

THE HARD FACTS OF SOFT SOCIAL SYSTEMS: A GENERAL SYSTEMS EXPLANATORY MODEL FOR SCHOOLS AND WORKPLACES

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ABSTRACT

In this paper, a new model for social systems is introduced, one that aims to inform all decision makers in schools and workplaces. The need for such a model is great, given the failure of modern well-intentioned reform efforts and wide variety of decision-makers. The new model is gleaned out of Boulding's nine-level typology of system complexity, and named TPO for the three key domains that are clarified: *technical*, *personal* and *organizational*, for specialists; and *things*, *people*, and *outcomes*, for non-specialist decision-makers. These three key parts of a social system have very different properties. First, *things* (technical) are of three kinds--level 1: frameworks (e.g., buildings, books and equipment); level 2: clockworks (e.g., school routines, schedules and calendars); and level 3: thermostat-like systems (e.g., school goals which people--students and educators--self-regulate to attain.) *Things* are predictable and designable. Second, *people* (personal) in a social system are not designable. While things like thermostats self-regulate to *externally* prescribed criteria, living systems self-regulate to *internally* prescribed criteria (level 4: open; e.g., a living cell). Living systems (levels 4-7) act to meet their own basic needs first, then, in people, higher needs—generally predictable by Maslow's hierarchy of human needs: survival, safety, belonging, achievement, self-actualization and transcendence. People's behavior decreases in predictability due to inherent individual differences (level 5: blueprint; e.g., plant); differing immediate perceptions from among competing stimuli (level 6: image-aware; e.g., animal), and their own long term reflections, prior knowledge, choices, and abilities (level 7: symbol processing; e.g., human). The third part of a social system is labeled *outcomes* (organizational). Outcomes depend on people's behavior. If people easily meet their basic needs, they will act to meet the organization's needs. This principle is not a question of ethics, but a question of physics. It is natural, biological, and scientific law that people will behave to meet their individual and personal needs (level 7: human) before their social system or organization's needs (levels 8 and 9). Level 8 systems (social) are optional. Level 7 functioning is mandatory. A person can transfer schools (level 8), but cannot transfer bodies (level 7). The TPO model of a social system clarifies that effective designers put all their attention to *things*, the designable components of a social system: frameworks; clockworks; and thermostat-like systems (e.g., school and classroom goals and ratios and flows of resources). Effective designers fashion these designable components as attractors, to allow system members to meet individual/ personal goals as first priority, and organization goals as second priority. Goals of the TPO approach are termed here *systemic renewal*, or systemic change efforts designed to increase opportunities for each social system member to meet his/her own self-perceived goals at his/her own pace. The ISSS Morning RoundTable corresponds to the goals of systemic renewal and the TPO model.

Keywords: General systems theory; social system theory; systemic school renewal

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BACKGROUND

The Failure of Social System and School Reform Efforts

In spite of advancing technology and equity in today's schools and workplaces, serious problems are resulting in social systems decline. Today, through research and study in schools as complex systems, I have come to better understand this decline in schools as a predictable reaction to decades of constant short-lived ill-conceived piecemeal reform efforts. This aggravated decline affects students, teachers, everyone. It is reported in the descriptive educational literature as increasing participant isolation and disconnection (Erickson, 1989; Maeroff, 1988), urban school staff struggling for survival (Rogers, 1989); and increasing school-site violence (Walker, 1995). I illustrate the decline in schools using Maslow's hierarchy in Figure 1. The black line represents the original and intended participant goals and outcomes of schools as achievement, self-actualization, and transcendence and the current and observed goals as safety and survival.



Figure 1. Intended vs. Observed Outcomes of Modern Schools and Society

Taking a wider perspective, Gardner (1991) explains that the deficiencies in our schools reflect deficiencies in our wider society (illustrated in Figure 1 by the gray line). Bracey (1992), too, argues that the "true crisis of education in America is that it is trying to function not only in an era of disinformation but also in a time of social decline that looks like collapse" (p. 104). This era of disinformation and social decline arguably has a worldwide scope, evidenced in the terrorist bombings in New York and Washington, D. C., on September 11, 2001 (Thomas, 2001), and the current wars and brutality in so many parts of the world. Most shockingly, these negative outcomes are being aggravated by educated societies who believe they are doing the right thing. It is clear that current educational and social systems are in need of a systemic renewal, and that our "best" reform efforts are based on erroneous assumptions.

In fact, it was helpful to me to realize that traditional scientific thinking might explain that 9 (quality of school) plus 1 (a new reform effort) would equal 10 (improved quality of school). In reality, my experience predicts that $9 + 1 = 8$; or 9 (quality of school programs) plus 1 (new ill-conceived reform effort) equals 8 (reduced quality in schools).



