

Contexts of Meaning and Children's Understanding of the World

Jeffrey W. Bloom
Faculty of Education
Queen's University
Kingston, Ontario K7L 3N6

Paper presented at the annual meeting of the Canadian Society for Studies in Education,
June, 1990.

The present study explores the complexity of children's understandings of the world. Drawing on data from several methodological strategies, children's notions about the world are used to elaborate the complex interrelationships within the theoretical framework of "contexts of meaning" (Bloom, In press a; In press b). Contexts in this sense are cognitive. What is meaningful to a child involves a framework of a complex set of relations among semantic knowledge, personal experiences, metaphors, interpretive frameworks, and emotions-values-aesthetics. Gregory Bateson and Jerome Bruner have suggested a similar notion of a wider framework for looking at what is meaningful. Bateson (1979) refers to context as a "story" or "pattern [of connectedness] through time....[and that] nothing has meaning except [as] seen...in some context" (pp. 16-17). Bruner (1986) and Bateson (1972) both include the notion of multiple perspectives as a dimension of human knowing and interaction. An even wider sense of context is created when we consider the idea that many perspectives can be incorporated into how children understand and create meaning of their world.

Rationale

Much recent research has been devoted to delineating specific alternative conceptions held by children. Such research has taken a predominantly semantic view of the construction of knowledge. Even though some researchers have discussed children's epistemologically oriented beliefs as contributors to the construction process (Gilbert, Osborne, & Fensham, 1982; Posner & Gertzog, 1982; Osborne & Wittrock, 1983; Driver & Bell, 1986), only the works of Gauld (1988) and Cobern (1988) have attempted to explore how the beliefs or world views held by children affect the construction of knowledge.

However, from the point of view of contexts of meaning (Bloom, In press a; In press b) a number of factors are taken into account in the description of how children construct meaningful knowledge. As mentioned previously, a number of factors other than semantic knowledge affect the construction of meaning. Since these factors are the products of and are affected by various mental processes and undergo continuous modification, contexts of meaning are viewed as dynamic representations of understanding.

Although dynamic in nature, contexts of meaning are more or less coherent arrays of information imbedded in emotions, values, and so forth. For example, the phrase, "a wagging tail," can refer to a context of meaning around tails. Such a context can contain all sorts of emotions, values, and aesthetics; can contain an assortment of information about tails; and can be permeated by notions constructed according to anthropomorphic and zoomorphic belief frameworks. At the same time, overlapping contexts can come into play, such as those concerned with dogs' tails, tails of kites, a dragon's tail, and so forth. In other words, within each context many different perspectives of a particular object, event, or idea are possible. In addition, overlapping contexts can add further sets

of perspectives. From this point of view, meaning is seen as a complex association of multiple perspectives or understandings.

Up to this point in time, most research has focused on delineating and describing the specific concepts held by children in various domains of knowledge. The notion of contexts of meaning goes beyond looking at specific concepts as a primary focus and probes the relations among the various factors that contribute to the construction of meaning. Such meaning is not limited to specific concepts or semantic knowledge, but is concerned with the wider scope of naturally occurring understandings. The present study looks at children's understandings of the life on Earth from the theoretical perspective of contexts of meaning.

Method

The subjects for the present study included 24 children in one grade 5 class. The school was located in a middle to upper middle class neighborhood of a city with a population of about 60,000. For the most part, the children came from professional or highly skilled families. For the sake of clarity, the children's pseudonyms have been arranged according to grade level, so that grade 5 names begin with "E."

During the spring of 1989, all 24 children were asked to complete a variety of tasks designed to elicit their ideas about different aspects of life on Earth. For the purposes of the present paper, one task serves as the focus of the analysis. This task involved giving each student a piece of drawing paper (approximately 14 X 20 inches) and asking them to communicate their ideas in response to the following instructions:

Aliens from outer space have just contacted you. They are interested in finding out what life on Earth is all about. They can translate your language, even your misspellings. Feel free to draw and/or write anything you want. You can use both sides of the piece of paper in front of you, if you want.

In addition to this primary task, data from other tasks are drawn on from time to time to support specific arguments or to extend the understanding of specific contexts or children. These other tasks included (a) a context map of "issues facing the world," (b) a context map of "forests," (c) a taped interview during a marsh and field hike, and (d) a taped interview of an examination of earthworms. Further information on context maps can be found in a recent paper by Bloom (1990, April). In short, however, context maps are brainstorming exercises which are constructed by connecting the generated terms or phrases (usually descriptions and examples) to the stimulus word or phrase (topic) which is located at the center of the page. The subjects are then instructed to connect any relationships they see between these terms or phrases by lines and label them appropriately. The resulting map has the terms or various perspectives arranged in a circular fashion around the topic word with labeled relations occurring between the perspectives.

