# The Butterfly Effect: Knowledge Building in Kindergarten. Instilling DR. ERIC JACKMAN Practices to set up Life Long Knowledge Building Learning

CHILD STUDY Stacy A. Costa, Gaoxia Zhu, & David Osorio

Ontario Institute for Studies in Education, & Dr. Eric Jackman Institute for Child Study, University of Toronto. Canada



# Aim of the study

OISE I ONTARIO INSTITUTE

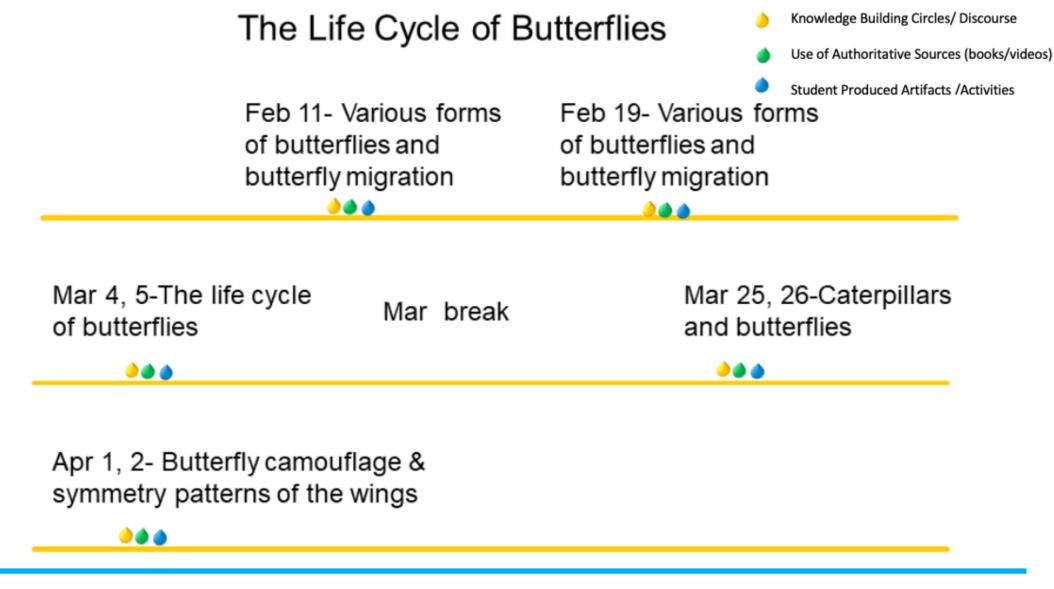
FOR STUDIES IN EDUCATION

This exploratory Pilot study examines 22 Junior Kindergarten Students scientific discourse from Hub of Innovation site, over eight weeks of a Knowledge Building intervention, while examining a unit on Butterfly Life cycles. The authors chose to examine this issue as it is a strong demonstration of how Knowledge Building is with young students without the usage of Knowledge Forum technology. The purpose of this poster is to demonstrate Junior Kindergarten's scientific inquiry on the life cycle of butterflies, and how Knowledge Building Principles are incorporated into a Junior Kindergarten class, and this poster will demonstrate some analytics of results of the discourse from student's learning and the Knowledge Building principles they incorporated. Knowledge building started in the earlier years have student comfortable with sharing their ideas, and exploring discourse and concepts while children can be coinvestigators (Scardamalia & Bereiter, 1983)

Many educational specialists newly introduced to Knowledge Building believe that Knowledge Forum execution is in tandem to(the online software which utilizes Knowledge Building Pedagogy). This assumption would lead out very young students who are grasping reading and writing skills and building foundational, and that very young students actually cannot do Knowledge Building as they cannot use Knowledge Forum. By incorporating Knowledge Building in Junior Kindergarten, learning is transformed into a frontier to identify and transform a student's schema. Students can have theories as young as the age of four in trying to decipher and understand their world from a social, scientific, historical, and environmental perspective. The research question is: how can young students incorporate Knowledge Building as easily adaptable principles as a part of their learning trajectories to build a base block in order to continue knowledge building in higher years?

## Timeline

JK students started with an underlying question which was innocent at first - why do butterflies fly to Mexico? This innocent and seemingly irrelevant question was important to the students. This presented an opportunity for the teacher to begin a Knowledge Building inquiry session on butterflies and their life spans. Concerning the development of the vocabulary of the kindergarten children, the students learn anywhere between 2,000 to 3,000 words per year. This makes us wonder on the vocabulary that is taught to the children, on methods that are used for it and on what is  $\epsilon$ 



Using thumbs up method to honour all children's contributions, rephrase or clarify responses of children in order to scaffold knowledge building and sharing in half-group.