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The Complexity and Variety of Decision-Makers

In addition to ill-conceived change efforts, there are many different school decision makers, with different viewpoints. In addition to their different perspectives, school decision makers often do not understand each other. Frequently, the specialized vocabulary within each group of decision makers is confusing to another group. For example, the meanings of the terms TOP DOWN and BOTTOM UP have opposite meanings in management and reading theory. In management theory, TOP DOWN (the old paradigm) means the CEO makes key decisions, and BOTTOM UP (the emerging new paradigm) means the front line workers are involved in key decisions (Column 1 and 2 in Table 1).

In reading theory, BOTTOM UP (the old paradigm) assumes that the children learn to read by memorizing letters, sounds, then words. TOP DOWN assumes that children learn best and first by reading and listening to engaging stories (Column 3 in Table 1). Confusingly, Top Down and Bottom Up have opposite meanings in management and reading theory.

Table 1. The Opposite Meanings of Top Down and Bottom Up

| PARADIGM | MANAGEMENT THEORY | INSTRUCTION THEORY: READING |
|---|--|---|
| <p>Old Paradigm (out of favor)</p>  | <p>top down- the CEO (T) makes key decisions</p> | <p>bottom up- children (SS) learn letters and sounds (K) first, then words, sentences, paragraphs.</p> |
| <p>New Paradigm? (in favor)</p>  | <p>bottom up- the front line workers (SS) are involved in key decisions</p> | <p>top down- children learn reading (K) by listening to and reading engaging stories first.</p> |

School decision makers at the school site include teachers, principals, parents, students, and other administrative and clerical staff. There are school decision makers at the district office, publishers of school textbooks, at the universities and other teacher training institutes, and at the state and federal government. Checkland explains that the most objective view is one that sweeps in the views of all the stakeholders (Jackson, 1992, p. 139). School decision makers have different and often conflicting perspectives in the positions that they hold without the complication of using different vocabulary. I illustrate these problems in Figure 2 as if they were speaking different languages while trying to build an educational system, and how much this resembles the Tower of Babel.

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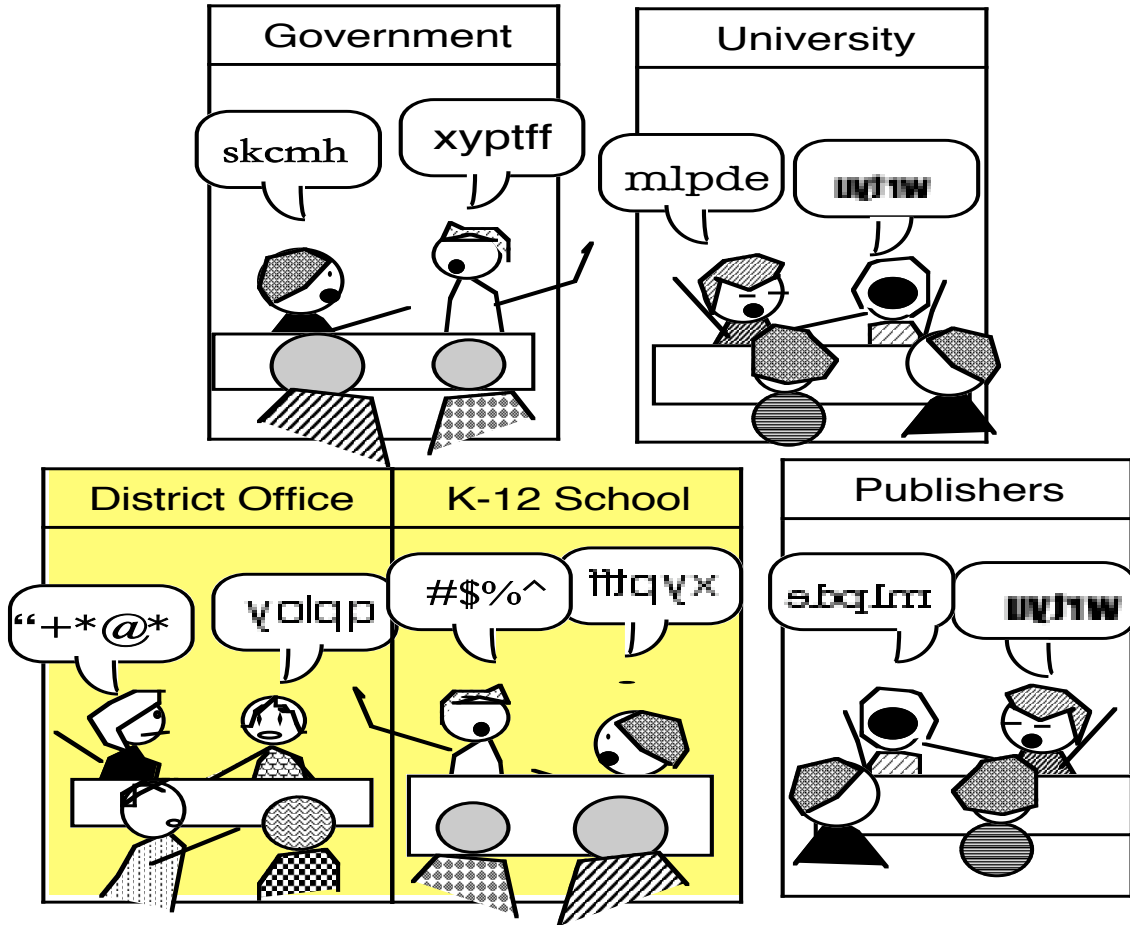