Results

In previous discussions of contexts of meaning (Bloom, In press a; In press b; 1990, April), children's understandings have been separated into various typological components, such as, (a) semantic knowledge; (b) episodic knowledge; (c) mental processes, including metaphorical thinking; (d) interpretive frameworks; and (d) emotions-values-aesthetics. Examining these components separately was necessary to establish the typology. However, the power behind the notion of contexts of meaning lies in the complex and dynamic interrelations between these components. In addition, one of the key ideas of using the plural--contexts of meaning--is the accommodation of multiple perspectives or understandings around singular topics. In the following examination of the results, the notion of multiple perspectives will serve as the framework of analysis.

The multiple understandings of the subjects in the present study are not completely evident or even largely portrayed in the data. What is evident, however, is the suggestion of a larger understanding. These suggestions are referred to as context markers, which are words or phrases that point to a larger understanding or a particular context of meaning. Some context markers are shared among students, while others are unique to a specific individual. For example, three students portray "Freddy Kruger," the horror movie character. This character points to a social phenomenon that has become a marker for a socially shared (at least, to some degree) context of meaning. On the other hand, one student, Evan, spent a great deal of time drawing a red jaguar (car), while saying, "This is what life's all about! This is what life's all about!" Although other students depicted cars, Evan's car marks a particularly personal context of meaning. Both of these contexts of meaning, "Freddy" and the "jaguar," contain semantic and episodic elements, as well as interpretive framework and emotions-values-aesthetics components.

In some cases, aspects of the meaning constructed by these components may be shared socially, such as with horror movies. However, even in socially shared contexts of meaning there are aspects that are highly personal, unique, and idiosyncratic. In a way, socially shared and personal aspects of contexts of meaning can be thought of as intertwining continua. Among individuals, contexts of meaning may vary in their degree of being socially shared or idiosyncratic.

With this background in mind, the following section will examine some overall patterns in context markers and their associated contexts. The notion of socially shared and idiosyncratic contexts will be discussed within the examination of overall patterns. The final part of the results section will then examine how the patterns within and among contexts are stories and how these stories tell further stories about individual children.

Context Markers

In a way, context markers are icons or symbols of larger contexts of meaning. Effie's description of life on Earth demonstrates the extent to which children's complex and

abstract ideas are represented by simpler expressions, as in her series of drawings (see Figure 1). In a follow-up interview, she explains that each drawing represents or symbolizes a greater meaning. For example, she conveys that,

...cars, ships, planes show how we travel...skeleton of a dinosaur shows prehistoric life...space travel [rocket] shows that we go beyond Earth....pyramids show our history, a school shows that we are educated...books show what we know....a chain of people show that we sometimes live in harmony...a football symbolizes the games that we play...a loaf of bread shows what we eat....a piggy bank shows that we save money, and a Canadian flag tells who we are.

Each of these symbols points to a greater context of understanding. Such a context of understanding or meaning extends beyond what Effie mentions in her interview. For example, she states that school shows we are educated. However, we can assume that she has a great deal of experiential knowledge of school and that she has all sorts of emotional and valuative connections with school. In a way, exploring each symbol in her drawing (Figure 1 is like opening a door to a large arena of personal experiences, semantic knowledge, interpretive frameworks, and emotions-values-aesthetics.



From left to right beginning at the top, the objects are a car, a dinosaur skeleton, a rocket, a movie projector, an airplane, a ship, signs, a camera, a newspaper, pyramids, a cat, a school, a book, a shopping bag, a hamburger, an apartment building, a glass of water, people holding hands, a football, a loaf of bread, an aquarium, a piggy bank, and a canadian flag.

Figure 1. Effie's "What's life on Earth about?" task.

Each of Effie's symbols is a context marker. The contexts to which they allude often overlap. For example, "airplane" and "ship" both refer to modes of transportation. She recognizes this commonality in her interview, however her experiences and knowledge of the airplane context may differ to a large extent from her ship context. An example of two context markers that differ a bit more widely but still overlap is "glass of water" and "fish bowl." Her comment in the interview that a "glass of water" represents water is opens up a context quite different from that of "fish bowl" which "...shows an animal that

lives in the water." Although both are related to a larger context of water, a glass of water has different associations than a fish bowl. At the same time, the context marked by "ship" overlaps with both senses of water. A simplified diagrammatic representation of the two larger contexts of water and transportation appears in Figure 2. The larger contexts are inferred, but serve to make the point that multiple and overlapping contexts are imbedded within larger contexts and so forth.

