

# Reforms in education through the lens of Transactional Analysis theory

Anna Sierpinska

Concordia University, Canada

*Abstract.* The question posed in this paper is why education reform movements don't seem to bring the expected improvements and lead only to calls for new reforms. The paper seeks answers to this question by interpreting (a) teacher-students classroom interactions, and (b) interactions between ideologues of school reform movements and the public, in terms of certain concepts from Transactional Analysis theory, particularly the notion of Rescue Game. The focus is on reform movements in North America since early nineteenth century. Particular attention is paid to the writings of the main ideologue of the Common School Movement, Horace Mann, and to the phenomenon of survival until today of the bureaucratic public school system whose foundations were laid during this movement.

*To Barbro Grevholm*

KEY WORDS: history of mathematics education, reform movements, Horace Mann, Johann Pestalozzi, critical perspectives, bureaucracy, social interactions, Transactional Analysis theory, Rescue Game, school games

## Introduction

I first met Barbro Grevholm at the 8<sup>th</sup> International Congress on Mathematical Education in Sevilla, after my talk. In the talk, I was reflecting on the phenomenon of educational reform movements. In the present paper, dedicated to Barbro on the 50<sup>th</sup> anniversary of her work in the service of mathematics education, my thoughts return to our first encounter, and the topic that brought us together.

Reforms come and go, like waves. They roll in energetically on the hope that, this time, everything will work as planned; that the mistakes of the previous reform will be overcome, and the ideals of, say, a democratic, equitable, meaningful and useful education for all will finally be reached. Then they recede, amidst criticisms and frustration. Barbro's paper on mathematics teacher education in Sweden provides samples of this phenomenon:

Through the university reform of 1977, the demand that teacher education must be research-based was raised.... During the 1980s teacher education was discussed politically and criticized because of claimed low results. The results of IEA tests, among other things, started a thorough investigation into mathematics education. A report from the Ministry of Education was presented with several suggestions in order to improve mathematics teaching and learning at all levels.... The result was a reformed teacher education in 1988.... These new education programs were evaluated in the mid-1990s, and critique was exposed.... (Grevholm, 2010)

Why is this cycle repeating? In my Sevilla talk, I saw the reason in the fact that each reform movement is imbued with an ideology, that is, a vision of ideal learners, teachers, classrooms and curricula, all based on a more or less explicit system of values (Sierpinska, 1996). Ideals are usually constructed by way of negation of some reality that we don't like. We may not like the reality, but it is there, and educational projects that ignore the reality do so at their own peril. Mathematics education research proposes to study and understand the reality of teaching and learning mathematics in different cultures, educational systems, and types of classroom interactions, and design reform actions on the results of this research. The problem is that research is slow and its results give a key-hole vision of a very broad and multidimensional landscape that also appears to change rapidly. Reforms are not passed and implemented by patient researchers and philosophically minded people. They are passed by politicians. To show they are worth their salt, politicians must "do something". This gives another reform that amounts to putting a coat of fresh paint on rotten planks.

This explanation is simple but not quite satisfactory. In this paper, I propose a somewhat more elaborate one, where ideology appears as an element in the dynamics of social interactions. The explanation will be framed in terms of Transactional Analysis theory (Berne, 1964; Steiner, 1974).

### **Theoretical framework: Transactional Analysis**

Transactional analysis, a theory of social interactions, was proposed in the 1960s by Eric Berne, a psychiatrist (1964). The theory explains people's difficulties in life in terms of "games" they play with others in social situations. This brings the theory close to sociology, especially micro-sociology. Berne's ideas have been extended by many others. Here, I will refer mainly to Steiner's book on "scripts" (1974) that summarizes some of these developments.

Berne credits, in particular, George H. Mead (1934), for drawing his attention to the game-like character of some social interactions (Berne, 1964, p. 64). Mead – a representative of a school of sociology that emerged in the 1930s in Chicago – used the metaphor of game to describe interactions that have an inner “logic, so that there is a definite end to be obtained; the actions of the different individuals are all related to each other with reference to that end... so that they further the purpose of the game itself.” (Mead, 1934, pp. 158-9). Berne’s own definition of game uses a few technical terms that need to be presented in some detail; therefore, I defer quoting Berne’s definition of game till later in this section.

Berne and Steiner were developing Transactional Analysis as a theoretical basis for psychiatric therapy techniques that both actively practiced. The techniques they developed have since been adapted in other domains, particularly in organisational development and education. A review of the practical applications of Transactional Analysis in educational contexts and an example of a case study in a school in the UK can be found, for example, in Stuart and Alger (2011). The study found that children, young people and teachers trained in Transactional Analysis “have better self-awareness, increased understanding of others, and... better relationships” and that the training had a positive impact on “attendance, attainment, personal and professional lives and school climate overall.”

### ***Focus on social interactions in educational research***

The general idea of studying social interactions was “in the air” in the 60s and 70s and had a clear influence on educators (Bruner, 1985) and mathematics educators, particularly those around Heinrich Bauersfeld (1995)<sup>1</sup> who studied patterns of socio-mathematical interactions in the classroom, and Guy Brousseau (Brousseau & Warfield, 2001)<sup>2</sup>, in a conceptualization of the didactic relation between a teacher, the students and the mathematical subject matter.

This was a shift from the focus on individual cognition, characteristic of research inspired by Piagetian constructivism, towards a broader perspective that took into account interactions among people involved in social situations marked by surrounding culture, traditions, norms, language, habitus, and specific patterns of conversational exchange.

---

<sup>1</sup> In the cited paper, Bauersfeld used Wittgenstein’s concept of “language games” (Wittgenstein, 1953/2009) to explain interactions in the mathematics classroom.

<sup>2</sup> For a justification of the micro-sociological inspirations in the work of Guy Brousseau, see (Sarrazy, 1995)

Brousseau referred to the *mathematical* notion of game in his modeling of the didactic relation in terms of games (1995). Berne insisted that his notion of game is distinct from that used in mathematical game theory (1964, p. 12). I surmise, however, but will not develop the idea in this paper, that didactic phenomena such as the Topaze effect (Brousseau, 1982; 1997, p. 25) could be usefully modeled in terms of Berne's notion of game.

Bruner's theory of early language acquisition in the interactions between adults and children appears to have been influenced by Transactional Analysis.

[T]he infant's Language Acquisition Device (LAD) could not function without the aid given by an adult who enters with him into a *transactional format*. That format, initially under the control of the adult, provides a Language Acquisition Support System (LASS). It frames or structures the input of language and interaction in a manner to 'make the system function.' In a word, it is the interaction between LAD and LASS that makes it possible for the infant to enter the linguistic community – and, at the same time, the culture to which the language gives access." (Bruner, 1985, p. 32); [my emphasis]

I will explain the relationship between Bruner's "transactional format" and Berne's notion of game after I have presented the technical definition of the latter. At this point, let me discuss Bruner's claim, in the above quotation, that the transactional formats in adult-infant interactions do more than teach children to speak a language; they introduce them to a culture.

### ***Injunctions and attributions***

Transactional Analysis theory posits that interactions with adults format children's access to culture in a way that restricts children's freedom of interpretation and choice of behavior. The adults' "injunctions" ("Don't do that!", "Stop it!"), and "attributions" ("You are so careless!") format children's perception of what they must do and not do and what/who they are (Steiner, 1974, p. 62).

Goffman's (1974) concept of framing which refers to interpreting events in terms of stereotypical situations, behaviors, or traits is related to the notion of attribution. Repeatedly framing a child's behavior as "careless" effectively attributes carelessness as a trait to the child who may then see no choice but grow to be a careless person. Berne and Steiner argued that injunctions and attributions in childhood may lead children to make pre-mature, uninformed decisions about who they are going to be and what they will do in life, and then they live according to this immature and sometimes dramatic, unhappy and destructive "script". As

psychiatrists, they were mostly concerned with transactions that led to such dramatic scripts. Sociologists were not interested in qualifying the psychological effects of using stereotypes in interpreting events as good or bad for people's personal and social well-being. The concept of framing was allowing them to study the effects of such interpretations without evaluating them as good or bad for people. They were interested in identifying those effects for the purposes of "objectively" explaining social behaviors, at both the individual and collective levels (Tversky & Kahneman, 1981).

In education literature, the concept of framing seems more popular than that of injunctions and attributions, although, like psychiatry, education is concerned about quality and does assess certain types of framing as having harmful effects on students' learning and development. Framing has become a common word in educational research, and its sources in sociological literature are sometimes not even acknowledged anymore. This is the case of a recent article on teacher-student interactions in a mathematics classroom (Battey, 2012), that I will use as a source of examples to illustrate certain concepts of the framework of Transactional Analysis.