Figure 2. Tower of Babel: School Decision Makers Creating an Educational System

The Need and Audience

With all this complexity, there is a need for a scientific paradigm that explains behavior in social systems. Decision-makers need to better understand classrooms and meetings in schools, workplaces, communities, and so forth. The explanatory model needs to be repeatable, verifiable, and credible to all school and social system decision makers: teachers, principals, superintendents, parents, students, theoreticians, researchers, lawmakers; CEOs, managers, employees; presidents, kings, citizens, and so forth.

THE METHOD: BOULDING'S 9-LEVEL TYPOLOGY

Boulding's 9-Level Typology of System Complexity is an eye-opening foundation for a model that explains how schools and social systems really work. The model is developed with the aim of making sense to all decision makers, from the most sophisticated to the most novice. The model is outlined below. Passages that follow explain the components.

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Kenneth Boulding, one of the founders of general systems theory, looked to the real world and nature to uncover the hard facts of soft social systems. He ranked the systems of the world in a nine level taxonomy. From simple to complex, his nine levels are:

- 1- **FRAMEWORKS:** systems composed of static structures, such as the arrangements of atoms in a crystal or the anatomy of an animal.
- 2- **CLOCKWORKS:** simple dynamic systems with predetermined motions, such as the clock and the solar system.
- 3- **“THERMOSTATS:”** cybernetic systems capable of self-regulation in terms of some externally prescribed target or criterion, such as a thermostat.
- 4- **OPEN-SYSTEMS:** systems capable of self-maintenance based on a throughput of resources from its environment, such as a living cell.
- 5- **BLUE-PRINTED GROWTH SYSTEMS:** systems that demonstrate divisions of labor, that reproduce not by duplication but by the production of seeds or eggs containing preprogrammed instructions for development, such as the acorn-oak system or the egg-chicken system.
- 6- **INTERNAL-IMAGE SYSTEMS:** systems capable of a detailed awareness of the environment through sense organs (eyes, ears, etc.). Information is received and organized into an image or knowledge structure of the environment as a whole, a level at which animals function. At this level the image or perception intervenes between the stimulus and response.
- 7- **SYMBOL-PROCESSING SYSTEMS:** systems that use language and other symbols, are self-conscious, and can contemplate the past, present, and future. Humans function at this level. Level 7 systems, humans, also walk upright and have hands and opposable thumbs.
- 8- **SOCIAL SYSTEMS:** multicephalous systems comprising actors functioning at level 7 who share a common social order and culture. Social organizations operate at this level.
- 9- **TRANSCENDENTAL SYSTEMS:** systems composed of the "absolutes and the inescapable unknowables." (adapted from Boulding, 1956)

Boulding’s Model Linked to Organization Theory and the Social Sciences

Boulding’s typology is clarifying to social science/organization theory (illustrated in Figure 3). Boulding notes that “most of the theoretical schemes of the social sciences are still at level 2 [clockworks], just now rising to level 3 [thermostat systems], although the subject matter clearly involves level 8 [social systems] (Scott, 1992, p. 78).”

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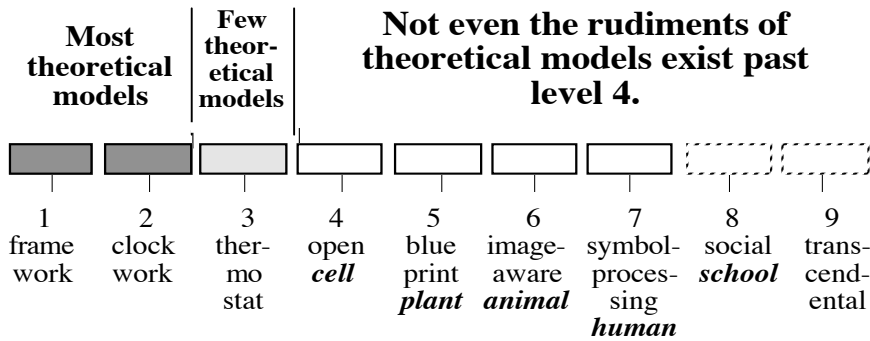


Figure 3. Boulding's 9 Systems Levels Linked to Organization Theory

Boulding further explains that each higher level systems contains subsystems of all those below it (Figure 4). For example, a social system (level 8) is made up of systems and subsystems of level 7, 6, 5, 4, 3, 2, and 1). A human (level 7) is made up of systems and subsystems of level 6, 5, 4, 3, 2, and 1). To illustrate both Boulding's 9 system types and the nature and increasing complexity of the nine types. I look at Figure 3 as a top view of Boulding's nine system types. Figure 4 is a front view and shows all the subsystems contained in each system type.