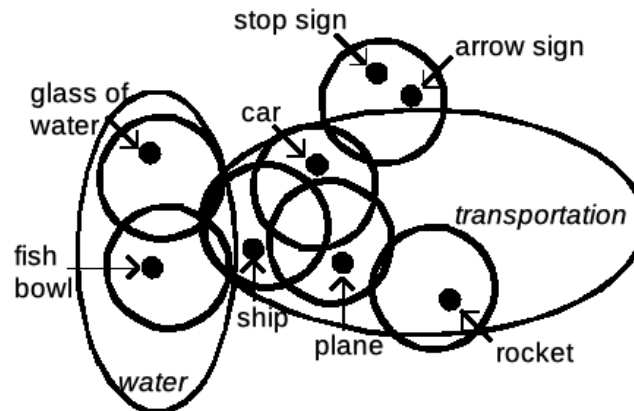


Figure 2. A diagrammatic representation of Effie's context markers and overlapping contexts in relation to two larger contexts of water and transportation. (Context markers are indicated by black dots; larger inferred contexts are labelled in italics.)

The context markers described in Effie's task are all semantic in nature. Although other aspects of contexts of meaning may be included within the associated context, the context markers themselves are actual objects. Many of these context markers are shared among other students. For instance, eight students mention cars, four mention planes, seven mention ships or boats, two mention spaceships, and seven mention water. Other semantic context markers include (with the number of respondents in parentheses): drugs (1); house, home, or apartment (10); televisions (7); radios (2); telephones (2); medicine (1); buildings and large human-made structures (15); prison (1); and pollution (2).

Although the contexts marked by semantic characteristics contain other features, such as emotions-values-aesthetics, interpretive frameworks, metaphors, and so forth, such other characteristics can be context markers. For example, Elliot's responses to "what's life on Earth about?" are, for the most part, non-semantic. Many of his comments depict opposites, such as, (a) "life is a smile...life is pain," (b) "life is Hot and cool," (c) "life is full of ups and downs," (d) "life is Good and Bad...fighting," (e) "life is Day/night," and (f) "a good place to live is a house/a bad place to live is a...prison." His other comments include, (a) "life is talking," (b) "life is WORK!," (c) "life is Help!," (d) "life Just Keeps rolling on," and (e) "life can Be confusing!" Each statement and image points to a specific and highly personal context of meaning. In addition, his statements tend to be metaphoric with a strong influence of emotions-values-aesthetics and interpretive frameworks. The pictorial imagery included with some of the statements reinforces Elliot's metaphoric way of thinking. For example, "life is Good..." is accompanied by a

picture of part of the sun and "...and Bad...fighting" is accompanied by lightning and clouds.

Elliot's contextual view of life, as expressed in the "what's life on Earth about" task, is quite different from other students in the class. Although he is obviously quite sensitive and perceptive, among his peers he is very sociable and out-going. His responses to the two context mapping tasks were more typically semantic. However, his context map of "issues facing the world" showed his awareness of a wide range of significant problems. Table 1 delineates Elliot's "issues."

Table 1. Elliot's responses to "issues facing the world." The only explicit link he made between items was between rape and murders, which he labelled as violence.

racism	free trade	the environment
women in work force	Meech Lake Accord	endangered species
poverty	government scandals	drinking water
apartheid	inflation	pollution
rights	lay offs	red tide
	war	acid rain
drugs	PLO	waste
Ben Johnson		nuclear power
drunk driving	rape	
child abuse	murders	mid-air disasters
abortion		
AIDS		

Non-semantic context markers are also apparent among other students. Erica depicts several issue-related aspects to life on Earth. Each aspect is associated with a particular value, which are as follows, (a) "Acid Rain" and "Bad," (b) "Blue box" and "good," (c) "Garbage" and "no place to put it," (d) "Drugs" and "Bad," and (e) "People" and "to [sic] many." In a similar way, Ellis depicts two scenes: (a) a city with smoke stacks, which is accompanied by "some places are not so nice" and (b) a country setting, which is labelled with "but then there are some places that are nice." Besides drawing several different types of cars and boats, Eugene depicts a big factory with the comment, "having pollution, Yuck!!!!" and a coastal setting with a lighthouse, which is described as "the sea side. I like that." In Eva's description of life on Earth, she has a picture of a heart followed by "it's about familys [sic] loving each other." In addition to several scenes of animals and flowers, she also states that "in the day people have friend [sic] that share, care, and have fun!" In a similar way, Eleanor shows a scene of "FRIENDS" playing in a park and a picture of two hands reaching out to an apple along with the word "SHARRING" [sic]. In each example of these context markers, the door to a larger context of personal meaning is opened through an emotions-values-aesthetics connection.