Attributions take place daily in classrooms. In direct or subtle ways, children are told they are careless, careful, lazy or hardworking, responsible or irresponsible, good at math, not good at math, etc. Teachers may not even be aware of the attributions they make in various situations. For example, by praising a girl for her mathematical achievement more loudly and with greater delight than a boy who obtained the same grade, the teacher may be effectively telling her that she is exceptional, i.e., not quite "normal" (Tiedemann, 2000). In the class observed by Battey (2012), the teacher was reacting very differently to a girl's and a boy's efforts in solving the handshake problem. The boy was more advanced in his solution than the girl; he was using multiplicative reasoning, the girl – additive reasoning. On the girl, she was pouring praise: "Way to go, Selena, good thinking. Excellent, very good.... Oh Selena, you're awesome". For the boy, there was challenge to think more about the problem and then a thoughtful admission that he might be right: "So, yeah, you're on the right train of thought, but you're going to have to think a little bit more to come up with it.... Mmhmm, that, that works.... Hmm, I think so" (Battey, 2012).

## ***The Rescue Game***

Teachers may also attribute weakness in mathematics to children by being extra helpful to them. By telling some children in more detail, or in simpler words than to others what to do to complete a task, the teacher may communicate to them that they are less able than others and cannot cope with the task without help. In such interactions, the teacher presents herself in the role of “Rescuer”, thus putting the child in the position of a helpless “Victim”. The child may not appreciate being singled out as needing the extra help and may show it in various ways. This may cause frustration in the teacher who will then punish the child, switching to the role of “Persecutor”. In retaliation, the child may do things to hurt the adult (e.g., respond defiantly or rudely; play mean tricks). This puts the adult in the position of Victim (“And this is what I get for all my good will and efforts!”)<sup>3</sup>. This is the classical Rescue Game (Steiner, 1974, p. 149)<sup>4</sup> in which every participant plays, in turn, each of the three roles: the Rescuer, the Persecutor and the Victim.

Playing the Rescue Game extends to situations where a child is not allowed to do things he or she is perfectly able to do (Steiner, 1974, p. 150). In North American pre-school institutions and early grades of school, adult supervision is omnipresent and children’s activity is strictly regulated. According to Wagner and Einarsdóttir (2006), the situation is very different in the Nordic countries, where children have more “time and freedom during the early childhood years to play and explore the world around them, unencumbered by excessive... supervision and control by adults” (ibid., p. 6). Adult-children transactions in Nordic countries are formatted by values such as democracy, egalitarianism, emancipation, freedom, cooperation, and solidarity (Wagner, 2006, p. 292). These values, Wagner states, are actively practiced in Nordic pre-schools and elementary schools, where children “have a voice in virtually all matters that concern them” (ibid., p. 295). American children, on the other hand, may be taught *about* democracy, but their voice does not count much in deciding which activities are “appropriate” for them and which are not.

---

<sup>3</sup> Examples of this phenomenon on the level of the systemic level are found in Martin’s study of African American community college students who reported being tracked into lower mathematics courses in spite of high achievement (Martin, 2000).

<sup>4</sup> The concepts of Rescue game and Rescue Triangle have been coined by Karpman (1968).

This has serious consequences for the children's future. According to Steiner, not allowing the child to "come up against situations in which it has to understand the world well enough to make decisions and to think in it... trains out power and autonomy and trains in discipline and docility to authoritarian rules. Powerlessness training, playing Victim in the Rescue Game, causes people to grow up with a feeling that the world can't be changed." (Steiner, 1974, p. 150).

Such "learned helplessness" orientation of the self (Reeve, 2005) is found in adult students of ("bridging" or prerequisite) basic algebra courses given in a university setting, who say things such as, "What's the use of trying, I'll never get better than this in math," or "What's the use of trying, I'll never be able to solve this problem on my own." (Beddard, 2012, pp. 28, 37, 103-4). In fact, the bridging courses reinforce the orientation. They are presented as a means to rescue students who did poorly in algebra in high school: university gives them a second chance. Students are offered extra help, such as free tutoring assistance in a "Math Help Centre" and/or homework and test solutions, which is usually not available in more advanced university mathematics courses. Officially, the message is that the University cares about those adult students and wants to help them. On another level, the message is, "You are too weak to be able to study on your own; you are too ignorant to figure out for yourself if your solution is right or wrong". It is alright, then, not to persevere in solving a problem for more than ten minutes; if unsuccessful, the student gives up or goes to a tutor (Sierpiska, Bobos, & Knipping, 2008). This, unfortunately, does not guarantee success on the final examination. Failure may not necessarily teach the students that they should perhaps change their habits of study. A "powerless" student will only seek more help and choose tutors more carefully.

### ***The basic human needs: for stimulus, structure and position***

Transactional Analysis theory is based on certain assumptions about human nature. One is that social interactions satisfy three fundamental human needs: for stimulus, for structure and for position (Berne, 1964, pp. 13-20; Steiner, 1974, pp. 36-38). Regarding the meaning of the need for stimulus (or "stimulus hunger"), let me quote the following passage:

Considerable research indicates that stimulation is one of the primary needs of higher organisms. Based on these findings and on clinical evidence, Berne evolved the concepts of stimulus hunger and stroking [as means of satisfying the stimulus hunger]. A stroke is a special form of stimulation one person gives to another....

Strokes can vary from actual physical stroking to praise, or just recognition [acknowledgement of the other person's presence].... People who cannot obtain or accept direct recognition for one reason or another will tend to obtain it by playing games which are a rich source of strokes. (Steiner, 1974, pp. 36-37)

The need for structure refers mainly to structuring time. Berne says: "The eternal problem of the human being is how to structure his waking hours" (1964, p. 16). People can structure their time through work, rituals, pastimes, games, and intimacy. Position need refers to the need of having some standards against which to define one's own and other people's status, abilities, knowledge, morals, etc., so that one can say, for example, "I am no good", or "They are no good." (Steiner, 1974, p. 37)

### ***Ego states***

Another basic assumption of the theory is that "a person operates in one of three distinct ego states at any one time" (Steiner, 1974, p. 27), called Child, Adult or Parent. In the Adult state, the cognition function is the most active: it is an impassive calculating mind that "gathers and processes data and makes predictions." (ibid., p. 29). Child and Parent states are emotional. In adult persons, the Child ego state "can be observed in situations which are structured to permit childlike behavior, such as sports events, parties, and revivals." (ibid., p. 28). The Parent ego state is a "repository of traditions and values" and behavior patterns learned from parents and authority figures (ibid., p. 29).

In an adult person, the Child state can appear in states similar to Parent, Adult or Child: "Pig Parent" (acting like a protective and nurturing parent, but not truly fulfilling these functions and being oppressive and controlling); "Little Professor" (acting upon intuition; being curious about the world); and "Natural Child" (acting spontaneously, being capable of intimacy). (Steiner, 1974, pp. 44-46). In playing the Rescue Game, the dominant ego state of all persons involved is Child in the Pig Parent state.

### ***Transactions and their classification***

A "transaction" is the assumed unit of social interaction; it consists of one person acknowledging the presence of another person by, e.g., saying something to her (transactional stimulus) and the other saying or doing something in relation with it (transactional response).

Transactions are classified as complementary or crossed, and further as simple or ulterior. A transaction is complementary, if, whenever it is stimulated from ego state X to ego state Y, it is responded from ego state Y to ego state X. Steiner's example of complementary transaction is:

Stimulus (Adult to Adult): How much is three times five?  
Response (Adult to Adult): Fifteen.  
(Steiner, 1974, p. 35).

If the response involves different ego states than the stimulus, we have a "crossed transaction". The example that Steiner gives is:

Stimulus (Adult to Adult): How much is 3 times 5?  
Response (Child to Parent): I hate math!

After crossed transaction, communication is interrupted, resulting "in two speechless people glaring at each other" (Berne, p. 32-33). Complementary transactions proceed smoothly.

Examples of crossed transactions abound in teacher-student interactions in the class observed in Battey (2012). It often happens that the teacher asks students a question (mathematical, or about their relation to mathematics) as if from Adult to Adult, students respond in a complementary way from their Adult to the teacher's Adult, but then, instead of continuing the interaction by an Adult to Adult response, the teacher switches to Parent in the Child (Pig Parent) and admonishes their Child, sometimes sarcastically, for using incorrect language or behaving inappropriately. Some students resist and continue speaking from their Adult state about the matter of the first question, ignoring the teacher's remarks or taking her advice and correcting their language.

A transaction is "simple" if, whenever the stimulus sounds as meaning something, it is also intended to mean it and the same is true for the response. Otherwise, the transaction is "ulterior". In ulterior transactions people mean something else than what they can be observed saying or doing (Steiner, p. 35). They have an ulterior motive, and what is going on at the overt, observable *social* level is different from what is going on at the implicit, *psychological* level. Here are some examples. Suppose an interaction starts with the following stimulus:

X to Y: This recipe for a carrot cake is for 18 servings. But I only need to make the cake for 14 servings. The recipe says to take 1 ¼ cups vegetable oil. How much oil do I need for my cake?

