elements in the sky.

The findings of the study suggests that if children were exposed to a variety of playful strategies and participating in many hands-on activities and projects in a playful and risk-free, collaborative environment enhance constructivist skills in dealing not only in school but in actual situations. Facilitators should be able to provide experiences and activities that spice the excitement and joy of doing science intrinsically and of sharing inquiry experiences with their peers. Moreover, parents and teachers should pave way to children's exploration of their environments which light up their curiosities, questions and wonders with great joy and satisfaction.

Totally, researchers discovered that all of the participants are very happy and enjoying in doing playful science. Happily engaged stakeholders is one vital indicator that the subject being investigated is and will be sustainable.

References

- Almon, J. (2013). "The vital role of play in early childhood education." In Olfman, S., ed. *All Work and No Play...: How Educational Reforms Are Harming Our Preschoolers*. Westport, CT: Praeger, 17-42.
- Blizard, C., & Schuster, R. (2004). They all cared about the forest: Elementary school children's experiences of the loss of a wooded play space at a private school in upstate New York. *Proceedings of the 2004 Northeastern Recreation Research Symposium* (pp. 57-63).
- Burdette, H. L., & Whitaker, R.C. (2005). Resurrecting free play in young children: Looking beyond fitness and fatness to attention, affiliation, and affect. *Archives of Pediatrics & Adolescent Medicine*, 159, 46-50.
- Camara, E.F. (2002). *Programme modifications for children and youth with special needs*. Manila: P'Mont Publisher
- Corbett, J., & Slee, R. (2000). An international conversation on inclusive education in F. Armstrong, D. Armstrong, & L. Barton (Eds.), *Inclusive education. policy, contexts and comparative perspectives* (pp. 133-146). London: David Fulton.
- Derr, T. (2006). Sometimes birds sound like fish: Perspectives on children's place experiences. In C. Spencer and M. Blades (Eds.), *Children and their Environments: Learning, Using and Designing Spaces* (pp. 108-123). New York: Cambridge University Press.
- Creswell, J.W. (2007). *Qualitative inquiry and research design: Choosing among five traditions (2nd ed.)*. Thousand Oaks, CA: Sage Publications.
- Frost, J. L., Wortham, S., & Reifel, S. (2001). *Play and child development*. Upper Saddle River, NJ: Merrill Prentice Hall.
- Fullan, M. & Stiegelhauer, S. (1991). *The new meaning of educational change*. London: Cassell.
- Giangreco, M.F. (2002). *Quick-guides to inclusion 3: Ideas for educating students with disabilities*. Baltimore: Paul H. Brookes Publishing.
- Ginsburg, K.R. and Committee on Psychosocial Aspects of Child and Family Health (2007). "The Importance of Play in Promoting Healthy Child Development and Maintaining Strong Parent-Child Bonds." *Pediatrics* 119(1): 182-191.
- Given, L. M. (Ed.) (2008). *The sage encyclopedia of qualitative research methods* (Vol.2, pp. 697-698). Thousand Oaks, CA : Sage.
- Guralnick, Michael J., editor (2005). *The developmental systems approach to early intervention: International issues in early intervention*. Baltimore, Maryland: Brookes Publishing Company.
- Hart, R. (2002). Containing children: Some lessons of planning for play from *New York City, Environment and Urbanization*, 14(2), 135-148.
- Hewes J. (2002). *Let the Children Play: Nature's Answer to Early Learning*. Ottawa, Ontario: Canadian Council on Learning, Early Childhood Learning Knowledge Centre. Retrieved on April 15, 2010 from http://www.cclcca.ca/NR/rdonlyres/A112461B-030B-4156-A1A2-E380BF998535/0/LearningthroughPlay_LinL.pdf
- Kellert, S. (2002). Experiencing nature: Affective, cognitive, and evaluative development in children. In P. Kahn and S. Kellert (Eds.), *Children and nature: Psychological, sociocultural, and evolutionary investigations* (pp. 117-151). Cambridge, MA: MIT Press.
- László, Ervin (2004). *Science and the akashic field: An integral theory of everything*. Rochester, Vermont: Inner Traditions.
- Lester, S., & Maudsley, M. (2007). *Play, naturally: A review of children's natural play*. Los Angeles: National Children's Bureau Enterprises Ltd.
- Malone, K., & Tranter, P. (2003). *Children's environmental learning and the use, design, and management of school grounds*. *Children, Youth and Environments*, 13(2). Retrieved from <http://colorado.edu/journals/cye>

