EDUC 890: Educational Media as Foundations of Curriculum

The Zero Waste Learning Design Rationale

Belinda (Wan Qi) Jin

2015.12.03.

Zero Waste Website Link: http://zero.belindajin.com/

Learning Problem

Zero Waste Background

Waste is the symbol of inefficiency in any modern society and a representation of misallocated resources. Global solid waste volume is estimated at about 11 billion tons per year in 2011. To illustrate this magnitude, one can circle the equator 300 circles the equator using 2.5 ton trucks. Per capita solid waste generation is approximately 1.74 tons/year in the world. Globally, 120 - 130 billion tons of natural resources are consumed every year and produce around 3.4 to 4 billion tons of municipal solid waste (Giljum et al., 2008; Chalmin & Gaillochet, 2009). This large amount of waste has also created huge pressure for governments to manage waste in a more sustainable manner (Shekdar, 2009). Based on this, Metro Vancouver has provided a "sustainable" framework "Zero Waste" to solve waste problems. For its waste management, Metro Vancouver has set a goal to increase the rate of diversion (recycling and composting) from the current 55% to 70% by 2015 (Vancouver Debates Zero Waste).

SFU Sustainability Zero Waste initiatives program

SFU takes part in the Metro Vancouver sustainable framework and focus more on the responsibility to reduce our environmental footprint in a big way (Simon Fraser University). SFU Sustainability has created part of strategic plan for waste reduction that aims to double the amount of waste we recycle or compost by 2015, while diverting 70% of our waste from landfills(Simon Fraser University). Along with other regional higher education institutions, SFU is pioneering standardized four bin recycling stations across all its campuses. In addition, SFU Sustainability also established a Zero Waste webpage to educate adult students and staff on the

four new Zero Waste stations and corresponding symbols and signage, in order to becoming a leader in waste management practice.

Problem through learning material

The SFUChildcare Society, where I am employed, is strong encouraging to increase sustainability initiative with the early childhood education and also implementing the Zero Waste program. Scholar Sue Elliott (2010) appealed for early childhood practitioners to incorporate children's learning towards sustainable living as an "essential element of early childhood teaching" (p. 34), which will bring the "powerful window of opportunity … to play an active and significant role"in assisting young children and families to understand sustainability issues, concepts and practices (p.34). The concept of Zero Waste has tremendous value in educating young children to participate and civically engage in society in their early stage of development. Although SFU Sustainability provided a specific text introduction for both adults students and staff to recognize 4-stream Zero Waste stations, the recent site is imperfect-especially for young children. The current SFU Sustainability Zero Waste online page did not offer specific lessons for preschool program children. During my work, many of my students still frequently asked in which bin they should put different types of garbage, such as milk bottles, papers, food scraps and etc., which bin to put their food scraps in after the lunch and wondering whether some used paper wrapper is recyclable.

The reason for this is because children are very young, differ from adult learners (Bransford, Brown, & Cocking, 2000) and find it difficult to learn through written words. The acquisition of sight vocabulary can be one of biggest concerned for them. The text is does not make it easy for

them to apply what they read in their recycling practices. Marianthi Papadimitriou (1997) in his article, *The Impact Images Have on Children's Learning in Hypermedia Environment,* stated that, because of the concerned of vocabulary, many children, especially preschool children, are unable to shift attention from the "less salient but more relevant cue, from pictures to letters, when the visual and verbal stimuli is presented simultaneously" (p.5). In addition, in *Digital Natives, Digital Immigrants,* Prensky (2001) also claimed that "our students today are all 'native speakers' of the digital language of computers, video games and the internet. … They prefer [the] graphics before [the] text rather than the opposite" (p.1-2). This shows young children focus and recognize pictures better than they do with words. Teaching the young age group of 3 - 5 year olds often occurs through social interaction with an adult who is reading or reacting to some form of media. One factor that affects this learning is the iconicity – realism – of the pictures presented, with greater iconicity leading to better learning (Ganea, Pickard & Deloache, 2008).

In this way, I decided to design a basic the Zero Waste site for 3 - 5 years old children at SFU Childcare Society. The Zero Waste website will provided active curriculum for children through realistic images, informative videos, and interactive games, which will easily engage them to learn about our environment. The desired result is to empower them as proponents of a safer and healthier world and to care for planet earth. By using the Zero Waste site, young students not just learn from what they are seeing and hearing, and they will also have opportunities to learn through virtual practice such as touching, doing, and moving from screen or keyboard (AbilityPath.org). So that they can grow up with an awareness about waste and the ingrained

good habits. Therefore, the Zero Waste site offers a variety of experiences to help children develop new strengths and interests of waste management that will broaden their understanding of the world at early age. In addition, it can be useful and educable curriculum material for both educators and parents for preparing children early education.