Suppose further that the interaction takes place in a kitchen where a carrot cake is to be made, and the response is:

Y to X: You'll need  $14/18$  or  $7/9$  as much oil, that is,  $35/36$  or just a wee bit less than 1 cup.

This is then an instance of a simple complementary transaction between two Adult ego states.

If the interaction goes on in the classroom, and the response is, "I hate math!" then we have an instance of a crossed transaction with Adult-Adult stimulus and Child-Parent response.

Suppose now that, still in a math classroom, the teacher notices that a student is checking messages on her cell phone while he is explaining how to solve a new type of problems, of which the carrot cake problem can be seen as an example. The teacher wants to punish the girl by shaming her in front of the whole class. He interrupts his lecture, calls the girl up and gives her the carrot cake problem to solve on the board. On the social level, he addresses her Adult ego state from his Adult ego state. On the psychological level, however, he addresses the girl from his Pig Parent ego state: "Now I got you, you naughty girl!" The girl, who is smart, may answer in a serious tone of voice, from her Adult state, "I'd say, about one cup". But she looks at the teacher defiantly, with a slight disdain. What she really means, therefore, is "Now I got YOU! I don't need your stupid calculations to figure out the answer! I am smarter than you!" On the psychological level, her Child addresses the teacher's Child. In this example, we have to do with a complementary ulterior transaction, a round of a "Gotcha!" game, that teachers and students routinely play in the classroom.

Batthey's paper (2012) provides several examples of ulterior transactions in a grade four mathematics class (9-10 years-olds). In one example, the teacher starts a whole class discussion on why mathematics is important. She calls on David, an African American student, who, according to the teacher, is mathematically strong but his behavior leaves much to desire (moves around too much, talks in class, etc.). In Table 1, I present, in one column, what the teacher and David actually said, and, in the other – the author's interpretation of what the teacher really meant. Many transactions in this exchange are crossed.

Social level	Psychological level
Teacher (Adult-to-Adult): Why is mathematics important? David?	
David (Adult-to-Adult): Well, so you don't get ripped off or something. This one time I gave a guy 5 dollars and it cost two and he gave me back one and I knew that tax wasn't a whole dollar so I said hey, I gave you a five.	
Teacher (Parent-to-Child), sarcastically: How do they figure out tax, David?	You probably don't know the formal methods of calculating tax.
David (Adult-to-Adult): I don't know, but it is less than a dollar for something that's two	
Teacher (Parent-to-Child): They calculate taxes using <i>percentages, okay?</i> [Battey's emphasis]	You don't know that, do you? So don't give yourself airs!
Teacher (Parent-to-Child): Next time you might try politely inquiring and saying there might be a mistake. Sometimes, <i>that</i> works better.	Your behavior is socially inappropriate. I disapprove of your behavior.

Table 1. Example of a sequence of ulterior transactions based on a transcript quoted in (Battey, 2012)

In this article, the author points to educational opportunities that this interaction missed:

[The teacher] did not address the legitimacy of the example [David] was raising, which was a valid response to her initial question, and did not pursue his thought process. If she wanted to teach David about calculating taxes, her [knowledge of mathematics and teaching] and instructional practices could have made this a productive conversation, but instead it became more of an argument. (Battey, 2012)

What I found amazing, in Battey's examples of interactions between the teacher and David, however, is that David did not react more negatively to the teacher's sarcasm and continued speaking to the point even when the teacher was not. Battey reports, however, that the teacher was equally amazed at the student's decent behavior and attributed it to the presence of the observer (the researcher) in the classroom.

### ***Berne's definition of game***

In Berne's sense, a game is "an ongoing series of complementary ulterior transactions, progressing to a well-defined, predictable outcome" or "payoff" for both players (Berne, 1964, p. 48). In Steiner's words, a game is 1) an orderly series of transactions with a beginning and an

end; 2) has an ulterior motive..., and 3) results in payoff for both players” (Steiner, 1974, pp. 34-36).

Descriptively, [a game] is a recurring set of transactions, often repetitious, superficially plausible, with a concealed motivation; or, more colloquially, a series of moves with a snare, or ‘gimmick’. Games are clearly differentiated from procedures, rituals, and pastimes by two chief characteristics: (1) their ulterior quality and (2) the payoff. Procedures may be successful, rituals effective, and pastimes profitable, but all of them are by definition candid; they may involve contest, but not conflict, and the ending may be sensational, but not dramatic. Every game, on the other hand, is basically dishonest, and the outcome has a dramatic, as distinct from merely exciting, quality. (Berne, 1964, p. 48)

Let us note that, since games are based on complementary transactions, they can proceed smoothly, without interruption. This is what can make them so toxic for human relations.

Bruner’s notion of transactional format includes Berne’s games but it is a larger concept: formats must satisfy the first and the third of Steiner’s conditions, but not necessarily the second condition (ulterior motive) in the interactions:

A format entails formally a contingent interaction between at least two acting parties, contingent in the sense that the responses of each member can be shown to be dependent upon a prior response of the other. Each member of the minimal pair has a goal and a set of means for its attainment such that two conditions are met: First, that a participant’s successive responses are instrumental to that goal, and, second, that there is a discernible stop order in the sequence indicating that the terminal goal has been reached. (Bruner, 1985, p. 39)

In the next section, I will give some examples of games traditionally played in classrooms, particularly mathematics classrooms. I surmise that the attachment, bordering on addiction, of our Parent (or rather Pig Parent) state to those games contributes to the difficulty of implementing, on a large scale, in the public schools, teaching approaches such as those proposed by Pestalozzi (1894), Montessori (1976), Freinet (1994), or von Glasersfeld (1995). In all these pedagogies, teacher-student interactions are assumed to consist of simple complementary transactions, in which interlocutors have no ulterior motives, trust each other and treat with respect. Notably, the first “pedagogical invariants” of Freinet are: “The child is of the same nature as us”; “To be bigger does not necessarily mean to be above others”; “Nobody – child or adult – likes being ordered about.” (“Les invariants pédagogiques”, first published in 1964; re-published in the second volume of *Oeuvres*, 1994).

## Games teachers and students play in the classroom

Many transactions between the teacher and students in the classroom have ulterior motives. Even when the teacher asks a student, *How much is three times five?* and the student responds, *Fifteen*, as in Steiner's example, this is not an instance of a candid complementary transaction, because the teacher knows the answer. What the teacher really means is, *Show me if you have learned your multiplication tables*. It is an instance of the "interrogation game" that, for a long time, belonged to the canon of instructional methods, and is still practiced by teachers.

In the past, teacher training included learning about the "art of interrogation" (Langevin, 1869, p. 52). Textbooks for teachers formulated principles of good interrogation. For example, Langevin (1869, p. 52-54) defines a good interrogation as

- based on clear, unambiguous questions;
- lively (if one student doesn't know the answer right away, another should be asked);
- varied (the questions should appear in various formulations, to verify if the student has really understood the question or just memorized an answer associated, in the textbook, with a certain formulation);
- methodical (the questions should constitute a reasoned sequence, following the Socratic or heuristic method);
- addressed sometimes to a single student and sometimes to all students.

Today, interrogation no longer occupies such central position in the classroom, but what is now called "whole class discussion" still seems to follow some of the above principles.

Teachers certainly want them to be "lively" and do not wait very long for a student's answer before calling on a next one. Here is an example, from Battey's article:

Ten minutes [into the whole class discussion, the teacher] posed a question and chose David to respond. As he began to answer, David briefly paused for 2 seconds; [the teacher] rolled her eyes as he restarted his response and called on another student. When Selena responded quickly, she praised her.... (Battey, 2012)

In the past, interrogation was present also in textbooks written in the form of questions and model answers, on the model of Catechism. This was the case even for mathematics textbooks. For example, Warren Colburn's popular "First lessons in Arithmetic: On the plan of Pestalozzi, with some improvements" (Colburn, 1825) was organized entirely as a collection of

questions, some of them with model answers, with an occasional “remark”, containing a definition. For example,

Remark. When any thing, or any number, is divided into two equal parts, one of the parts is called the half of the thing or the number.

1. If an apple is worth two cents, what is one half of it worth?

2. What is one half of two cents?

*Ans.* One cent.

*Q.* Why?

*A.* Because if you divide two cents into two equal parts, one of the parts is one cent

(Colburn, 1825, p. 42)

The “plan of Pestalozzi” in Colburn’s interpretation consisted in (a) allowing children to find answers in their own way, (b) asking them to explain how they got the answer, and (c) showing the children the difference between his or her method and the method to be learned in school (Colburn, 1825, p. vi). Colburn gave little information about the spontaneous explanations that teachers could expect from children. There are only a few examples in a footnote to the *Preface*, where Colburn’s says that children are likely to use addition to perform any arithmetical operation. Thus, when children are asked to explain how they got their answer to “How much is five less than eight?” they are likely to say “Because five and three are eight”. Another example shows how children use addition in a problem that can be solved by multiplication<sup>5</sup>:

*Q.* How much must you give for four apples at 2 cents apiece?