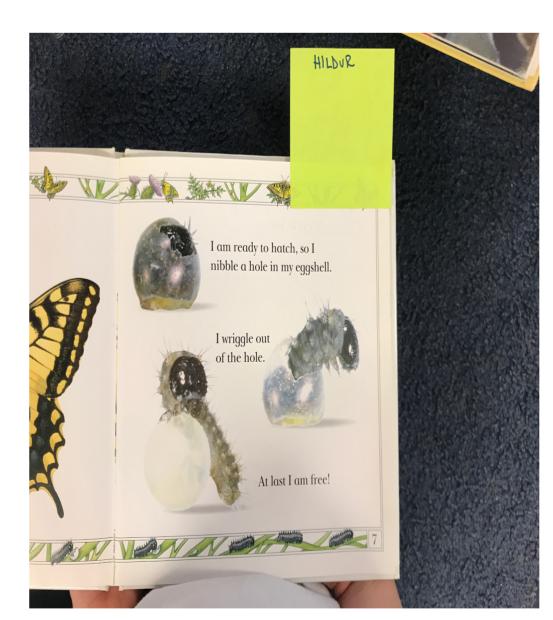
#### Method

Students were told to search through Authoritative sources (20 books). By searching through information texts for useful pictures of a butterfly's life cycle. Teachers asked students to keep in mind - What do you notice in this picture?" "How does that help the life cycle of a butterfly?" "What do you want to know about butterfly life-cycles?"

Students created low level annotations in which were dictated then transcribed. Students then picked an image or pages from a book and answered with three sentence started "I notice, I think & I wonder." These were instructed as sentence starters, and as an easier form of KB scaffolds, to be introduced in later years. See two Examples below.

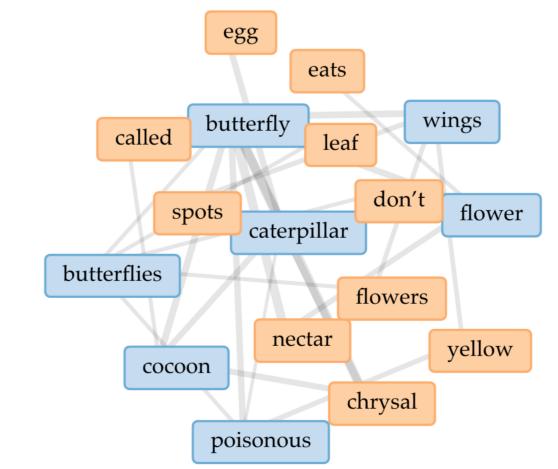


I notice that the butterfly comes out of the cocoon. I think that first it's on a plant, then it hatches into a caterpillar, then a chrysalis. The chrysalis hatches into a butterfly. *I think* it helps the caterpillar turn into butterfly very very slowly. I wonder what happens inside of the chrysalis when the butterfly is almost ready to come out?



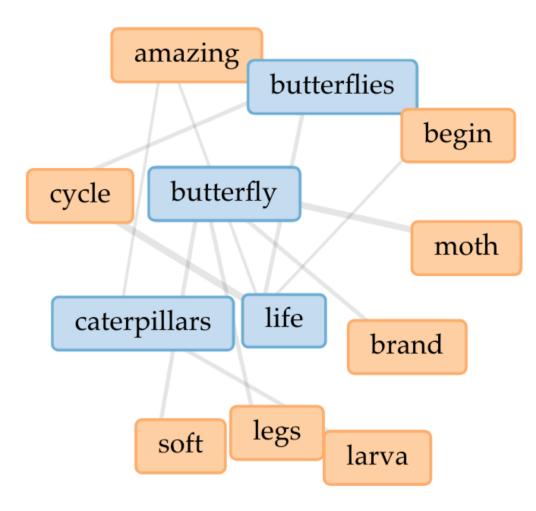
I notice that the chrysalis turns lighter and lighter and then the caterpillar hatches out. *I think* the caterpillars turn into a chrysalis and then it turns into a huge walking, flying butterfly. I wonder how does it fly really high?

# **Analysis and Findings**



Here is a Collocates Graph representing students Annotated Butterfly terms that occur in close proximity as a force directed network graph. We removed the first 1000 most common words.

# Analysis and Findings



leacher discourse collocates graph. (March 4" KB session. – prior to activity. Voyant Iools)

The teacher when viewing these analytical features, can gauge where students may need to acquire more expert sources, or more research. The classroom did not use Knowledge Forum, but implementing analytics allows for the creation of new artifacts, new methods of assessment and ways to present classroom data on the community level.

Through documenting students' questions, as researchers and the teacher's collection of data assisted in tracking the inquiry and how to move forward in student's acquisition of discourse. Also these questions posed by students, provided the teacher with new leads to gauge student's critical thinking and to be certain of discourse and understanding of scientific theories, in this case Butterfly life cycles. Teachers seeking to foster an inquiry-based learning environment make a concerted effort to record students' questions that arise during Knowledge Building activities (Natural Curiosity, 2011).

We have learned that the classroom implemented the following three, easily adaptable knowledge building principles, as they were readily understandable by 4-5 years old. These three principals were explained, adapted and implemented in ways in which the students could understand.

- Improvable ideas
- Constructive Use of Authoritative Sources
  - Knowledge Building Discourse

We will continue to study additional acquired data to produce more detailed studies. This poster presents a a quick overview of this project.

### References

Chiarotto, L., & Dr. Eric Jackman Institute of Child Study. (2011). Natural curiosity: A resource for teachers: building children's understanding of the world through environmental inquiry. Toronto, Ont: The Laboratory School at the Dr. Eric Jackman Institute of Child Study, Ontario Institute for Studies in Education, University of Toronto.

into their own Mental Processes. In Paris, S., Olson, G., & Stevenson. H. (Eds.), Learning and Motivation in the Classroom. (pp. 61-82). Hillsdale, NJ: Lawrence Erlbaum Associates

Sinclair, S., Rockwell, G., and the Voyant Tools Team. (2012). Voyant Tools (web application).