Target Audience

Based on the previously mentioned learning problems, the Zero Waste site will provide a unique learning environment for young children to visualize and illustrate knowledge and concepts. The website is primarily intended for the 3 - 5 years old children who are participating in preschool program at SFU Childcare Society. The SFUChildcare Society, as a part of SFU community, is a place where children are encouraged to learn through play, in a caring environment that fosters a sense of community.The site can support young children in early learning by showing them what is happening around their environment. Thus, the website brings preschool program children a broad variety of real life experiences in their early stage learning that will inspire curiosity, exploration and cooperation along with themselves and their parents and educators.

Learning Goal

The primary learning goal of the Zero Waste website is to engage young children (3- 5 years old) in early environmental learning and to improve the way we look after our environment through Zero Waste management. Particularly, by listening, watching, and virtual practicing through Zero Waste site, young children should be able to learn about the concept of Zero Waste and understand how to recycle and compost garbage and utilize the four new waste stream Zero

Waste stations with high efficiency. In order to learn more about our surrounding environment through the Zero Waste website, children have ability to identify solutions to conflicts happening in our environment; in order to care for planet earth from their early age (Ministry of Education, 2007). Moreover, I hope the site can also be a great tool for adults (educators and parents) to prepare educational materials to support their children's learning and, in turn, to develop their behaviours, thinking, and formation of habits (Murray, 2008).

Design Document

Context of use:

The reason why I have chosen to design a Zero Waste website for my learning design is that the educational website is very powerful for visually presented information. The leader of ChildTrauma Academy Dr, Bruce D. Perry stated that "the human brain has a tremendous bias for visually presented information. [Videos, Images, Sounds and Digital Games] are very visually oriented and therefore attract and maintain the attention of young children"(Kneas, &Perry, para.5).I intend to design the site for preschool program children; at the same time, it can be used "on demand" for both educators and parents too. The website activity is designed to be used in conjunction with traditional face-to-face instruction between educators/parents and their children. The studies show that young children "who took all or part of their class online performed better, on average, than those taking the same course through traditional face-to-face instruction" (Means et al., 2009, p.xiv.). Since Zero Waste site is accessible by internet, early childhood educators and parents can access the pages while at work, home, or even from a mobile device, to show and teach their children anywhere and anytime. Children can also learn

about waste management and complete the tasks on their own through their parents' iPad and laptops outside the preschool class. The Zero Waste site provides text, images, videos and games to introduce kids how to recycle and compost garbage which is helpful and more easily to lead attention from young kids.

Technical details:

Design Tools:

The Zero Waste site is created by both Wordpress and Adobe Dreamweaver, edited by HTML5, CSS and PhP. All the images and graphics are created and designed through Adobe Illustrator and Photoshop. All learning games were designed in Scratch. The Zero Waste site primarily focusses on one simple home page and is divided into four sections, such as Pre-Learning, Learning Begin, Learning Game, and Related Videos.

Design Structure:

The **Home Page** of The Zero Waste site is very simple and easy to use, showing considerable respect for children and parents alike. The straightforward design, with its white space, bright colours, and background images, will immediately catch the eyes of the visitors (children and parents). The homepage is arranged in clear four sections, the overall styling is clean and consistent. This makes it easier for educators, parents, and children to see the content. Children can browse and navigate freely, while focusing on the four main sections:

Pre-Learning Section is a motivational section presenting detailed information on the SFU

Sustainability plan through short text and videos. It generally serves as a brief introduction to

children to show them about significance of recycling and problem of waste. Early childhood

educators and parents explain the texts and show videos to children that can bring the general

overview of what Zero Waste is and why we need to recycle and compost waste.

Learning Begin Section uses a variety of art materials for the tactile experiences and

exploration of the children. Based on SFU Sustainability Zero Waste Strategic Plan, this site

provides garbage bins in four main colours: green, blue, yellow, and black. After children click

each garbage bin, they will be able to see image explanations of what type of garbage should go

into each bin and what type of garbage should not go into each bin. In addition, they can learn

through sight and easily remember visual details (Baker, 2015). The reason I'm replacing

garbage and refundable bins with four stream stations is to educate young children to better

manage the waste to increase diversion of waste from landfills, which can meet the goal of

Metro Vancouver's targets Sustainability Strategic Plan.