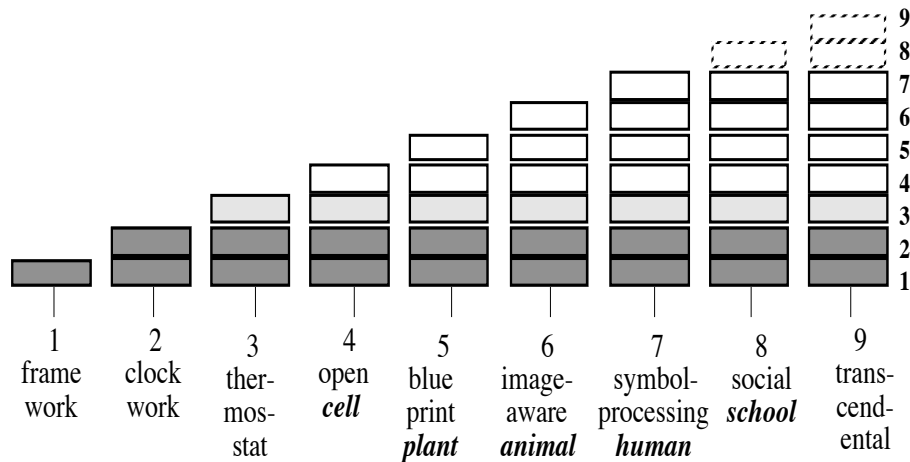


Figure 4. A View of Boulding's 9 Systems and Their Subsystems and Complexity

Coding in Figures 3 and 4

Figure 3 and 4 also briefly introduce my coding to illustrate the natural breaks and the increasing unpredictability of Boulding's system levels. Boulding's Levels 1 and 2 are dark gray boxes because structures and clockworks are designable, externally regulated to externally prescribed criteria. Level 3 is a light gray box, as control systems (cybernetic,

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thermostat-like systems) are self-regulating to externally prescribed or designable. These three levels are the domains of traditional science.

In Figures 3 and 4, Levels 4 -7 are clear boxes, as living systems are undesignable by an outside designer. They are self-regulating to internally prescribed criteria (their own needs and goals). These levels, the arenas of Miller's Living Systems (1978), are beyond the scope of traditional scientific law.

Levels 8 -9, are clear boxes with dotted-line boundaries, as social systems are unbounded and intangible. In contrast, levels 1-7 systems have fixed boundaries. Thus, level 8 systems (social) are optional. Level 7 functioning is mandatory. A person can transfer schools, workplaces, etc. (level 8), but cannot transfer bodies (level 7).

Boulding's Model to Unify the Two Main Camps: Directive vs. Participatory

Boulding's typology clarifies the two main camps of school approaches and theory—directive vs. participatory. It also solves the issues in the conflicting “either-or” perspectives of organization theory. Boulding's typology uncovers both the problems of, and the value of, the top-down governing bureaucratic assumptions.

The problems of clockwork assumptions of old paradigm models. The fundamental flaw of current old paradigm directive or bureaucratic models lies in the assumption of predictability and stability or “clockwork” assumptions. For example, it assumes that the principal controls the teachers and the teacher controls the students. The directive model does not distinguish between processes that Boulding calls clockwork (predictable) and nonclockwork (variable, intangible). Our current educational reform efforts are based on, or maintain traces of, these unexamined assumptions. For example, in the new paradigm term “cooperative learning,” “cooperative” means operating jointly, but the more common meaning of cooperative is *obedient* (an old paradigm virtue).

The value of clockwork assumptions. While the clockwork assumptions underlying bureaucratic systems are known to be inadequate, Boulding remarks that “much valuable information and insights can be obtained by applying low-level systems [frameworks, clockworks] to high-level subject matter [humans, social, and transcendental systems]” (Scott, 1992, p. 78). The reason for this is that each of Boulding's system levels incorporates all those below it.

Thus, proponents of the new paradigm (e.g., decentralization and self-regulation) who ignore the need for framework and clockwork subsystems are also short-sighted. The fully-specified new paradigm must subsume characteristics of the old; it must be joint-optimizing for both stability and flexibility. More specifically, Boulding's model distinguishes between subsystems of external and internal agency to explain what can be predicted or externally designed and controlled, and what is controlled by internal agency or criteria (i.e., individual human choices).