Elaine depicts 12 scenes about life on Earth, some of which are metaphoric. Her scenes are titled (a) "people," (b) "watching shows," (c) "lazy people's homes," (d)

"citys" [sic], (e) "alpes" [sic], (f) "farms," (g) #"schools, (h) "beaches," (i) "sunset," (j) "wildlife," (k) " robbery's" [sic], and (l) "towns." Her scene of people shows two men standing around smoking cigarettes, one of whom has a big pot-belly. In a follow-up interview, she explains that,

people are getting into drugs these days. There's a lot of problems about drugs in big cities and that's a problem. I don't think they should do that because it just pollutes the city, pollutes the air and of course it's bad for them. I think everybody should stay healthy and so....I should have put drugs there.

Her pot-bellied smokers represented a larger context of meaning about drug abuse. Her drawing of a lazy person's home contains a "Sony" TV, an ash tray with a burning cigarette, some furniture, and other undefinable objects. In her comments later, she says,

you know, lazy people's homes they're all junky. Well, they smoke and sometimes that can cause problems because if they smoke they can eat too much and then they throw it away and they dirty up the buildings and the rooms and usually sometimes if they smoke they cause fires....

Although her logic is interesting, not to mention faulty, she expresses a larger context of meaning that intertwines a variety of issues and concerns with a complex of emotions-values-aesthetics.

In addition, her unsolicited comments about other features of her task include:

Sometimes, with this one [picture of "Jack's Jewelry" store under the label "robbery's" (sic)] I was trying to show them that life's not always good, sometimes it's bad, like robberies....and, um also good things like sunsets are very pretty and Alps with sunsets behind them are pretty and beaches, miles and miles of beaches.

Her view that life is not always good, although simpler, is similar to Elliot's view of life on Earth. Elaine's scenes contain complex metaphoric representations along with more straight forward depictions of life on Earth as she experiences it. Each of her drawings, however, appears to be embedded in emotions, values, and aesthetics.

Ella's representations of life on Earth are typically semantic in nature and include such items as clouds, birds, TV, flower, apple tree, school with a swing, light bulb, box, airplane, and "lady driving a car" (with the car looking very much like a ladybug on wheels). However, her context map of forests contains a number of emotion-value-aesthetic context markers. Along with semantic items, such as plants, wolves, grass, branches, trees, and wood, she also includes, (a) "dark," (b) "nothing," (c) "no store," (d) "scarry" [sic], (e) "dangerous," (f) "no garbage cans," and (g) "no one (alone)." From her follow-up interview and from conversations with her teacher, Ella's background is quite unique. As a political refugee on the run, along with her family, she has lived in many parts of the world. The following excerpts from a follow-up interview should help to explain the important part that emotions-values-aesthetics play in her constructions fo meaning. (Because of the sensitive nature of Ella's situation, actual locations are omitted from interview excerpts).

- I: Have you ever taken a walk in a forest?
 E: No, not in [here], [on this continent], in this [country].
 I: and had you walked through forest there...?
 E: Um hum
 I: And they're pretty scary?
 E: Um hum. There are these people who like wear masks and come through the grass and scare you.... Like, sometimes they steal... sometimes they'll catch you and take you to...I don't know... They'll kill you sometimes and steal all your things and run away like...
 I: Why did you put no stores, nothing, nobody?
 E: Well, because... there's no one. Like sometimes there is someone there but there's no one... you're alone. And sometimes... there are no stores. If you're hungry, you have have to bring your own things.
 I: Why did you mention dark, scary, and dangerous?
 E: Because...like, my mom doesn't allow me to walk alone because, like, people are out there who are...even if its is a big person they can like come and grab your things from your hand and run away? Like, sometimes they can come behind you, if you're holding your bag behind and take something out of your bag....
 I: Can you describe the forest? What's your impression?
 E: There's trees and a lot of grass... like quiet... like, only if you hear a frog or something....

Although her experiences reveal very emotional contexts, she still has a less threatening image of the "quiet...hear a frog or something." At the same time, these scary images do not dominate her view of the world as can be seen in her responses to the "what's life on Earth about" task.

Emily's three images of life on Earth are (a) "going to work," (b) "growing up" (with a picture of a baby, older child, and adult), and (c) "becoming a millionaire [sic]" (with a picture of people riding in a limousine). Such context markers involve the interpretive framework of anthropocentrism. In addition, the last one (becoming a millionaire) shows a goal orientation that combines interpretive frameworks with a certain set of values. The value placed upon money adds to the development of a different type of goal oriented interpretive framework. The problem is whether to take her responses to this particular task seriously. Emily is a bright, aware, and articulate girl, with a wry sense of humor. However, even if her responses are a ruse, the context of meaning is still there. The major difference being that it is embedded in humor.