Wenger et al.(2002) in their article, pointed out that the third principle of cultivating

communities learning is to "invite different levels of participation" (p.55). Based on this

principle, the **Learning Game Section** will be followed by three different levels, such as

beginner, intermediate, and advanced, to encourages children to naturally to participated in

learning development. In addition, children will have lots of fun and be involved while learning

how to properly recycle waste. For beginner and intermediate levels, the games will ask the

children to sort the falling items into the correct garbage bin and catch the recyclables with their

corresponding bins. Moreover, the game in the advanced level is based on Cinderella story and

established the story line. During the storyline, I have set up few questions about recycling and

the children have to be more careful to put items into the correct bins. As long as they put the

right items into correct bins, the story will continue. This will assist children in developing

advanced level understanding about recycling and composting in different situations. At the same

time, educators can also use the game to examine young children about their learning process.

The **Related Videos Section** that I chosen for this site can help young children to deeply

understand the reason why do we need to recycle and compost garbage. 3 - 5years old children

are curious about everything, which leads to a lots of 'why' questions. The videos will be so

important for encouraging them as learners and help them find answers for their questions.

In the end, **About Us Page** provides a detailed introduction of the Zero Waste website will

include audiences and mission/goal of the site. Additionally, I also provided the contact

information of the main administrator of this website and the contact forms for users (Early

Childhood Educators and Parents), giving feedback and asking questions about my site. This

design feature allows users to leave messages to reach the web administrator directly.

Activity structure:

Engaging young children in learning environments is a concern of early childhood educators.

The Zero Waste site provides an individual preschool student an unique collaborative online

learning environment. The activities, such as watching videos, reading image posts, and playing

games, display the development of a new teaching structure. When children participate in

learning through interaction, a more dynamic learning environment is created and knowledge

construction freely takes place (John-Steiner & Mahn, 1996, p. 193-194). Young students learn

through visual- verbal- vocal and then practice with new knowledge through gaming, thereby

increasing the quality of their learning.

To sum up, the Zero Waste site has greatly ameliorated the way for 3-5 years old children

participate in learning and gather knowledge. It is a digital learning tool within the educational

environment and as the means of using children leisure learning practices to engage them in

learning the educational curricula. All young children learn through seeing, hearing, and

meaningful virtual experiences, which really constitute the cornerstone of quality early childhood

education, leading children to learn about real society more easily while building correct habits. I

believe that learning by doing and learning in collaboration can engage students in becoming

active learners instead of passive learners.

Assessment

The assessment of the Zero Waste website, as featured on the Learning Gaming Section, will

focus on solving the described learning problem above. The Learning Gaming Section is the

most important section in the site, since it can be highly motivating for young children and the

truthful assessment of learning during kids play games (Gee, 2003). For beginner and

intermediate levels, the games that I designed reflected on "back to basics", that clearly

emphasize to children the specification of the basics of Zero Waste. In the game, children will be

asked to sort the falling items into the correct garbage bin and catch the recyclables with their

corresponding bins. For example, among items bottles, paper, newspaper, plastic containers,

aluminum cans and etc, what should be put in each of the four bins? Kids will get points based

on their sorting, such as correct sorting: +10 points and incorrect sorting: -15 points. The features

of games will help children gain virtual practice with knowledge from pervious Zero Waste

sections; at the same time, educators and parents can examine how children understand waste

management by looking at their points and analyzing how they solve the problems (Hannafin et

al, 1997). Moreover, the game in the advanced level provides a sophisticated Cinderella

storyline, which enables knowledge and skill required for higher-level understanding and

performance (Hannafin et al, 1997, p.105). Children have to answer recycling questions to keep

the storyline going. As long as they put right items into correct bins, the story will be continue.

This will help kids to develop advanced level understanding about recycling and composting in

different situation. "Grading" Rubric:

Game Section	Guide	Assessment	The Grading for Kids
Beginner Level: SFU Recycling Game	Use the arrow keys to sort the falling items into the correct bins. Sort as many as you can before the song ends! **Recyclable Items:** Paper, Card, Glass, Plastic bottles, Food and Garden Waste. **Non-Recyclable Items:** plastic bag, styrofoam cup, aerosol can.	Correct: +10 points. Incorrect: -15 points. This game is based on the Zero Waste material that provided in previous learning begin section. Children will be assessed how well they understand the Zero Waste material by scores	Game over! Your score is… Thank You for playing.