*A.* Eight.

*Q.* Why?

*A.* Because two and two are four, and two are six, and two are eight.

(Colburn, 1825, p. v)

Even if the teacher is truly interested in knowing how the child reasons and the interaction continues with the teacher showing the child how the problem can be solved by multiplication, not all transactions in the above sequence are devoid of an ulterior motive. The teacher knows the answer to the first question asked and his or her ulterior motive could be to verify if the child knows the answer, too. Only the last Question-Answer pair could be a simple

---

<sup>5</sup> Multiplication, however, is not epistemologically necessary in this problem, and children are perfectly justified in using addition. According to Davydov, a situation that creates an epistemological need for multiplication and cannot be reduced to repeated addition is the situation of change of unit in measurement (Davydov, 1992; Boulet, 1998). Forcing students to use certain mathematical concepts and techniques in problems that could be solved with mathematically simpler tools is another school game: students are told to solve a problem, but the context (the lesson, the textbook chapter they are on, etc.) cues them on the ulterior motive of the transaction: show you have learned the newly taught material.

transaction if the teacher really doesn't know how the child was thinking, is interested in knowing it, and plans to act upon this knowledge in subsequent teaching. The teacher may, however, ask this question simply to appear to follow the plan of Pestalozzi: play the "Pestalozzi game".

An ulterior motive underlying the whole sequence of transactions above could be to just get over the introductory part of the lesson: asking students a question to which the new technique to be taught provides an answer, obtaining some students' answers, and then dismissing the answers as naïve by showing how the new technique leads to an answer faster or gives a more accurate or elegant solution. An example of a class playing this game (in the context of solving an optimization problem) can be found in (Steinbring, 1993). After having been tricked this way several times, students learn to recognize the game, and withdraw from engaging themselves in solving the given initial problem with the techniques they already know or can invent. They may just wait for the teacher to tell them what they should know. This is how the "problem-based approach" (MacMath, Wallace, & Chi, 2009) may degenerate into an "introductory problem game".

Our knowledge of children's spontaneous ways of solving arithmetic problems has expanded somewhat since the time of Colburn, and present-day textbooks for elementary teachers sometimes contain an organized system of children's arithmetic strategies. This is the case of the textbook promoting the Cognitively Guided Instruction (CGI) approach (Carpenter, Empson, Fennema, Franke, & Levi, 1999). The approach may not guarantee an increase in candid teacher-student interactions, however, since a teacher's ulterior motive in asking a child to explain his or her thinking may be just to classify the child's response into one of the CGI categories of children's problem solving strategies, and assess its level as more or less advanced.

Reforms in mathematics education in the last 50 years or so have attempted to reduce game-based teacher-students interactions, by making students more engaged in mathematical problem solving and teachers more interested in their solutions. Constructivism was perhaps the most radical in this respect (Steffe & Gale, 1995). Teachers were expected to follow the students' lead in solving problems; teachers' questions were to be aimed at understanding where the students were going with their solutions, and not at verifying if they could recite a memorized answer, or produce an answer known to the teacher in advance. The reform was

predicated on the assumption that the aim of education, at both the social and psychological levels, is to teach students to think mathematically and grow to become flexible and creative problem solvers in their adult lives.

The “political approach” to mathematics education, advocated by Mellin-Olsen (Mellin-Olsen, 1987), was also meant to eliminate games from teacher-students interactions. School games, he realized, were particularly loathsome for the “backstreet” youngsters in Bergen that he knew first hand as their peer in his school years. These games made school mathematics irrelevant for them. Mellin-Olsen proposed to respect students’ experiences with “folk mathematics” or mathematics implicit in, for example, “gambling, buying and selling,... building, construction and design” and build teaching-learning situations upon these experiences (Mellin-Olsen, 1987, p. 21). I have adopted one of his examples (p. 23) to illustrate the difference between transactions that usually take place in school and those suggested by Mellin-Olsen (Figure 1).

The problem with implementing these pedagogical approaches is that the outcome of teacher-students conversations based on candid transactions is unpredictable and uncontrollable. They may satisfy the participants’ needs for stimulus, structure and position but not the school institution’s definitions of the stimuli that it must provide students, the time prescribed for the distribution of the stimuli and the standards to which the participants must measure up in establishing their position. A school institution whose definitions of those basic human needs differ from those of teachers and students will be unfavorable to candid interactions among them.

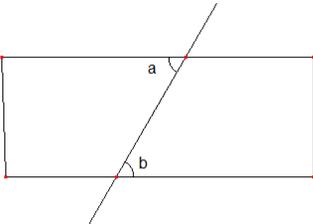
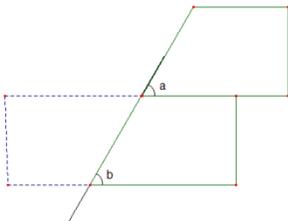
The interrogation game	Simple complementary transactions
	
<p>Teacher: Tell me why <math>\sphericalangle a = \sphericalangle b</math>?</p> <p>Child in Student: I guess you want me to say that the angles are “corresponding angles”? Or perhaps “Internal alternate angles?” I don’t remember. I hate geometry! It’s just lots of silly words! (compare with Mellin-Olsen, 1987, p. 7)<sup>6</sup></p>	<p>Student: “You should see our pigeon hut, teacher. We have built it high up on the hillside. Eight square meters.... Oak covering the floor. We collected the wood from the wood-shop some nights ago.” (Mellin-Olsen, 1987, p. 2)</p> <p>Teacher: And how did you saw the wood for the walls? How did you assemble the pieces?</p> <p>Student: Here is how [draws a picture similar to the one above and explains why it works]</p>

Figure 1. Interrogation game versus simple complementary transactions in a geometry lesson

In the next section, I will elaborate some more on the differences between school system’s needs and individuals’ needs. I will move from games played at the micro-level of interactions between teachers and students, to games played at the macro-level of interactions between the school institution and the public. I will use examples from the times when the public school system was being conceived and organized, particularly in North America. This history suggests that the motives behind public education have rarely if ever been identical with those loudly proclaimed by reformers in the public discourse. I surmise that the games played at both the micro and macro levels are at least partly responsible for the relative constancy of the education system established in the 19<sup>th</sup> century.

<sup>6</sup> Mellin-Olsen quotes one of his “friends... from the backstreets of Bergen during the mid-fifties” speaking about their school and their teacher: “I don’t understand how you can cope, staying at that mad-house. We had another fight with that pig of ours today. He thrashed the three of us just because we set fire to those litter baskets.” (Mellin-Olsen, 1987, p. 1)

## **Games in large scale educational interactions**

History of education has known many ways of turning children into Victims, by assuming from the start that they are deficient human beings in need of being reformed, “socialized”; “civilized”; “enculturated” or “acculturated” (Bishop, 1988). Children have had to be rescued from the ill-effects of their naturally sinful human nature (Desbiens, 1960); from poverty or “low socio-economic” status (Ginsburg, 1972); from parents’ inability to provide children with “proper” models of language use or behavior (Bernstein, 1977); from ethnic background (Adler, 2001) and from “[mathematical] learning disabilities” (Mabbott & Bisanz, 2008).

### ***Ulterior motives behind the Common School Movement***

In North America, from the beginning of industrialization and urbanization on a large scale in the early 19<sup>th</sup> century, public education was presented as a means of rescuing society from moral degradation, poverty, social inequality, racism, and economic crises. Horace Mann, the main promoter of the Common School Movement in the United States and one of the architects of a highly bureaucratized public educational system whose basic structures have survived until today, was arguing in his Twelfth Annual Report in 1848 that education was a cure for the naturally immoral nature of mankind; that it can “repel the deluge of vice” (Mann, 1957, pp. 98-100). Public education was proclaimed as “the great equalizer of the conditions of men” because “it gives each man the independence and the means, by which he can resist the selfishness of other men. It does better than to disarm the poor of their hostility towards the rich; it prevents from being poor.” (Mann, 1957, p. 87)

Mann’s Reports represented education reformers as Rescuers of the poor urban families and their children. Images of a “deluge of vice” that needs to be “repelled” and of finding ways to “disarm the poor of their hostility towards the rich” suggest, however, an ulterior motive of the Common School Movement: to protect the respectable wealthy from the morally degraded and hostile poor.

Schooling could not feed and keep the poor children warm. Yet if, instead of going to school, they went out in the streets to hunt for food and fuel, they were condemned for “theft” and “malicious mischief”.

