

Compassion and Empathy through Inventions: GoGo Board Toolkit for 7-10 years old

Sawaros Thanapornsanguth, *st2839@tc.columbia.edu*
Teachers College, Columbia University

Abstract

GoGo board toolkit is a hardware-embedded curriculum designed to teach children aged 7-10 years old (grade 2-5) the concept of compassion and empathy through inventions. The toolkit is inspired by stories that adults read out loud to their loved ones. Many storybooks are interactive but not so many engender proactive behaviors from the young readers. Storybooks in GoGo Board toolkit aims to help young children observe and understand the problems of others. With support from adults, children can construct original inventions that help others solve their problems using GoGo Board, scrap or prototype materials, and their imagination. The main objective is to inspire children to be active social inventors who can see the problems of others or themselves and be eager to solve them

Keywords

GoGo Board; Tinkering; Constructionism; Elementary Education; Toolkit; Inventions; Empathy

Problems

Learning should be a fun and engaging experience and it should take place anywhere and anytime. School time should not be the only place and time that children can learn. Teachers also should not be children's only source of knowledge. The problem that I perceive is that young children, once they enter the school system, often gain new knowledge by receiving rather than constructing. Children are "active builder of their own intellectual structure" (Papert, 1980, p. 19). Papert (1980) argues that knowledge does not build from nothing but is influenced by the environment and surroundings. However, many schools that teach in didactic manners views teaching students as a linear progression: from basic skills to more complicated skills. Teachers have obligation to manage the classroom as well as making sure that they cover the material that their students need to know (Wenglinsky, 2005). Thus cross subject area integration often lacks and feeding knowledge seems to be a timely efficient way to catch up with curriculum. However, it is not effective since not every student can receive the same amount of knowledge and aren't able to learn at their own pace. Although learning takes place informally and in a less stressful environment in home settings, constructionist learning has not been much promoted. For example, when parents read a story to their child, the child tends to be the receiver of knowledge and passively listens to the story rather than contributing or making observations about the story.

Literature Review

Constructionism incorporates two types of construction: "construction of knowledge in the context of building personally meaningful artifacts" (Kafai & Resnick, 1996). GoGo Board is a low-cost open source hardware device kit that encourages young users to plan and set a goal while creating meaningful automated projects (Learning Inventions Laboratory, 2015) that they care about through simple programming blocks. Within the process, the software provides a tinkering space for young users to learn and experiment. They can try using multiple sensors and actuators to see how they react right away. The design of the hardware supports "low floor" and "wide wall" that is easy for young users to get started while still providing opportunities for the creation of a wide range of different explorations (Resnick & Silverman, 2005). Unlike early programming software, where syntax is too difficult for young users to master, Tinker: GoGo Board offers a more kid-friendly interface with bright design, where the programmable actions can be inviting and meaningful to young users.

GoGo Board Toolkit

The GoGo Board toolkit is comprised of four main objects:

1. Adult Guidebook (printed and/or digital) are for parents, teachers, or caregivers as an introductory guide to GoGo board, as well as some suggestions of how GoGo board can be taught to their children or students. The guidebook introduces the following topics: (1) Introduction to GoGo Board, (2) Coding with GoGo Board, (3) Guideline and ideas to facilitate children learning and making process in constructionist manner. The guidebook comes with *Program Control Mats* and a deck of *function cards, sensor cards, and actuator cards* that would teach children about each input and output in a fun and experimental manner.
2. "Tommy and the Inventor" storybook (printed and/or digital) for adults to read out loud to children. The book helps children to understand different kind of sensors by inviting them to help the main character by choosing the right sensors. At the end of the book, children are encouraged to write their own stories
3. "I am an Inventor: Family Edition," or a creator storybook (printed) guides the children to invent for people in their families. It's a combination of: (1) story book, (2) drawing and coloring book, and (3) basic guidelines for using GoGo Board. It allows the children to personalize their inventions and ask them to write problem statements to solve the given problems. The book encourages children to start programming with GoGo Board, create prototypes of automatic devices, and test their inventions out. Adult guidance is highly encouraged.
4. Blank book (printed and/or digital) for the children to create their own narratives. Children can write, draw, or animate original stories from their own experience, imagination, or even stories from others. The stories must include the problem that they want to solve. Then they will build automatic devices using GoGo Board to solve the particular problems.

Learning Goals

1. The ability to understand basic functions of the GoGo Board and start programming and tinkering with it.
2. The ability to initiate creative and meaningful physical computing projects of their own using resources that are available to them and the GoGo Board. My hope is to see the inventions that children can continually surprise themselves and people around them. Within the process of designing and coming up with tangible products to solve the problems that interest them, the children need to tinker, encounter obstacles, make mistakes, and experience disappointing results. Being able to persevere, manage frustration, think creatively and work with others are valuable skills that can be generated through making with GoGo Board.
3. The ability to see the problem and figure out how to solve it in a structural and logical manner. Inspired by Papert's *Mindstorms* (1993) the design believes that kids learn most effectively when they try to solve problems where they are genuinely interested in the outcome of the problem.
4. Engaging in constructive social and emotional interactions especially in compassion and empathy in the narratives. Moreover, the process of making can be a social experience that children learn to interact and work with others with respect.

The learning goal for the adults:

1. Be able to gain confidence in technology to the level that they can facilitate the children to use GoGo Board.

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