Intermediate Level: Recycling Frenzy	Use the arrow keys to rotate the recycling bins. Catch the recyclables with their corresponding bins, but be careful not to put them in the wrong bin or let them reach the world! Press "m" to toggle music on and off. (Note: for a challenge, press "s" to turn off the arrow and try sorting the recyclables by memory!) List of recyclables and bin colours: **Food Scraps & Compostables Bin (Green)**–Apple Core, aluminum pie plate **Recyclables Bin(Blue)**–Jar, glass bottle (without label),Soda can, soup can, flask **Mixed Paper Bin (Yellow)**– Newspaper, cardboard, milk carton **Landfill Garbage Bin (Black)**– Plastic bottle (with label), yogurt container, margarine tub	Kids only get one life when they play this game; after all, we only have one planet. If kids put recyclable item into the wrong bin. The game will be stopped and then shows the highest score. This game brings the recycling into the real context and develops basic Zero Waste material. Students can replay the game all the time. The comparing score will show students' learning development.	You Recycled Things The high score is 1999999999things have been recycled in total. Click the world to play again
Advanced Level: Recycling Princess	This game is based on Cinderella story. Cinderella has to complete each level recycling requirement to keep the story goes on.	This game enabling knowledge and skill are requisite to higher-level understanding and performance of the concept of Zero Waste . Students have to succeed complete all the requirements (drag right garbage to correct bins) in order to run through the game.	Princess and Prince dance together and they lived happily ever after The end. Replay!

By end of each game, the grading rubric will be well-received by kids. Thus, the basic gaming concept from the Zero Waste site simple and positive, which guide and encourage children to understand or solve problems; in turn to, build good habits.

Conclusion

The Zero Waste website, is an effort to address the learning problem of understanding SFU Sustainability waste management and 4-stream Zero Waste stations for 3 - 5 years old children who are in the SFUChildcare Society preschool program. It is more than important for them to learn about composing and recycling. In fact, I'd say it is imperative! Today's children are not really informed in the classroom about significant topics such as recycling. The Zero Waste

website as an informal learning tool to capabilities to support preschool kids learning (Hannafin et al, 1997). The impact could be great if children are taught at an early age about recycling and composing that could impact their well-being on the planet, so that they can grow up with an awareness about waste and the ingrained good habits.

References

AbilityPath.org (n.d.).Children's learning style. In *Learning & Schools.* Retrieved November 20,
        2015, from http://www.abilitypath.org/areas-of-development/learning--schools/learning-
        and-teaching-styles/articles/childrens-learning-styles.html?referrer=https://
        www.google.ca/#sthash.ecFzyPg0.dpuf

Baker, F. (2015). Learning styles in children. *Kidspot.* Retrieved November 18, 2015, from
         http://www.kidspot.com.au/school/primary/learning-and-behaviour/learning-styles-in-
        children

Bransford, J., Brown, A., & Cocking, R. (2000). *How people learn: Mind, brain, experience, and
        school.* Washington, DC: National Research Council. Retrieved from http://
        www.colorado.edu/MCDB/LearningBiology/readings/How-people-learn.pdf.

Chalmin, P., Gaillochet, C., (2009). FromWaste to Resource: an Abstract of World Waste Survey
        2009. Retrieved from. http://www.veolia-environmentalservices.com/ veolia/ressources/
        files/1/927,753,Abstract_2009_GB-1.pdf.

Elliott, S. (2010). Essential, not optional: education for sustainability in early childhood centres.
         Childcare Information Exchange, March/April.

Ganea, P.A., Pickard, M.B., & Deloache, J.S.(2008). Transfer between picture books and the real
         world by very young children. *Journal of Cognition and Development*. 2008 (9) : 46–66.

Gee, J.P. (2003). What Video Games Have to Teach Us About Learning and Literacy. *ACM
        Computers in Entertainment. 1(1), 1-4*

Giljum, S., Lutz, C., Jungnitz, A., Bruckner, M., & Hinterberger, F. (2008). Global Dimensions
        of European Natural Resource Use; First Results from the Global Resource Accounting
        Model (GRAM). *Sustainable Europe Research Institute (SERI) and Institute for
        Economic Structures Research (GWS).* Retrieved from http://www.petre.org.uk/pdf/
        Giljum%20et%20al_GRAMresults_petrE.pdf.