‘There are now in the city upwards of two hundred boys and girls between five and fifteen years old who keep aloof from school and have no regular employment.... [They spend time] in prowling about shops, alleys and backyards, pilfering swill, fuel, old-iron, and such more valuable articles that happen to be unprotected.... These two hundred little marauders rarely if ever enter a school of literature and science, of wisdom and virtue; but through each live-long day they are taught by example and their knowledge [is] fixed by practice, in the school of the street, where the violation of every moral precept and duty form the morning and the evening lesson.... The losses from theft, the malicious mischief done to the public and private property, the occasional disturbance of schools and religious meetings, and the frequent and increasing insults to women and children [influence respectable children, who, brought in contact with them are] introduced to the Primary School of Vice.’ A quote from a school superintendent’s report, contemporary of Mann, reproduced in Katz (1968, p. 99)

Thus, on the “psychological level”, public schools were meant to keep the “little marauders” off the streets, in conditions that, to some of these smart and industrious problem-solvers resembled military barracks or jail more than the acclaimed “schools of a free people” (Mann, 1957, p. 57). Schools were to “civilize” the uncivilized and provide moral guidance and control presumed lacking in the families of factory workers (Carnoy, 1976, p. 124). As we now know, poor children come to school with rich experience and knowledge (Ginsburg, 1972; Saxe, 1988; Nunes, Carraher, & Schliemann, 1993). In Mann’s public schools, however, their knowledge was discounted as “lowly”, not just irrelevant. Only knowledge valued by the higher-income classes could aspire to be taught in school. The slogan that education promotes social mobility was telling children of factory workers that their social position was shameful and, if they were good, they would be able to get out of it. Factories were forcing artisans out of business. Thus people who used to be well-off and felt respected, were losing their position in the society (Carnoy, 1976, p. 125). For the working-class children and their parents, the reformers appeared as Persecutors.

The public school system did not deliver on its promise of solving social problems in the long run, either. Mass schooling was largely achieved by mid-twentieth century but problems of poverty and social inequality did not subside: statistics published in 1962 revealed that 21% of the population was living in poverty, with high concentration of poverty amongst ethnic minorities (Carnoy & Levin, 1976, p. 2). The situation has not improved since then (World Hunger Education Service, 2012). Today, a teenager born in a New York’s black or Hispanic community is “nearly four times more likely to be enrolled in one of the city’s poorest

performing high schools than an Asian or white, non-Hispanic student” (Jackson & Noguera, 2012).

### ***Horace Mann and Johann Pestalozzi***

In one of his Reports, Mann praised the “Pestalozzi method” that he observed in Prussian schools during his European tour (Mann, 1957, pp. 54-55), but a typical American elementary classroom between 1820 and 1880 had little to do with the spontaneous way Pestalozzi taught his classes (Pestalozzi, 1894):

Students recited passages from textbooks, worked at their desks on assignments, or listened to the teacher and classmates during the time set aside for instruction. Teachers assigned work and expected uniformity from students both in behavior and in classwork. Teachers told students ‘when they should sit, when they should stand, when they should hang their coats, when they should turn their heads....’ Students often entered and exited the room, rose and sat, wrote and spoke – as one. (Cuban, 1993, p. 25)<sup>7</sup>

Like Mann, Pestalozzi was also “profoundly disturbed by the apparent disintegration of... peasant society and family life taking place as a result of the rapid growth of cities and towns” (Button & Provenzo jr., 1989, p. 71). He did not see a solution to the problem in a bureaucratic system of uniform mass education, however. Rather, he focused on using all kinds of situations and everyday objects and activities – especially occurring in purposeful work – to teach reading, writing, calculating, etc. In “How Gertrude teaches her children”, Pestalozzi (1894, p. xviii) wrote: “My ideal training included work on the farm, in the factory, and the workshop”. He had a project of establishing an industrial school. Such situations were certainly more favourable to candid teacher-student interactions, than to the formal school games such as interrogations and recitations, although those were not eliminated from Pestalozzi’s classes.

Pestalozzi did not have ulterior motives in establishing free schools for poor children. His “sole end” in life had indeed been “to stop the sources of the misery in which I saw the people around me sunk” (Pestalozzi, 1894, p. 9). But the schools for poor children that Pestalozzi started did not last. They ruined him physically and financially and had to close. Looking back on his life, he saw himself as a victim of his childish efforts to rescue some children from poverty,

---

<sup>7</sup> The quotation is from Barbara Finkelstein’s unpublished doctoral dissertation, 1970, ‘Governing the young: Teacher behavior in American primary schools, 1820-1880’.

instead of spending his energy in developing the foundations of an educational system that could have helped masses of children.

Pestalozzi became aware of being “lost... in the whirl of powerful impulses towards outward operations of which [he had] not worked out the foundations deeply enough” (Pestalozzi, 1894, p. 12). His total engagement in “outward operations” left him no time for “understanding the details of skilled labour and knowledge that is necessary to accomplish them” (ibid.).

As a result, he wasn’t able to make himself better understood by his contemporaries, and many of his projects had a short life. He was not successful in convincing teachers to follow his method when he was put in charge of a Teachers’ Institute: “These young people thought themselves already tolerably well educated, and such simple childish exercises, far from interesting them, only served to wound their vanity.” (Pestalozzi, 1894, p. xxii).

Also, in the hands of others, his pedagogical ideas were trivialized. The “method of object lessons” that Pestalozzi was credited with, was likely to take a shortcut and substitute the teacher *illustrating* words and numbers in front of the children with pictures and objects for children learning in situations of their own productive activity. An example of this is an 1867 textbook titled, “A pictorial primary arithmetic on the plan of object lessons” (Walton, 1867). In the US, Pestalozzi’s method was also criticized for its focus on reasoning at the beginning of learning arithmetical operations. Cajori (1896, p. 219) quotes a certain Rev. Thomas Hill’s objections against using Colburn’s ‘First Lesson in Arithmetic: On the plan of Pestalozzi, with some improvements’ to teach children younger than 12 years old:

‘Warren Colburn’s First Lessons have been abused by being put in the hands of children too early, and has been productive of almost as much harm as good.... The teacher who has been accustomed to the modern erroneous method of teaching to reason out his processes from the beginning may be assured [that the] method of gaining facility in the operations, before attempting to explain them, is the method of Nature; and that it is not only much pleasanter to the child, but that it will make a better mathematician of him. (Hill, 1878, pp. 43-49)<sup>8</sup>

Even Eugene Smith, praised for progressive ideas about the teaching of arithmetic such as avoidance of uninteresting and artificial school problems and concentrating on problems

---

<sup>8</sup> This opinion reminds me of the critique of the “Standards-based curriculum” voiced by some participants of the Californian “Math Wars” (Schoenfeld, 2004)

related to “children’s activities in school, for example, measuring liquids, building models or playing a game” (Donoghue, 2007, p. 568), which are aligned with Pestalozzi’s ideal, was nevertheless insisting on drill. In a book addressed to teachers of mathematics, Smith justified the importance of “thorough drill”, in schools, of computational skills and “accuracy”, by businessmen’s complaint that school graduates whom they want to hire are lacking in this regard (Smith, 1909, p. 25). Pleasing the businessmen thus turns out to have been Smith’s ulterior motive in a discourse that, on the surface, was so truly concerned with children’s interests.

Pestalozzi realized he became bitter as a result of his failed efforts – “I met my misfortune with inward scorn and contempt of mankind” (Pestalozzi, 1894, p. 13) – and was ashamed of this feeling, because it was a sign of his own naïveté. He admitted being childish – “I was grey-haired, yet still as child” Pestalozzi, 1894, p. 14) – in expecting

a good issue from the tinkling cymbals of civil truth... [and] ideas of right from the men of my time, who, with few exceptions, live only to make themselves comfortable and hanker after well-spread tables. (Pestalozzi, 1894, p. 14)

Horace Mann, on the other hand, was past master in playing the “cymbals of civil truth” in the noble and self-righteous discourse of his Reports. He also accepted as a fact, without scorn, that most people “live only to make themselves comfortable and hanker after well-spread tables”. Thus, he won the support of the wealthy and was able to realize his project. Public education was not meant to save children, as Pestalozzi proposed, from schools functioning as “artificial stifling-machines for destroying all the results of the power and experience that nature herself brings to life in [the children]” (1894, p. 26), or from growing “like geese which, ever since they cracked the shell, have been shut up in the coop and shed, and so have lost all power of flying and swimming” (1894, p. 19). On the contrary, public schools were conceived as places to “tame the wild”. Public schools did not trust children, respect their points of view or appreciate the experience and knowledge they brought with them. They also did not tolerate differences among them: uniformity and standardization were on the agenda.

### ***Values underlying the bureaucratic public school system and the Rescue Game***

According to Katz (1975, p. 108), Mann’s project rested on values of “order, efficiency, and uniformity” as opposed to “responsiveness, variety, and flexibility”, and this has not changed in spite of the many educational innovations or reforms in the US in the 20<sup>th</sup> century.