Her more serious treatment of the "issues" context map can serve as an example of the type of thinking of which she is capable. Among the 28 aspects of issues facing the world, she includes (a) "police, are they really racist;" (b) "wars;" (c) "confusing;" (d) "uninploment" [sic]; (e) "people (Muslims) want to kill Salmon Rushdie for wrting a book which supposedly [sic] is an insult to them;" (f) "Aids;" (g) "elections;" and (h) "consiquence" [sic]. She explains in a follow-up interview that,

the issues were broken into several levels. At the first level are symptoms of problems, words like "problem," "event." At the second level are words pertaining to consequences of actions, words like "election" and "drinking and driving." The third level is issues, current events. [emphasis added]Emily's understanding and organization of her knowledge are quite sophisticated for a 10 year old. Yet, as described in another study (Bloom, 1990, April), her humor was evident in her drawing of a forest in which she showed a girl walking into a tree.

In Figure 3, Evan's depiction of life on Earth is substantively very different from all of the other students' tasks. As a very bright, but underachieving child, he has trouble fitting into the normal setting. Although he is not disruptive, he spends much of his time with his own interests and stories. For example, at one point during a marsh walk (which was tape recorded) after we had talked about various plants and animals we had seen along the way, he said,

now, the path is getting narrower. You can just... slightly see the path. It's like a "Choose Your Own Adventure" story. We have to decide which path we're going to go through.... There's a new James Bond "Choose Your Own Adventure," but who cares about that. Let's just get back to where we were, reality. The thing I hate the most is reality. I'd rather sleep all my life...

During an earlier interview during which we talked about earthworms, Evan began by saying,

which way is your head? I think this one. What does it feel like to be a worm under the ground all the time? You just, you just have these little testicles and they pick up stuff. (sighs) It must be dark or something like that.... Great for fishing.... I don't know.... I just think it would be dark. It would be a bit boring. I think it would be lonely...

[Interviewer: Lonely?]

Lonely... I don't know. It just feels weird to be a human being.... I don't know. It depends.... There are some times when I just get really, really confused. But how come everything, every subject in my life has to do with a Led Zepplin song. I just realized, but that has absolutely nothing to do with it.

Before returning to his observations of the worms, Evan goes on to describe how he feels different. With such a view of Evan in mind, the items depicted in Figure 3 take on slightly different character. In a way, many of the items are metaphors of difference. School and the routines of day to day life do not stimulate his interests or meet his needs. The contexts of meaning behind the iconic context markers are more involved with a world of fantasy, as is typified by Evan's comments while he was drawing the red Ferrari at the bottom of Figure 3: "Ferrari, this is what life's all about. This is what life's all about."

