Table of Contents

Go Back

Dynamics of Performance Measurement Systems in JTPA:

Exploring how learning processes and rule-following preferences influence changes in organizational rule systems.

Ignacio J. Martínez-Moyano [*a]
Doctoral Student
im7797@albany.edu

Gerald Marschke [b]
Assistant Professor
marschke@albany.edu

Rockefeller College
University at Albany
Milne Hall 101-A 135 Western Av. Albany, NY 12222, USA
Tel: (518) 442 5257 Fax: (518) 442 5298

Abstract

We created a model of how systems of rules in organizations are used and, over time, changed by learning processes and rule-following preferences of their actors. The paper uses the case of performance measurement systems of the Job Training Partnership Act (JTPA) using a system dynamics model to create simulated experiments to study information about enrollment and termination processes, changes in performance measures, and changes in performance measurement systems. In our model, the principal defines the system that the agent learns how to game over time. The mutual learning (agent's learning about the rules and about the game and the principal's learning about the agents' learning) generates pressures to change the system and modify the existing rules. We present implications of the model results.

Keywords: Performance Incentive, Performance Measurement, Gaming, Rules, Rule Dynamics, Learning, Organizational Learning, System Dynamics

[*] Corresponding author
[a] Ignacio J. Martínez-Moyano is a doctoral student at the Rockefeller College at the University at Albany. His current research focuses on the dynamics of rules in organizations and on discovering the underlying structures that condition the creation, modification, and death of rules and best practices.
[b] Gerald Marschke is an assistant professor of public administration and policy at the Rockefeller College at the University at Albany. His work specializes in: Labor Economics, Organizational Economics, and Technology Policy.

"All human social action is interaction—with others, ourselves, our natural and created physical world—within culturally defined contexts that largely determine, not only action, but its meaning."

Barbara Frankel in 'Metatheory in Social Science' (1986, p. 360)

"…objective understanding is an illusion created by 'inter-subjective agreement' on what is objectivity…"
(Fernandez-Armesto, 1997)

Contents

1. Introduction

The Job Training Partnership Act—JTPA—of 1982 created, what is now, one of the largest federal employment and training programs in the country (Courty and Marschke, 2002). JTPA has a budget of nearly $4.0 billion dollars and serves a constituency of almost one million people annually (for details of the numbers presented see Courty and Marschke, 2002, page 5 footnote 3). JTPA is a program that is (1) highly decentralized, (2) in which training agencies have significant decision discretion, and (3) the Federal government uses a financially backed performance incentive system with them.

The original titles of the JTPA legislation established four different programs. Title IIB authorized a summer youth program, Title III funded a program for dislocated workers, and Title IV governed various federally administered programs. Title IIA authorized the largest of these programs to serve "economically disadvantaged" youth and adults, accounting for the majority of JTPA client enrollments and training expenditures. In the early 1990s, Title IIA was split, however, and a new Title IIC was created specifically for economically disadvantaged youth, while IIA was re-authorized to serve adults only.

Congress intended JTPA activities to influence participants' human capital by transforming them into more capable and efficient workers. The agency graduates enrollees as part of their normal process. An enrollee that has finalized the training, under ideal circumstances, would be 'graduated' and reported to the state. However, because the graduation date is the date the training agency officially closes an enrollee's case and removes him from its rolls, that date has a possible impact on the agency performance evaluation. Thus, agencies tend to report graduation dates differently than the actual date in which the enrollees finished training.

Courty and Marschke (1997) have argued, by means of analysis of empirical evidence, that training agencies time graduation dates to maximize their financial awards over time. They argue that, "because labor market outcomes vary over time naturally on their own, training agencies have an incentive to choose the date they report enrollees' employment outcomes strategically (2002, p. 10)."