Valuing uniformity lays the ground for racist attitudes, which, for Katz, extend to considering “one group of people as essentially different from and inferior” to another (Katz, 1975, pp. 110-111). Valuing efficiency and “scientific measurement” justifies the use of standardized tests, which then legitimize and make “objective”, rather than “racist”, the attributions of academic inferiority to some groups of people. The attitude could be expressed with an air of superiority (from the Persecutor’s position), or with an air of pity (from the Rescuer’s position), but in any case, it puts the child from a group of “different and inferior” people in the position of a Victim who can give up trying, or retaliate by acting up. One way or another, however, the Rescue Game serves to maintain the system: school failure can be blamed on the innate or environmental inferiority of a group of people. Since members of the group cannot stop being members of the group, their school achievement becomes a personal trait that cannot be changed. Everybody in the Rescue game thus feels powerless, and can be excused for not trying.

Batthey’s observations of the class of colored students 85% of which qualified for free lunches, and his extensive review of literature, support this interpretation of the situation. In spite of David’s and other students’ good achievement in mathematics and active participation in the class, the teacher’s interactions with them implied that she hasn’t changed her opinion of the class as lazy, lacking motivation, effort and “not having the foundations to add and subtract”. This continual implied attribution risks causing the students to actually live up to her expectations, and give up trying to convince her that she is wrong about them.

Directly after posing the [handshake problem], David raised his hand. [The teacher] stated, ‘You can’t answer it right now David. I mean you could, but it would be *wrong* most likely. It’s gonna take a little bit of *thinking*, like most word problems. *Okay!*’ The overall tone of this interaction was one of sarcasm, framing David as not thinking and not genuinely engaged in the word problem, both issues that seemed to run counter to his participation....This form of aggressive talk has been shown to reduce students’ sense of responsibility for their actions in the classroom (Lewis, 2001).  
(Batthey, 2012)

In present-day American educational literature, the discrepancy between the loudly professed democratic beliefs and racist behavior (Cuban, 2001, p. 16) is framed not as a problem waiting to be solved but as a dilemma to be “satisficed”: one can only “manage” the situation through more or less satisfactory compromises. Cuban (2001, p. 16) credits a Swedish social

scientist, Gunnar Myrdal (1944), for making Americans aware that their “racial trouble” is “a clash of choices within white Americans’ souls between social and economic advantages gained from segregation and the historic ideals of equality and freedom”. The framing of the racial tension as a dilemma is another convenient excuse for not changing anything at the level of the system as a whole. Dilemmas have to be managed locally by school principals and teachers. If they are not successful, it just means that these individuals are not very “imaginative” or “cooperative”, or “competent” and not that there is anything wrong with the bureaucratic school system and values of order, efficiency and uniformity on which it rests.

### ***The payoff***

According to Berne, what makes people continue to play a game, despite its disadvantages for the quality of their and other people’s lives, is its payoff (Steiner, 1974, p. 37). What could be the payoff for the society as a whole in playing the “bureaucratic education game”? Here are some ideas.

The state appears as a noble and disinterested Rescuer: it offers free education which is represented as a just and progressive way to deal with generally recognized social problems such as crime, poverty, and unemployment (Katz, 1975, p. 109).

The conditions for the rescue to be successful appear to be clear and logical: sharp standards of “achievement” must be reached in order for education to indeed solve the social problems.

The education system is equipped with means to act as a Persecutor to those individuals (students, teachers) and institutions (schools, school boards) that do not measure up to the standards of achievement; students can be failed; teachers may be denied certification, promotion or may be dismissed from their jobs; underachieving schools and school boards may be denied funding.

The system offers students who feel Victims of the system or of their teachers’ opportunities to retaliate (they can effectively disrupt the functioning of the system by behaving and doing badly at school, bringing drugs and guns to school, etc.).

There is a provision for the state to return to its Rescue position: education is represented as a self-repairing system. It is enough to reform it and everything will be all right again.

Reform provides a great stimulus to the system at all levels of its administration and the society at large: it “unleashes a flurry of seemingly purposeful activity” (Katz, 1975, p. 109), while maintaining intact the structuring of the time people are used to, and the traditional values underlying the way people position themselves with respect to others. The activity brings measurable benefits to all concerned. Educators boost their publication records by writing papers about the philosophical and pedagogical foundations of the reform, and proposing new pedagogical and didactic “approaches” that are then experimented locally in schools. State departments of education are busy rewriting the curricula. Publishers obtain contracts for new textbooks. Teachers can engage in innovations and thus overcome the boredom of routine (Brousseau, 1997, p. 268). When teachers are experimenting with new ideas, they may be more likely to treat their students as partners than as naughty kids to be tamed – since they need the students’ cooperation for their project to succeed – and, for a while, classroom interactions become healthier, less game-like. Media have news to report from the education reform front.

The bureaucratic system offers also the means to offset criticisms. If things don’t work, it is always someone else’s fault. Everyone can declare powerlessness at one point or another. The minister of education can say, “What can I do? Ultimately, the quality of education depends on the teachers.” Teachers can say, “What do you want me to do, with thirty students in the classroom, ten of which have ADD or behavior problems, and an overloaded curriculum?” Nothing can be changed. The system is there to stay. And it is there to stay because, on a superficial level, it satisfies everybody’s basic needs: it stimulates people cognitively and emotionally; it structures their time; and it provides clear and unquestioned standards to position oneself with respect to others.

Future teachers appear to be looking forward to playing Rescuers to their students. As reported in Bergsten and Grevholm (2004, p. 135), they want their students to know that their teacher “cares” and is there “by their side”,. They do not anticipate having to play games with the students. They want to have healthy relationships with them, “built on friendship and respect”, so that “the pupils forget about the invisible wall between pupils and teachers” (ibid.), which is something close to Berne’s “intimacy” interactions (Berne, 1964, p. 18). They think they can achieve it and “prevent negative moods [from] tak[ing] over” by having a teaching unit well-planned in advance; starting a class by establishing a “good and active working climate and ending it with students feeling they have accomplished something together”; designing the class

so as “to catch the attention and inspire the pupils, in order to make the basic work in the class more active and meaningful”; avoiding long lectures and ambiguous instructions; instead, “build[ing] on pupils’ own thoughts to creat[ing] a meaningful learning activity” (ibid.).

How long before their expectations are frustrated by a rigid and merciless grading system that neatly classifies students into those that can and those that can’t do mathematics and are therefore not fit to enter university programs supposedly leading to the more lucrative positions and jobs?

In Quebec, during the reform which started in 2000, there has been an attempt to abolish the letter and percentage grading system, and evaluate students’ progress at school in the form of an essay describing what competencies (specified in the curriculum) the student made progress on and in which he or she should improve. This made it more difficult for parents to decide how their child was positioned in different school subjects (mother tongue, mathematics, science, etc.) relative to other students. Parents and the public at large reacted negatively to this change and demanded a return to the usual school report cards, where a student’s achievement on each school subject was described in terms of a letter grade or a percentage (Conseil Pédagogique Interdisciplinaire du Québec, 2010). Apparently, the evaluation system proposed in the reform did not adequately satisfy their “position hunger”; they were used to a different diet. Teachers were also critical: evaluation in the form of essays required them to develop long-term “learning and evaluation situations” (*situations d’apprentissage et d’évaluation*) (Lusignan, 2008) so that they could collect observational material for their assessment of individual students. It was costly in terms of required knowledge, since there were not many ready-made resources available for the learning situations and teachers had to invent them themselves. It required a different structuring of time than they were used to. The traditional grading system structured their time into relatively long evaluation-free teaching periods, where they could ignore their students’ cognitive activity, and brief periods of evaluation where tests were administered and quickly marked. This payoff of the bureaucratic education system was difficult to discount.

In view of this state of affairs, reformers can again blame the reform’s failure to live up to its ideals on the force of tradition, the economy of least effort, etc., and do nothing until the government gives the signal to launch a new reform.

## Conclusions

The picture sketched above appears pessimistic. I prefer to see it as realistic. I believe that if we accept reality as it is and not as we would have it, then we are more inclined to study it without prejudice and wishful thinking and we may actually find ways to change the things we do not like. It would be good to start by realizing what education can do and what it cannot do. And it would be good to stop playing Rescue Games and other school games. It is quite clear now, I think, that the bureaucratic public education system cannot solve the problems of unemployment, poverty and racism. These problems must be solved by different means. Education does not create jobs outside of education: it is a system that can only expand itself. If you study mathematics for its own sake, you link your future with the institutions where you have studied it: schools, universities. If you study mathematics as a tool to be used in non-academic domains, you need a non-educational institution to create a job for you. Education therefore needs external resources to survive. The society must be willing to supply the funding; whether through taxes or tuition fees – this should be a matter of a societal debate. Society must be convinced that education is worth paying for. We already know that arguments such as those used by Horace Mann are not true and have ulterior motives that only perpetuate the problems that the bureaucratic education system is claimed to solve. So why is education really worth the taxpayers' money?