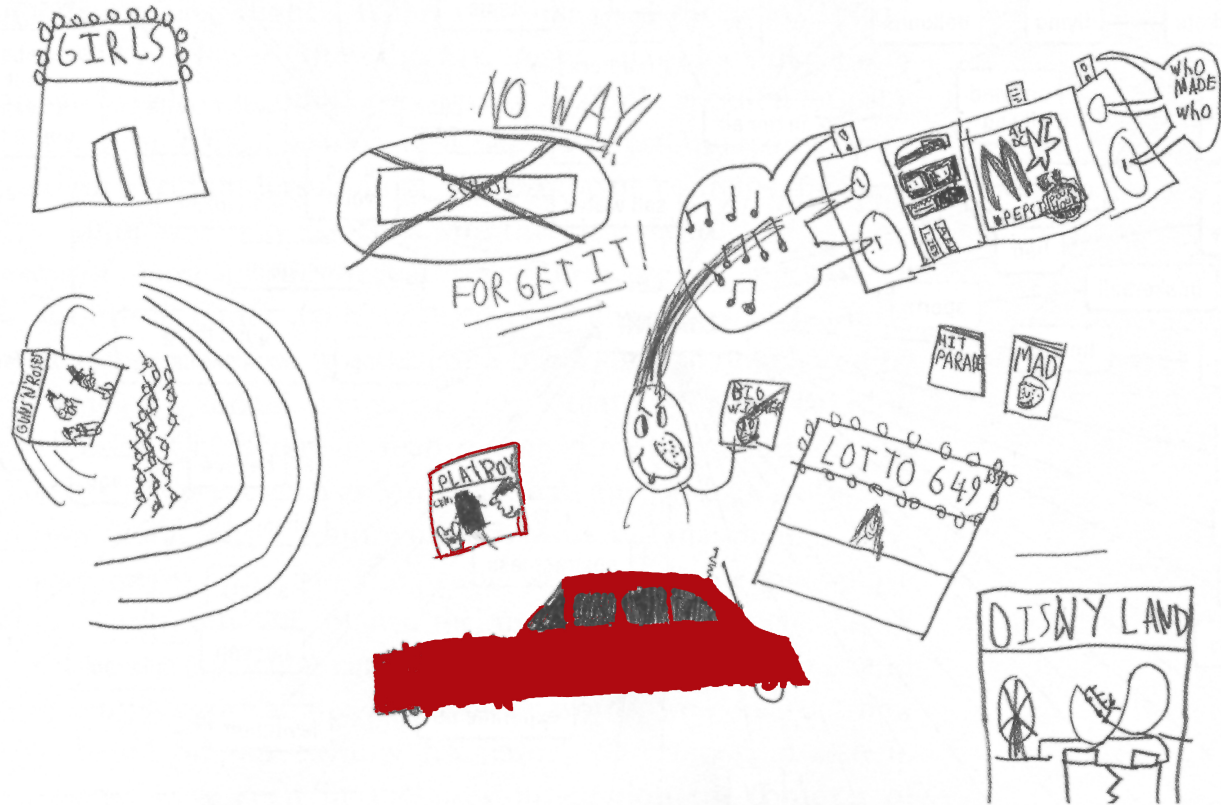


Figure 3. Evan's "what's life on Earth about" task.

Fantasy is also a significant part of two other students' responses on the "what's life on Earth about" task. Both boys created stories about being contacted by aliens (which is appropriate considering the instructions to the task told students that aliens had contacted them and wanted to know what life on Earth is all about). Elvin's drawing shows a boy, himself, talking on a walky-talky accompanied by the following commentary: "I was standind [sic] on my front lawn and I was playing on my walky-talky and an alien came on and stared [sic] talking Japinese [sic]." The next picture shows what is presumably an alien. In his follow-up interview he comments that,

our teacher [a student teacher] came and she told us we were supposed to make [these creatures out of waste materials], so we made ours as a group out of a cereal box and an old toothbrush and a spring water bottle. This guy's talking on a walky-talky to his friend. An alien gets on and starts talking. He doesn't quite understand, but he starts speaking Japanese.

Elton's drawing is similar to Elvin's in that both aliens are constructed out of the same materials: a spring water bottle on their heads and "super G" on their chests. Presumably both boys worked in the same group. However, Elton's commentary with the picture is a bit different: "Me and Gizmo he contacted me on TV. I was happy! He still had his water pistle [sic] and tomato blaster. I was happy to see him."

Up to this point, the notion of context markers and overlapping contexts have been examined as glimpses of individuals' understandings of their world. As with contexts of meaning in general, context markers can be semantic in nature, as well as metaphoric, emotional, valuative, aesthetic, or representative of a particular interpretive framework. In addition, we have seen that some markers are tied into fantasy. The fantasy as well as the more "reality" based contexts are, in a sense, stories. In wrapping up this section of the present paper, the notion of contexts as stories will be examined.

Contexts as Stories

The notion of story is not that simple. Stories appear within stories. Stories overlap and contradict one another. As we have seen, Effie's list of symbolic images tells a story about her ideas of life on Earth. Much like an amateur anthropologist, she delineates a wide range of features and characteristics of living in Canada. Each symbol opens up a new story. Yet, from this task there is no evidence of stories that deal with problems facing our society or that are particularly non-Canadian or non-North American. However, Effie's "issues" context map includes a different picture of the world. Some of the items include (a) world peace, (b) the homeless, (c) drugs, (d) atomic bombs, (e) endangered species, (f) environment, and (g) war. She has stories to tell beyond those mentioned in the "life on Earth" task. Why there is not more overlap between the tasks, we do not know.

Eddie's "life on Earth" task depicts two stories: (a) "people walking in the park" and (b) "a person who is drinking, eating and watching T.V." The story of people walking in the park includes three stick figures, a tree, some clouds, a large radiating sun, and an undefinable feature (possibly a park bench and table or a jungle gym). The second story shows two people with long hair, one of whom has a scruffy beard. Both people are drinking out of a bottle. There is a sofa, a pizza, and a TV with a clown type figure on the screen. Each "story" is quite different from the other. At the same time, the view of life on Earth as portrayed in these stories is rather limited. However, as in Effie's case, Eddie's "issue" context map demonstrates his knowledge of problems facing the world, such as crime, disease, the environment, drugs, war, and so on.

Everett's response to the "life on Earth" task was written and illustrated as a "real" story. He starts off with:

On earth we have four different seasons winter, spring, summer, fall.