- Maxwell, J. (1996). *Qualitative research design: An interactive approach*. Thousand Oaks, CA: Sage Publications
- Maxwell, L. E., Mitchell, M. R., & Evans, G. W. (2008). Effects of play equipment and loose parts on preschool children's outdoor play behavior: An observational study and design intervention. *Children, Youth and Environments*, 18(2), 36-63.
- Office of the United Nations High Commissioner for Human Rights. Convention on the Rights of the Child. General Assembly Resolution 44/25 of 20 November 1989.
Available at: www.unhcr.ch/html/menu3/b/k2crc.htm. Accessed June 22, 2006
- Olsen, H., Hudson, S., & Thompson, D. (2009, Winter). Building engaging science labs outdoors. *Texas Child Care*, pp. 30-37.
- Opie, C. (2004). *Doing Educational Research: A Guide to First-time Researchers*. London: Sage Publications.
- Piaget, J. (2003). Development and Learning. *Journal of Research in Science Teaching*, 40, Supplement. 8-18
(Original work published in 1964)
- Republic Acts 7277, 9442, 10524. Retrieved June 10, 2013 at:
http://www.lawphil.net/statutes/repacts/ra2012/ra_10157_2012.html
- Republic of the Philippines, Department of Education. (2012). *DECS Order No. 26 s. 1997* at:
http://www.deped.gov.ph/orders?f%5B0%5D=field_classification%3A735
- Republic of the Philippines, Department of Education.
DepED Order No. 72 s. 2009 at:
<http://deped.gov.ph/orders/do-72-s-2009>
- Resnick, M. (2004). Edutainment? No Thanks. I Prefer Playful Learning. *Associazione Civita Report on Edutainment*. Retrieved at http://www.parentschoice.org/article.cfm?CFID=5154ec59-f123-4b4d-9117c5555db75b68&CFTOKEN=0&art_id=172&the_page=consider_this
- Sandall, S., Smith, B., McLean, M., & Ramsey, A. (2002). Qualitative research in early intervention/early childhood special education. *Journal of Early Intervention*, 25(2), 129– 136.
- Severeide, R.C., & Pizzini, E.L. (1984). The role of play in science. *Science and Children*, 2, 58-61.
- Special Education Division, Bureau of Elementary Education, Department of Education, Culture and Sports. (1999). *Handbook on inclusive education*. Manila: DECS
- Special Education Division, Bureau of Elementary Education, Department of Education, Culture and Sports. (1997). *Policies and guidelines of special education in the philippines*. Manila: DECS
- Stephens, E. (2007, July). *Designing for preschoolers: The engagement of natural spaces for play*. White Paper. Faculty of Landscape Architecture, State University of New York, College of Environmental Science and Forestry.
Retrieved on April 15, 2010 from
http://www.esf.edu/la/capstones/2007/Stephens_Eleanor_07/Stephens_report_07.pdf
- Sutterby, J. A., & Frost, J. (2006).
Creating play environments for early childhood: Indoors and out. In B. Spodek & O. N. Saracho (Eds.), *Handbook of research on the education of young children (2nd ed.)*. (pp. 305-321). Mahwah, NJ: Lawrence Erlbaum Associates.
- The UNESCO Salamanca Statement. (1994) at:
http://www.UNESCO.org/education/pdf/SALAMA_E.PDF
- Thompson, J. E., & Thompson, R. A. (2007, November/December). Natural connections: Children, nature and social-emotional development. *Exchange*, pp. 46-49
- UNESCO. (2005). *Guidelines for Inclusion: Ensuring Access to Education for All*. Paris, France: UNESCO
- UNICEF. (2006). *State of the World's Children, 2007*. New York: UNICEF.
- Vygotsky, L. (1994). The problem of the cultural development of the child. In R. Van Der Veer, & J. Valsiner (Eds.), *The Vygotsky Reader* (pp. 57–72). Oxford: Blackwell Publishers.
- White, R. & Stoecklin, L. (1997). *Children's outdoor play and learning environments*:

- Returning to nature*. Retrieved June 10, 2010 from
<http://hsnrc.org/AIAN/Workshops>.
- Wardle, F. (2000, May). Supporting constructive play in the wild. *Child Care Information Exchange*, pp. 26-29.
- Wilson, R. (2007). *Nature and Young Children: Encouraging Creative Play and Learning in Natural Environments (1st ed.)*. New York: Routledge
- Yin, R. K. (2003). *Case study research: Design and methods (3rd ed.)*. Thousand Oaks, CA: Sage Publications.