Hannafin, M. J., Hannafin, K. M., Land, S. M., & Oliver, K. (1997). Grounded practice and the
        design of constructivist learning environment. *Educational Technology Research and
        Development*, 45(3), 101–117.

John-Steiner, V., & Mahn, H. (1996). Sociocultural approaches to learning and development: A
        Vygotskian framework. *Educational Psychologist*, 31(3-4), 191-206.

Kneas, K.M., &Perry, B.D. (n.d.). Using technology in the early childhood classroom. *Scholastic open a world of possible Teacher.* Retrieved November 15, 2015, from http:// teacher.scholastic.com/professional/bruceperry/using_technology.htm

Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2010). Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies. *U.S. Department of Education.* Retrieved November 15, 2015,from https:// www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf

Murray, J. P. (2008). Media violence: The effects are both real and strong. *American Behavioral Scientist*, 51, 1212-1230.

Ministry of Education.Ontario. (2007). *Early learning for every child today: A framework for Ontario early childhood settings (ELECT)*. Best Start Expert Panel on Early Learning. Toronto. Retrieved from http://www.edu.gov.on.ca/childcare/oelf/continuum/ continuum.pdf.

Papadimitriou, M. (1997). The Impact Images Have on Children's Learning in Hypermedia Environment. *Hypermedia in Education*. Retrieved November 20, 2015, from http:// www.pauldowling.me/studentswork/papadimitriou/Hypermedia_images.pdf

Prensky, M.(2001). Digital natives, digital immigrants. *On the Horizon,* 9(5), 1-8

Simon Fraser University. (n.d.). Zero Waste. In *Sustainability*. Retrieved November 20, 2015, from https://www.sfu.ca/sustainability/zerowaste.html

Shekdar, A.V. (2009). Sustainable solid waste management: an integrated approach for Asian countries. Waste Management. 29 (4), 1438 - 1448.

Vancouver Debates Zero Waste.(2009). *Solid Waste & Recycling* (14) 5. ProQuest pg.7.

Wenger, E., McDermott, R., & Synder,W. (2002). *Cultivating Communities of Practice*. Boston: Harvard Business School Press.

The Zero Waste Website Work Cited

Devon contract waste. (n.d.). How waste recycling helps our planet - Zero to Landfill. Retrieved
        November 15, 2015, from https://www.youtube.com/watch?v=e2Ffs5gMk4g

Food and Agriculture Organization of the United Nations. (n.d.). Food wastage footprint.
        Retrieved October 17, 2015, from https://www.youtube.com/watch?v=IoCVrkcaH6Q

Harry Kindergarten Music. (2013). *Going Green.* Retrieved December 1, 2015, from
        https://www.youtube.com/watch?v=8DJ45Yc3urg

HighfieldsComposting. (n.d.). Composting for Kids. Retrieved November 15, 2015, from https://
        www.youtube.com/watch?v=dRXNo7Ieky8

HooplaKidz TV. (n.d.). What Is Recycling For Children? Retrieved November 15, 2015, from
        https://www.youtube.com/watch?v=gSATRSB4OcE

Info4YourLife. (n.d.). Recycling Plastic Water Bottles. Retrieved October 17, 2015, from https://
        www.youtube.com/watch?v=WLkZ6LzwCQY

Makemegenius. (n.d.). 3 R' s - Reduce ,Reuse , Re-cycle - Pollution -Video Lesson - by
        www.makemegenius.com. Retrieved October 17, 2015, from https://www.youtube.com/
        watch?v=SKvGgb3YcDQ

Simon Fraser University. (n.d.). Zero Waste. In *Sustainability*. Retrieved November 20, 2015,
        from https://www.sfu.ca/sustainability/zerowaste.html

Starrynitezzz. (n.d.). Video 2 Paper Recycling Process. Retrieved October 17, 2015, from
        https://www.youtube.com/watch?v=jODl07akVHM

Urban Impact - recycling at work. (n.d.). Retrieved December 3, 2015, from
        http://urbanimpact.com/

Wastech - Lower Mainland recycling and solid waste disposal. (n.d.). Retrieved December 3,
        2015, from http://www.wastech.ca/