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Boulding’s explanation of the problems (inadequacies) and value (suitabilities) of the top-down governing model was clarifying and unifying to me. The old question for organizational change theorists and practitioners was: “Which is correct? top-down/directive or laissez-faire/participatory?” There are the two main camps, but, of course, many theorists and practitioners (especially systems theorists) know that both directive and participatory components are needed. Boulding’s model transcends the old question and clarifies the new question: “Which *parts* of an organization need top-down control, and which *parts* need bottom-up flexibility?”

THE TPO MODEL: THINGS, PEOPLE AND OUTCOMES

Figure 5 is an illustration of my journey to the TPO model. In 1980, I began my journey as a classroom teacher turned detective when I saw a “Warning: Teacher Burnout!” poster in the teachers’ workroom. I determined that $9 + 1 = 8$ in most educational reform efforts, and I wondered why. What were the laws behind these predictable outcomes?

In 1992, I found my answers in Boulding’s nine systems and system levels. His model explained that people in schools and organizations behave according to their own needs, abilities, perceptions, and choices (levels 4-7). In 1997, I published my elaboration of Boulding’s model (Gabriele, 1997) illustrating his distinctions between components.

In 2007, I joined a local writing group. At each session, I wrote or rewrote a section of my article intending it for a popular audience. At this time, I discovered a good, simple way to categorize the three key parts: *things, people, outcomes* (Right in Figure 5).

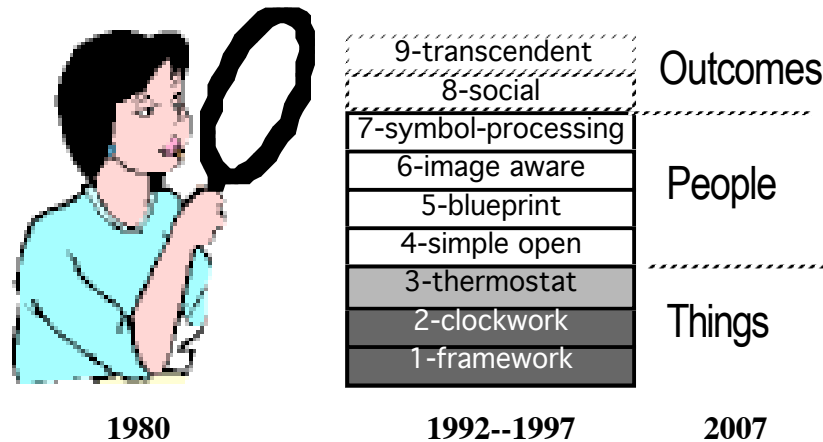


Figure 5. My Journey to the TPO Model

Things, people, and outcomes are the three key parts of a social system because they each have very different properties. They each behave according to different laws and principles. Understanding the characteristics of each of these key parts, and designing around this understanding, is the value of the TPO model.

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Things

Things of a school can be predicted, designed, regulated to exteriorly prescribed criteria/goals-- in other words—the agent is an architect, builder, publisher, superintendent, principal, teacher, and others. In the TPO model, three kinds of things are:

- (1)-**Frameworks or static structures** (e.g., buildings, rooms, chalkboards, bookshelves, wall charts, equipment, TVs, computers, books, supplies, paper, pencils, pens, etc.)
- (2)-**Clockwork procedures and systems** are composed of frameworks plus clockworks (calendars, schedules, classroom and school opening & closing routines and procedures--hourly, daily, weekly, monthly, yearly and holiday or other special times). Some examples of clockwork procedures follow. That is, systems are ON or OFF by clockwork. The school year is in session (ON) September through June; School is OFF July and August. School is in session from 8-3. Faculty meetings are Tuesday from 3-4:00. Period One is from 8-8:55 every day. In Period One, students have a review activity from 8-8:10. The teacher introduces a new lesson from 8:10 to 8:30. Students work on activities coming out of the lesson in small groups or teams from 8:30 to 8:55. Tests are Friday.
- (3)-**Control Systems or Thermostat-like procedures, processes, or systems** (composed of frameworks, clockworks and thermostat-like systems) are self-regulating to exteriorly prescribed criteria/goals. The thermostat pictured in Figure 6 illustrates the parts and functions of a control system.

First, there are the parts that are designable and controllable.

- ❖ **The Goal.** The system's goal is set by an outside agent. In this case, the teacher has set the desired room temperature at 68 degrees.
- ❖ **The System Modes.** The teacher can choose among various system modes: the gray circles along the bottom of the thermostat.
 - **OFF:** The system is OFF and does not respond to the 68 degrees set by the teacher
 - **ON: manual:** The system is ON but does not respond to the goal set by the teacher. The room gets hotter and hotter, if the windows and doors are closed.