In winter it is cold because of snow it's like frezzing [sic] rain but you can build snowforts [sic].

Spring is the season where the crazy weather starts. Rain--sun. But it's a nice change from winter.

Summer is the season that's the hottest the sun is brighter and it barley [sic] ever rains.

Fall is the season where all the leafs [sic] fall of [sic] the trees.

We have creaturs [sic] called animals, dogs, cats, mice, birds, fish.

We are called humans we live in homes and transport by cars.

This is a home we like sleep & eat in here.

This is a car we transport by this.

His story takes on a certain thematic approach with seasons as the primary topic. Once again, however, his "issues" context map includes the typical problems, as well as alcohol which is linked to pressure, drugs which is also linked to pressure, waste management, politics which is linked to laws, and jobs which is also linked to laws. In addition, issues were included in both context mapping tasks ("issues" and "forest"). Yet, only two problems appeared in both tasks: (a) animal population problems and (b) pollution.

Evelyn's stories of life on Earth are pleasant and very simplistic, if not somewhat naive. Her drawing of a tree and flowers is accompanied by the statement: "this is a tree and there are some flowers next to the tree flowers are all diferent [sic] colours and sizes." Her picture of a horse is described as "this is a hourse [sic] you can ride them and there different [sic] sizes." Her other other drawings, which are accompanied simple descriptive labels, include, (a) an empty row boat in the water, (b) the sun, (c) a view of night with stars and moon, and (d) a school. Evelyn's "forest" context map included, (a) flowers, (b) trees, (c) bark, (d) leaves, (e) wood, (f) mud, (g) moss, (h) water, (i) sounds, (j) animals, (k) rocks, (l) grass, and (m) grasshopper. The letter "O" in the word forest at the center of the page had a smiling face drawn inside it. Her "issues" context map was centered around the topic "summer" with the following items listed: (a) swimming, (b) shorts, (c) pools, (d) swimsuits, (e) flip-flops, and (f) bicycles. When asked about this she said that she liked it when the weather is warm. When asked again about issues facing the world, the only thing she mentioned was pollution. Other students share similar stories about the world, as Eugenie does on her "life on Earth" task. However, Eugenie shows more awareness of issues facing the world. Only Elizabeth, demonstrates a similar naivte, focusing her "issues" context map on musicals because she "loves acting."

The stories children tell in their drawings, writings, and conversations do, themselves, tell stories about the children. Both types of stories are contexts of meaning. What is meaningful to each child becomes a meaningful story, or meaningful stories, about that individual. It is the nature and substance of these stories and their associated meaning which is important for developing our understanding of how children learn and construct meaningful knowledge.

Discussion

The major difficulty one encounters when trying to describe and discuss cognition from a contexts of meaning perspective is the complexity. Most research has focused on one aspect meaning, namely semantic knowledge. The notion of contexts has extended the scope to include other aspects of knowing and meaning. However, if we isolate one

aspect, such as emotions-values-aesthetics, we lose sight of how everything works together and run the risk of falling into a reductionistic trap. The power of contexts of meaning lies in the complexity and dynamic quality of the relations between the various components in the meaning-making process.

In the present study, the open-ended question--"what is life on Earth about?"--provided children with an opportunity to express some of their ideas and feelings about their experiences and knowledge of living in this world. The results obviously do not reveal a complete picture of what they know. However, what is shown is a glimpse of some aspects of what happened to be meaningful to the children at the time.

Context markers can be considered as another term for glimpse or a pointer to a larger context of meaning. As we have seen, a variety of different context markers point to overlapping contexts. Evident within these contexts and in the context markers themselves are the various components of contexts of meaning: semantic knowledge, personal experiential knowledge, metaphors and other aspects of mental processes, interpretive frameworks, and emotions-values-aesthetics. The significance of context markers and overlapping contexts of meaning involves how they affect our understanding of learning and knowledge and how they can influence instruction and curriculum development.

If we consider the representation of context markers and overlapping contexts in Figure 2, we really only see a few potentialities in the form of context markers. The contexts of meaning surrounding these context markers are what children have been bringing and are bringing into the arena of meaning-making. The context of marker, "rocket," was displayed as a typical exemplar of rocket (see Figure 1). The production of this exemplar is not surprising, based on what we know from the research on schema theory (Champagne & Klopfer, 1984). According to this theory, relevant semantic knowledge would be associated in various ways with "rocket." However, from a contexts of meaning perspective, not only is semantic knowledge associated with "rocket," but also personal experiences, metaphors, interpretive frameworks, and emotions-values-aesthetics. Although some aspects of such contexts are shared socially, others are idiosyncratic. A student living in Clear Lake, Texas (near NASA's Johnson Space Center) will have different perspectives than a student in Ottawa. The Clear Lake child may have known one of the astronauts who died aboard the space shuttle, Columbia. The impact of this event would influence the construction of a different context of meaning in the Clear Lake child than in the Ottawa child. However, if the Ottawa student is involved in model rocketry, she or he will have different experiences and emotions-values-aesthetics incorporated into that particular context of meaning. Learning from a context of meaning point of view is heavily influenced by personal experiences and the other aspects of contexts of meaning.