History of philosophy and history of education is replete with points of view on this question. It is worth reading Quick's (1901/1879) essays on educational reformers between antiquity and the nineteenth century to see both the variety of opinions and threads that remained constant over time. Seven major twentieth century answers to this question are critically reviewed in an interesting study by Heymann (2003).

For me, influenced as I am now by Transactional Analysis theory, I see education not as a tool to satisfy human needs but a basic human need in itself. Before the adults' injunctions and attributions turn the child into a Pig Parent, its dominant ego state is the Little Professor: the curious, wide-eyed, intrepid explorer of the world, or worlds, of human relations; of words, stories, and letters; of relations between quantities; of numbers, shapes, changes and speeds of those changes, and many other. Children want to know, but, when they come to school, their questions are ignored and they have to learn answers to questions they didn't ask. They are told

to be quiet, stop fidgeting, and not to disturb the teacher. They are told they are “not OK”, even in the progressive “reform-based classes”, as we have seen in Battey’s article (2012). As children learn to behave, their Little Professors fade into the background. They are not curious about the world anymore. They become more interested in holding a one-up position with respect to others; they start enjoying power plays; they need to be told what to do and become afraid of autonomy and responsibility. Such school, therefore, does not satisfy the human education hunger. It eliminates the hunger, and replaces it by other hungers: for scores on tests, for power over others, for position, for having new things, etc. This is not worth a cent of the taxpayers’ money. The only school worth supporting, I believe, is a school that is capable of keeping up the instinctive and specifically human education hunger and making sure it will not fade when the child grows up. When entering such schools, both teachers and students would have to be asked to switch off not only their cell phones, but also their Pig Parent ego states. This might help them interact with each other using simple complementary transactions. Teaching and learning mathematics, in particular, can be immensely rewarding when only the Adult, Nurturing Parent and Little Professor ego states are involved and all transactions are simple. I have only my personal experience of mathematical conversations with my grandchildren and students to support this belief. It would be technically easy to devise a “scientific experiment” to test this hypothesis, using a control group with a teacher in a predominantly Pig Parent state playing, in turn, all the roles in the Rescue Game. It would be unethical, however, to consciously subject any student to such treatment. We should be satisfied with the existing experiential evidence for the unfortunate effects of school games on the students’ education hunger.

Recurring education reforms are proof that educators are not satisfied and are looking for solutions. But they may be looking in the wrong place. Some time ago, for example, looking with envy at the high ranking of East Asian countries on international mathematics proficiency tests such as TIMSS or PISA, American educators tried to learn more about their education systems in view of implementing some of their elements in the U.S. schools. They were told that, to achieve the same results, they would have to substantially change their value systems, which would be equivalent to changing their identity (Leung, 2001). Today, Americans are fascinated with the latest educational reform in Finland, for the same reason: high ranking on international proficiency tests (Darling-Hammond, 2010). This is a value that is dear to Americans but not necessarily to other people. In fact, the Finnish reform tried to avoid three of the main aspects of

the American education system: standardization of education by means of frequent testing of students and teachers; using the ranking on international student assessment tests such as TIMSS or PISA to measure the success or failure of students, teachers and educational systems as a whole in a country; consequential accountability systems for schools, whereby “raising student achievement... is closely tied to processes of accrediting, promoting, inspecting, and, ultimately, rewarding or punishing schools and teachers” (Sahlberg, 2007, p. 151). It would require much more than what is usually done in American “reform movements” to apply the “Finnish lessons”. Finnish education policies favour “flexibility and loose standards”: curriculum development is school-based, not centrally imposed; networking is one of the tools of the development (Sahlberg, 2007, p. 152). Ranking in international assessments is not a measure of success. The Finnish reform promotes also “intelligent” (rather than “consequential”) accountability policies and “gradual building of a culture of trust within the education system that values teachers’ and headmasters’ professionalism in judging what is best for students and in reporting their learning progress.” (Sahlberg, 2007, p. 152). These Finnish principles are grounded in a culture of consensus, “where major political decisions have been agreed by all key players in society” (Sahlberg, 2007, p. 153) and it is thus normal practice that education system administrators do not address schools and teachers from a one-up power position.

“Finnish lessons” or “East Asian lessons” may not be applicable in countries that do not share the same values, but learning them can be an eye-opening experience for a better understanding of education systems we live with, study and try to improve through local initiatives. Working on this paper, reading historical documents promoting as well as criticizing educational reforms, has been such an eye-opening experience for me. It was also very useful for me not to read those documents passively, but frame the processes I was learning about in terms of a definite analytic framework. This framework has its limitations in explaining the phenomenon of perpetuity of educational reform, of course, but it did have an energizing effect on my understanding of it.

Working on this paper made me also better appreciate the “political” (Mellin-Olsen, 1987) and “critical” (Skovsmose, 1994; Skovsmose & Greer, 2012) perspectives on mathematics education that, for me, have characterized Nordic research in mathematics education, Barbro’s research included. I feel that, finally, after all these years, I am more in step with Barbro’s interests in mathematics education, and I am looking forward to our collaboration in the future.

## Bibliography

- Adler, J. (2001). *Teaching mathematics in multilingual classrooms*. Dordrecht: Kluwer.
- Battey, D. (2012). 'Good mathematics teaching for students of color and those in poverty: the importance of relational interaction within instruction. *Educational Studies in Mathematics*.
- Bauersfeld, H. (1995). 'Language games' in the mathematics classroom: Their function and their effects. In P. Cobb, & H. Bauersfeld, *The emergence of mathematical meaning: Interaction in classroom cultures* (pp. 211-292). Hillsdale, NJ: Erlbaum.
- Beddard, C. (2012). *Motivating adult students taking a basic algebra course in a university setting. A Master in the Teaching of Mathematics thesis*. Montreal: Concordia University.
- Bergsten, C., & Grevholm, B. (2004). The didactic divide and the education of teachers of mathematics in Sweden. *Nordic Studies in Mathematics Education*, 2, 123-143.
- Berne, E. (1964). *Games people play*. New York: Ballantine Books.
- Bernstein, B. (1977). *Class, codes and control. Rev. ed.* London: Routledge and Kegan Paul.
- Bishop, A. (1988). *Mathematical enculturation. A cultural perspective on mathematics education*. Dordrecht: Kluwer.
- Boulet, G. (1998). On the essence of multiplication. *For the Learning of Mathematics*, 18(3), 12-19.
- Brousseau, G. (1982). Les 'effets' du 'contrat didactique'. *Actes de la IIe École d'été de didactique des mathématiques, Olivet*. Orléans: IREM Orléans.
- Brousseau, G. (1995). L'enseignant dans la théorie des situations didactiques: 1. Structure et fonctionnement du système didactique. *Actes de la VIIIe École d'été de didactique des mathématiques, St-Sauves d'Auvergne* (pp. 3-46). Clermont-Ferrand: IREM de Clermont-Ferrand.
- Brousseau, G. (1997). *Theory of didactical situations in mathematics*. Dordrecht: Kluwer.
- Brousseau, G., & Warfield, V. (2001, 10 30). *Le cas de Gael*. Retrieved 05 14, 2010, from Guy Brousseau: <http://pagesperso-orange.fr/daest/guy-brousseau/textes/CasdeGael.pdf>

- Bruner, J. (1985). The role of interaction formats in language acquisition. In J. Forgas, *Language and social situations* (pp. 31-46). New York: Springer-Verlag.
- Button, H., & Provenzo jr., E. F. (1989). *History of education and culture in America. Second edition*. Englewood Cliffs, NJ: Prentice-Hall.
- Cajori, F. (1896). *A history of elementary mathematics with hints on methods of teaching*. New York: Macmillan & Co, Ltd.
- Carnoy, M. (1976). Educational reform and social control in the United States, 1830-1970. In M. Carnoy, & H. M. Levin, *The limits of educational reform* (pp. 115-155). New York: David McKay Company, Inc.
- Carnoy, M., & Levin, H. M. (1976). *The limits of educational reform*. New York: David McKay Company, Inc.
- Carpenter, T. P., Empson, S. B., Fennema, E., Franke, M. L., & Levi, L. (1999). *Children's mathematics: Cognitively Guided Instruction*. Portsmouth, NH: Heinemann.
- Colburn, W. (1825). *First lessons in arithmetic, on the plan of Pestalozzi, with some improvements*. Boston: Cummings, Hilliard, & Co.
- Conseil Pédagogique Interdisciplinaire du Québec. (2010, avril). *Bulletin scolaire, épreuves ministérielles et modifications appréhendées. Entre perplexité et questionnement*. Retrieved May 28, 2012, from Conseil Pédagogique Interdisciplinaire du Québec: [http://www.conseil-cpiq.qc.ca/web/doc/AVIS\\_AVRIL\\_2010\\_2010423141131.pdf](http://www.conseil-cpiq.qc.ca/web/doc/AVIS_AVRIL_2010_2010423141131.pdf)
- Cuban, L. (1993). *How teachers taught. Constancy and change in American classrooms, 1890-1990. Second edition*. New York: Teachers College Press.
- Cuban, L. (2001). *How can I fix it? Finding solutions and managing dilemmas*. New York: Teachers College Press.
- Darling-Hammond, L. (2010, October/November). What we can learn from Finland's successful school reform. *NEA Today Magazine*.
- Davydov, V. (1992). The psychological analysis of multiplication procedures. *Focus on Learning Problems in Mathematics*, 14(1), 3-67.
- Desbiens, J.-P. (1960). *Les insolences du Frère Untel*. Montreal: Les Editions de l'Homme Ltée.