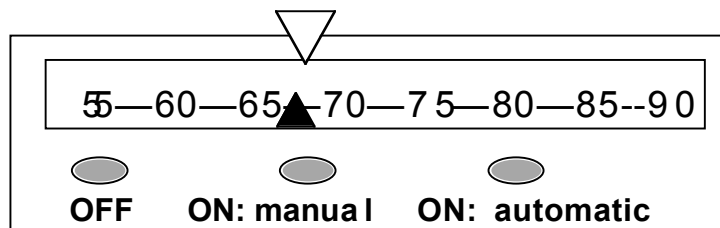


Figure 6. A Thermostat and Its Settings

Second, there are the parts that are self-regulating to exteriorly prescribed criteria.

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- ❖ **ON: automatic.** The system self-regulates to outside information, the selected goal. In Figure 6, the larger white triangle on top is a goal set by the teacher/manager: 68 degrees. The smaller black triangle is reflecting that the temperature of the room is about 67 degrees. The heater has turned itself turned off and will stay off until the temperature falls below the range (perhaps 65 degrees). When the heater turns on again, it will stay on until the room is 70 degrees, and then it will turn off again.
- ❖ **The Sensor.** The black triangle in Figure 6 represents the sensor. The teacher has no control of this. It was designed by the engineer to sense (in this case) room temperature.

Things, and the three kinds of things--frameworks or static structures; clockworks; and thermostat-like processes or systems-- are pictured in Figure 7A as the first of the three parts of a social system.

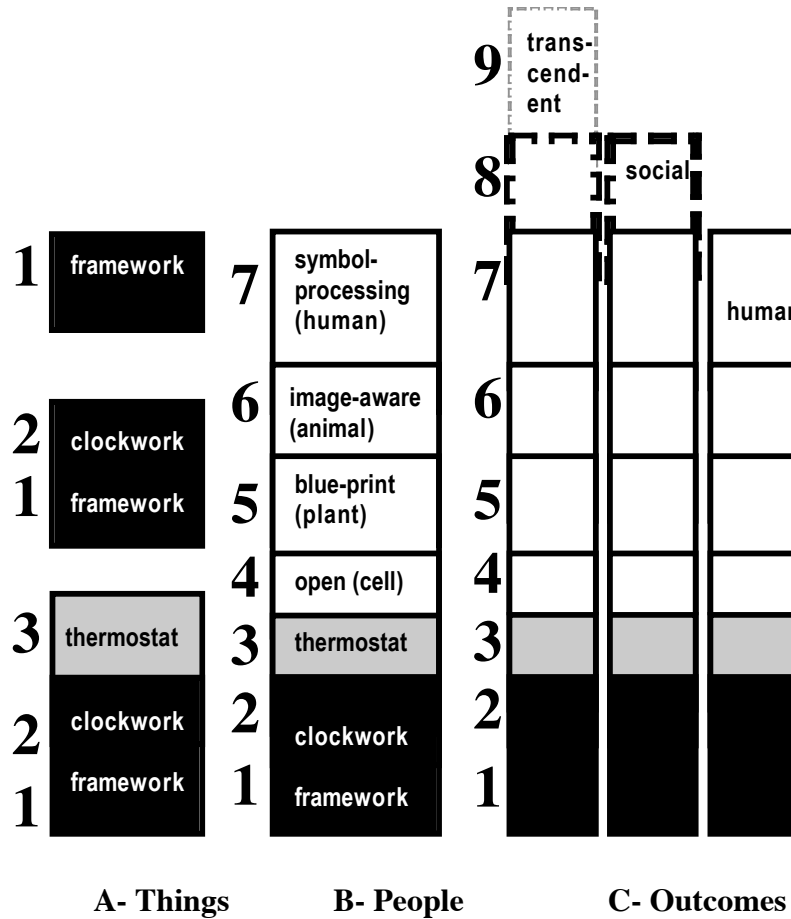


Figure 7. TPO Illustrated with Boulding's Levels

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People

People in a school are not designable by an outside agent (teacher, principal, etc.). They are (level 4) self-regulating to interiorly prescribed criteria/goals. Their behavior is generally predictable as acting to meet their own individual goals/needs: for survival, safety, belonging, achievement, self-actualization and transcendence (Maslow in Valle, 1989). Predictability decreases because of human differences: (level 5) genetic diversity; (level 6) people's immediate here-and-now perceptions through the five senses from among competing stimuli; and; (level 7) their long-term perceptions, reflections, and choices (contemplating the past, present, and future). Thus, the variety in people's behavior is almost limitless. People, as the second of the three key parts of a social system, are pictured in Figure 7B.

Of course, people also are composed of frameworks, clockworks and thermostat levels. Because of their level 1-3 systems (e.g., their bodies, organs, circulatory and respiratory systems), their behavior is generally predictable; they will act to meet their own self-perceived needs and goals. The thermostat (level 3) is a key function in higher-level systems. For example, relating only to Maslow's hierarchy of needs, people have six thermostats that are self-regulating: for survival, safety, relationship, achievement, self-actualization, and transcendence. When the more basic needs are not being met (survival, safety, relationship) people have to use their energy to meet them and they have little energy for higher goals (achievement, self-actualization, and transcendence).