The potentialities inherent in context markers, however, provide powerful cues for instruction. Even though "rockets" as a context marker may be shared among all of the students of a particular class, the meaning associated with rockets may be different for each child. However, the rocket context marker is a potentiality in that it points to a wide range of possible connections. Some possible examples include, (a) rockets and jet

propulsion, (b) jet propulsion and squid, (c) rockets and space exploration, (d) rockets and UFOs, (e) rockets and danger, (f) rockets and missiles, (g) rockets and "star wars," and (h) rockets and fireworks. Rockets also overlap with other contexts associated with planes and other kinds of transportation. Since "rocket" came up in the larger context of "life on Earth," rocket becomes a potential topic for further study. In addition, all of the potential examples of connections with rockets become avenues for instructional development.

The contention of a contexts of meaning approach is that instruction and curriculum development address not only semantic knowledge, but all aspects of meaning, as well. It is not enough to assume that children are constructing meaningful knowledge, when significant and highly influential aspects of knowing are ignored. As mentioned in an earlier paper (Bloom, In press b), interpretive frameworks and emotions-values-aesthetics affect the semantic information is processed. For instance, an emotional connection can influence the way in which an observation is interpreted or can influence the outcome of an inference.

Several questions arise when considering the implications of the effects of such influences on learning and meaning-making. In the past, we have ignored these aspects. Do we try to change the way children rely on interpretive frameworks, emotions-values-aesthetics, and so forth? Do we not confront significant ethical problems when we propose to change the fundamental way in which children think and learn? Do we have the right to make such changes? Instead of attempting such changes, could we encourage children to see how their own thinking works? For example, could we make the use of emotions-values-aesthetics explicit by designing activities to do so?

Acknowledgements

This research has been supported by a grant from the Advisory Research Committee, School of Graduate Studies and Research, Queen's University. I especially extend my appreciation to Ms. Carol Hulland for her able assistance in collecting and analyzing the copious amounts of data.

References

- Bateson, G. (1972). *Steps to an ecology of mind*. New York: Bantam.
- Bateson, G. (1979). *Mind and nature: A necessary unity*. New York: Bantam.
- Bruner, J. (1986). *Actual minds, possible worlds*. Cambridge, MA: Harvard University Press.
- Bloom, J. W. (1992). Contexts of meaning and conceptual integration: How children understand and learn. In R. A. Duschl & R. J. Hamilton (Eds.), *Philosophy of science, cognitive psychology, and educational theory and practice* (pp. 177–194). State University New York Press.

- Bloom, J. W. (1990). Contexts of meaning: Young children's understanding of biological phenomena. *International Journal of Science Education*, 12(5), 549–561.
- Bloom, J. W. (1990, April). *Methodological perspectives in assessing and extending the scope of children's contexts of meaning*. Paper accepted for presentation at the annual meeting of the American Educational Research Association, Boston.
- Champagne, A. B. & Klopfer, L. E. (1984). The cognitive perspective in science education. In R. W. Bybee, J. Carlson, and A. J. McCormack (Eds.), *Redesigning science and technology education: 1984 yearbook of the National Science Teachers Association*. Washington, DC: NSTA.
- Cobern, W. W. (1988, April). *World view theory and misconception research*. A paper presented at the annual meeting of the National Association for Research in Science Teaching, Lake of the Ozarks, MO.
- Driver, R. & Bell, B. (1986). Students' thinking and the learning of science: A constructivist view. *School Science Review*, 67, 443-456.
- Gauld, C. F. (1988). The cognitive context of pupils' alternative frameworks. *International Journal of Science Education*, 10(3), 267-274.
- Gilbert, J. K., Osborne, R. J., & Fensham, P. J. (1982). Children's science and its consequences for teaching. *Science Education*, 66, 623-633.
- Osborne, R. J., & Wittrock, M. C. (1983). Learning science: A generative process. *Science Education*, 67(4), 489-508.
- Posner, G. J. & Gertzog, W. A. (1982). The clinical interview and the measurement of conceptual change. *Science Education*, 66(2), 195-209.