- Donoghue, E. (2007). The education of mathematics teachers in the United States: David Eugene Smith, early twentieth-century pioneer. *Paedagogica Historica: International Journal of the History of Education*, 42(4-5), 559-573.
- Freinet, C. (1994). *Oeuvres pédagogiques*. Paris: Seuil.
- Ginsburg, H. (1972). *The myth of the deprived child. Poor children's intellect and education*. Englewood Cliffs, NJ: Prentice-Hall.
- Glaserfeld, E. v. (1995). *Radical constructivism: a way of knowing and learning*. London: Falmer Press.
- Goffman, E. (1974). *Frame analysis: An essay on the organization of experience*. Cambridge: Harvard University Press.
- Grevholm, B. (2010). Research on mathematics teacher education in Sweden. In B. Sriraman, C. Bergsten, S. Goodchild, G. Pálsdóttir, B. Dahl, & L. Haapasalo, *The first sourcebook on Nordic research in mathematics education: Norway, Sweden, Iceland, Denmark and contributions from Finland* (pp. 347-362). Charlotte, NC: Information Age Publishing.
- Heymann, H. (2003). *Why teach mathematics? A focus on general education*. Dordrecht: Kluwer.
- Hill, T. (1878). *The true order of studies*. New York: G.P.Putnam's Sons.
- Jackson, J., & Noguera, P. (2012, May 16). Why education inequality persists - and how to fix it. *Washington Post*, pp. "The Answer Sheet" section, edited by Valerie Strauss.
- Karpman, S. (1968). Script drama analysis. *Transactional Analysis Bulletin*, 7(26), 39-43.
- Katz, M. (1968). *The irony of early school reform*. Cambridge, Mass.: Harvard University Press.
- Katz, M. (1975). *Class, bureaucracy, and schools. The illusion of educational change in America*. New York: Praeger Publishers.
- Langevin, J. (1869). *Cours de pédagogie, 2e édition*. Rimouski: Imprimerie de la Voix du Golfe.
- Leung, F. (2001). In search of East Asian identity in mathematics education. *Educational Studies in Mathematics*, 47(1), 35-51.
- Lewis, R. (2001). Classroom discipline and student responsibility: The students' view. *Teaching and Teacher Education*, 19, 307-319.

- Lusignan, G. (2008, septembre). Points de vue de deux enseignantes du secondaire sur les changements apportés en évaluation des apprentissages. *Vie Pédagogique*, 148.
- Mabbott, D., & Bisanz, J. (2008). Computational skills, working memory, and conceptual knowledge in older children with mathematics learning disabilities. *Journal of Learning Disabilities*, 41(1), 15-28.
- MacMath, S., Wallace, J., & Chi, X. (2009, November). *Problem-based learning in mathematics. Research monograph # 22*. Retrieved May 30, 2012, from What works? Research into Practice:  
[http://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/WW\\_problem\\_based\\_math.pdf](http://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/WW_problem_based_math.pdf)
- Mann, H. (1957). *The Republic and the School. Horace Mann on the education of free men. Edited by Lawrence A. Cremin*. New York: Teachers College Press.
- Martin, D. (2000). *Mathematics success and failure among African-American youth: The roles of sociohistorical context, community forces, school influence and individual agency*. Mahwah, NJ: Erlbaum.
- Mead, G. (1934). *Mind, self and society*. Chicago: University of Chicago Press.
- Mellin-Olsen, S. (1987). *The politics of mathematics education*. Dordrecht: D. Reidel.
- Montessori, M. J. (1976). *Education for human development: understanding Montessori*. (P. Polk Lillard, Ed.) New York: Schocken Books.
- Myrdal, K. (1944). *An American dilemma. The Negro problem and modern democracy*. New York: Harper and Brothers.
- Nunes, T., Carraher, D. W., & Schliemann, A. D. (1993). *Street mathematics and school mathematics*. West Nyack, New York: Cambridge University Press.
- Pestalozzi, J. (1894). *How Gertrude teaches her children*. (E. Cooke, Ed., L. Holland, & F. C. Turner, Trans.) Syracuse, N.Y.: Swan Sonnenschein & Co.
- Quick, R. (1901/1879). *Essays on educational reformers*. New York: D. Appleton & Company.
- Reeve, J. (2005). *Understanding motivation and emotion*. Hoboken: John Wiley & Sons, Inc.

- Sahlberg, P. (2007). Education policies for raising student learning: The Finnish approach. *Journal of Education Policy*, 22(2), 147-171.
- Sarrazy, B. (1995). Le contrat didactique. Note de synthèse. *Revue Française de Pédagogie*, 112, 85-118.
- Saxe, G. B. (1988). The mathematics of child street vendors. *Child Development*, 59, 1415-1425.
- Schoenfeld, A. (2004). The math wars. *Educational Policy*, 18(1), 253-286.
- Sierpinska, A. (1996). Whither mathematics education? *Proceedings of the 8th International Congress on Mathematical Education* (pp. 21-46). Sevilla: S.A.E.M. 'THALES'.
- Sierpinska, A., Bobos, G., & Knipping, C. (2008). Sources of students' frustration in pre-university level, prerequisite mathematics courses. *Instructional science*, 36, 289-320.
- Skovsmose, O. (1994). *Towards a philosophy of critical mathematics education*. Dordrecht: Kluwer.
- Skovsmose, O., & Greer, B. (2012). *Opening the cage: Critique and politics of mathematics education*. Rotterdam: Sense Publishers.
- Smith, D. (1909). *The teaching of arithmetic*. New York City: Teachers College, Columbia University.
- Steffe, L., & Gale, J. (1995). *Constructivism in education*. New Jersey: Erlbaum.
- Steinbring, H. (1993). Problems in the development of mathematical knowledge in the classroom: the case of a calculus lesson. *For the Learning of Mathematics*, 37-50.
- Steiner, C. (1974). *Scripts people live. Transactional analysis of life scripts*. New York: Grove Press.
- Stuart, K., & Alger, A. (2011, May 19). *An evaluation of Transactional Analysis in secondary education*. Retrieved May 3, 2012, from Cumbria University: [http://cumbria.academia.edu/KazStuart/Papers/626703/An\\_Evaluation\\_of\\_Transactional\\_Analysis\\_in\\_Secondary\\_Education](http://cumbria.academia.edu/KazStuart/Papers/626703/An_Evaluation_of_Transactional_Analysis_in_Secondary_Education)
- Tiedemann, J. (2000). Gender-related beliefs of teachers in elementary school mathematics. *Educational Studies in Mathematics*, 41(2), 191-207.

- Tversky, A., & Kahneman, D. (1981). The framing decisions and the psychology of choice. *Science*, 211, 453-458.
- Wagner, J. (2006). An outsider's perspective: Childhoods and early education in the Nordic countries. In J. Einarsdottir, & J. T. Wagner, *Nordic childhoods and early education* (pp. 289-306). Charlotte, NC: Information Age Publishers.
- Wagner, J., & Einarsdottir, J. (2006). Nordic ideals as reflected in Nordic childhoods and early education. In J. Einarsdottir, & J. T. Wagner, *Nordic childhoods and early education: Philosophy, research, policy, and practice in Denmark, Finland, Iceland, Norway, and Sweden* (pp. 1-12). Charlotte, NC: Information Age Publishing.
- Walton, G. (1867). *Primary arithmetic, on the plan of object-lessons*. Boston: Brewer and Tileston.
- Wittgenstein, L. (1953/2009). *Philosophical investigations. Revised 4th edition*. Chichester, West Sussex, UK; Maiden, MA: Wiley-Blackwell.
- World Hunger Education Service. (2012). *Hunger in America: 2012 United States hunger and poverty facts*. Retrieved May 30, 2012, from Hunger Notes:  
[http://www.worldhunger.org/articles/Learn/us\\_hunger\\_facts.htm](http://www.worldhunger.org/articles/Learn/us_hunger_facts.htm)