Outcomes

Outcomes are the third key part of a social system. Three types of outcomes for social systems are illustrated in Figure 7C: Social systems are transcending, average, or declining. These three types are oversimplified, but they provide new insights into social system behavior, desired and undesired outcomes, and what should count as evidence.

Transcending. Figure 7C left indicates transcending. People in the organization or school are getting their needs and goals met so easily that there is considerable evidence of social and transcendental function. The organization is carefully designed so that all of its members can meet their needs and goals at their own rates. People meet their own goals and transcend them to new goals.

Average. Figure 7C center indicates average. People in the organization or school are getting some of their needs and goals met so that there is some evidence of social function.

Declining. Figure 7C right indicates declining. Most people in the organization or school are not getting their individual needs and goals met, so there is little evidence of social function. People at the bottom of the hierarchy are in the survival mode. People at the top of the hierarchy are working towards level 7 personal goals (wealth, promotions), rather than level 8 organization goals.

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A close up of these three general types of outcomes is in Figure 8. As stated above, these three types are an oversimplification. On one hand, instead of three types, this way of looking at schools or social systems might yield a continuum with schools ranging from transcending to declining (two headed arrow in Figure 8). Moreover, outcomes in social systems are very complex and multifaceted. Some people (students, teachers, parents or others) may be very satisfied and transcending and others at the survival level. People's satisfaction also varies from year to year, day to day, from hour to hour. Even given this complexity, these three types of outcomes inspired by Boulding are a useful and illuminating way to look at school outcomes. For a long time now, schools have been reported as functioning at the survival level in the descriptive educational literature. It is helpful to understand that many people in struggling schools, in the survival mode, downshift from level 8 (school goals) to level 7 (personal goals.)

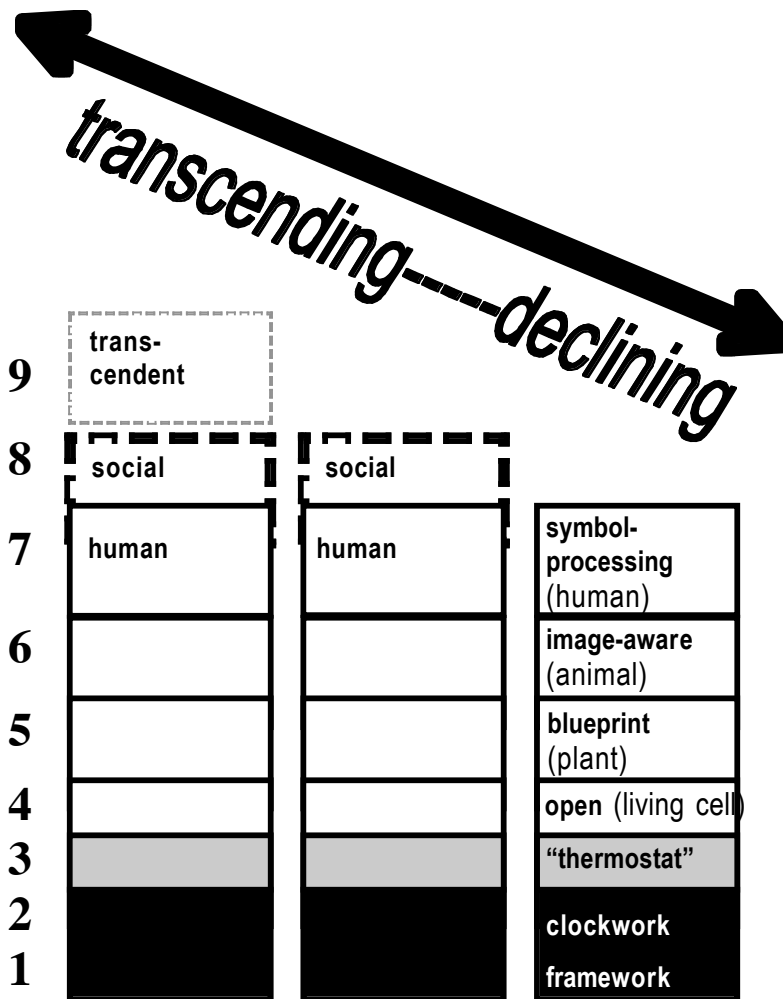


Figure 8. Three Types of Outcomes and a Continuum

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The TPO Model For Everyone

I created Figure 9 for all school decision makers with the idea that a picture is worth a thousand words. It is an illustration of the TPO theory—things, people, and outcomes -- as the three key parts of schools. The behavior of things (T) is designable, predictable, and/or controllable. The behavior of people (P) is not controllable. We can predict that people will behave according to their own goals, perceptions and abilities. Outcomes (O) depend on people’s behavior and are even less predictable. What is predictable about outcomes is the following: If social systems are designed or function in ways that satisfy their members, outcomes will be positive and the social system will flourish. On the other hand, if social systems are designed or function in ways that ignore the needs of their members, outcomes will be negative and the social system will deteriorate.

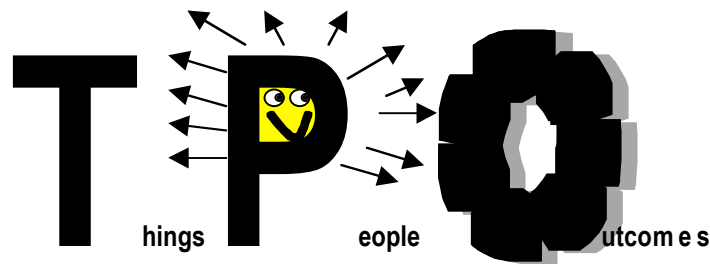


Figure 9. The TPO Model For Everyone

Since I wrote the article, in 1997, I have often made presentations at educational conferences. I showed my TPO powerpoint presentation to a friend of mine, a retired teacher. At first, she said that “things” was too general of a term. As I continued and elaborated Boulding’s concepts, she changed her mind. We talked about it and thought that I should not begin my presentation with the TPO model. **Things** seem too simple. I decided NOT to name this book TPO or things, people and outcomes. I am hoping, by now, readers are ready for these categories: things, people and outcomes. I am hoping that readers realize that these terms are not too simple, but elegant! I am defining elegant from wikipedia as “being unusually effective and simple.”

The TPO Model For Specialists and Theorists

Education Theory. With regard to education theory, I thought it was interesting and significant that McREL (McREL.org), a well respected nonprofit educational organization, categorizes the three major facets of schools in a similar way (2008). Their domains are the Technical, Personal and Organizational, an organizer chosen from work by educational scholars Cordell and Waters (1993). Their TPO approaches differ from the TPO model in this book in that they focus on the designable components of these three domains. Whereas, my use of the terms focuses on the different behavioral laws and principles of the three domains.

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Organizational Change Theory. With regard to organizational change theory, the three-part TPO model (technical goals, personal goals and organization goals) builds on and enhances organizational change theory: socio-technical theory, and critical systems theory.

- **Critical Systems Theory.** A key contribution of Critical Systems Theory is that it acknowledges that decision-makers’ viewpoints are not simply plural, they are sometimes coercive and conflicting. However, risks of critical systems practice are that focusing on the imbalance in power of the stakeholders increases polarity. The TPO model avoids this issue by showing how to distribute resources, rather than illuminating the unequal distribution of resources.
- **Socio-technical theory.** Socio-technical theory, in brief, recognizes the interaction between people and technology in workplaces. The TPO model has added a new valuable distinction. The “Socio” in socio-technical theory is now clarified by TPO to consist of two parts: personal and organizational goals. This is an important distinction because personal and organizational goals have very different appeals and behaviors (which is the heart of this book).

Table 2 provides another picture, summarizing and comparing three models. Top left is the name of the approach or model, top right are the parts of the model. Row 1 is the workplace model, Socio-Technical Systems. Row 2 is the educational model referred to in McREL. Row three is the model in this book, the TPO model for everyone.

Table 2. Comparing Three Models

| The Model | Parts of Each Model | | |
|--------------------------|---------------------|----------|----------------|
| 1- Socio-Technical | technical | social | |
| 2- TPO – for specialists | technical | personal | organizational |
| 3- TPO for everyone | things | people | outcomes |

IMPLICATIONS OF THE TPO MODEL

The major finding for hard facts and hard theory is this: *The principle, individual needs before organization needs, is not a question of ethics: It is a question of physics.* This is not a soft, new-age idea, it is a hard fact.

In other words, it is natural, biological, and scientific law that people will behave to meet their individual and personal needs (level 7: human) before their social system or organization’s needs (levels 8). Level 8 systems (social) are optional. Level 7 functioning is mandatory: a person can transfer workplaces (level 8), but cannot transfer bodies (level 7).

Therefore, effective educators and school designers put all their attention to things, the designable components of a social system: frameworks, clockworks, and thermostat-like

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systems (e.g., workplace goals and ratios and flows of resources). Effective designers fashion these designable components as attractors, to attract people in the system. Things are selected, arranged, distributed to maximize peoples access to them. People in the systems will use them at their own rates, for their own self-determined purposes. The These things/attractors function to allow students, parents and staff to meet individual/personal goals as first priority, and organization goals as second priority. As people meet their basic needs with a minimum of energy, they have energy to meet their organization's needs which result in desired outcomes. Goals of the TPO approach are termed here *systemic renewal*, or systemic change efforts designed to increase opportunities for each social system member to meet his/her own self-perceived goals at his/her own pace. The ISSS Morning RoundTable corresponds to the goals of systemic renewal and the TPO model.

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