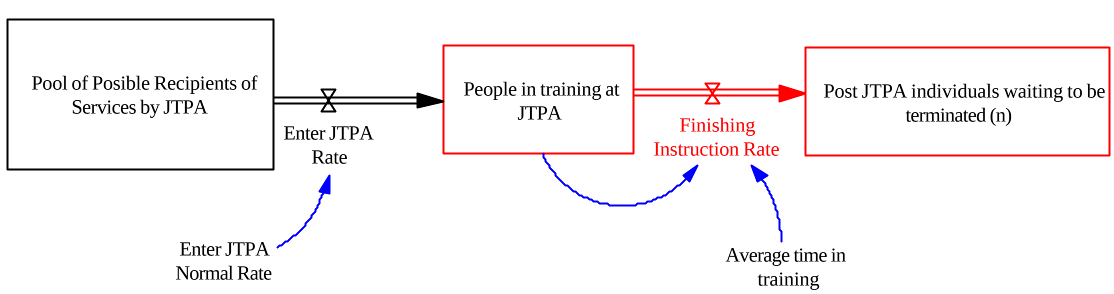
What seems to be happening is that, because agencies have discretionary power with respect to graduation dates[1], the agency decides how many 'heads' from its inventory to graduate the present year and how many to carry over for next year.

In this paper, I will investigate JTPA's graduating date behavior over time using a dynamic approach. I will use the system dynamics modeling method to build a dynamic mathematical model that can help me understand better the performance phenomenon.

2. The Model

2.1. The Context of the Model Used

The model developed captures the dynamics of JTPA (Job Training Partnership Act) enrollment and termination and the implications of different individual characteristics on the observed behavior. To do this, we chose to model the behavior of JTPA dynamics based on the work of Courty and Marschke (1997; 2002) on government performance and gaming responses to incentives. The basic structure used is shown in Figure 1. Three stocks are present in an aging-chain arrangement where the first stock is the inventory of all possible recipients of services by JTPA and does not have dynamics implications in the model. The stock is used in the model as a way to remember that the pool of recipients is very large, but might be affected by some interaction effect with the other accumulations of the model.



---

[1] Provided that they do not exceed a 90 days constraint imposed by the federal government.

Figure 1—The Basic Stock—and—Flow Representation of JTPA Dynamics

2.2. The Method

The model was developed using a system-dynamics modeling method. System-dynamics modeling provides a way to explore feedback-rich systems in which the nature of the relationships among the elements creates circular causality. System dynamics allows the researcher to investigate the effect of changes in one variable on other variables over time. System dynamics is a computer-aided approach to policy analysis and design that applies to dynamic problems arising in complex social, managerial, economic, or ecological systems (Richardson, 1996). Dynamic systems are characterized by interdependence, mutual interaction, information feedback, and circular causality. Judgment tasks, which evolve over time, can be characterized as dynamic systems and therefore can be explored using system dynamics.

The main purpose of system dynamics is to try to discover the 'structure' that conditions the observed behavior of system over time. System dynamicists try to pose 'dynamic' hypotheses that *endogenously* describe the observed behavior of systems. The 'endogenous' view is critical to system dynamics modeling allowing the existence of feedback rich explanations for certain types of phenomenon. System dynamics is fundamentally interdisciplinary and is grounded in the theory of nonlinear dynamics and feedback control developed in mathematics, physics, and engineering (Sterman, 2000, pp. 4-5). Mathematically, the basic structure of a system dynamics model is a system of coupled, nonlinear, first-order differential (or integral) equations (Richardson, 1996, p. 657) that can be written in the form:

$$\frac{dx}{dt} = \dot{x}(t) = f[x(t), u(t)]\,;\ x(t_0) \text{ Given}$$

Where:

$x(t) = n^{th}$ Order vector of system states (or levels)

$u(t) =$ Vector of exogenous inputs

$x(t_0) =$ Initial value for state vector at $t = t_0$

$f(\_) =$ Nonlinear vector function

$\frac{dx}{dt} = \dot{x}(t) =$ Time derivative of the state vector

2.3. The Hypothesis

The hypothesis of this work is that JTPA dynamics, as presented by Courty and Marschke (1997, see figure 1 in page 385), can be understood using an endogenous view based on the structure of the incentive system and the response of the individuals to it (see Figure 2). The hypothesis says that observed behavior influences the incentive system, which in turn influences the responses of the individuals being motivated causing changes in the observed behavior and more changes in the incentive system.

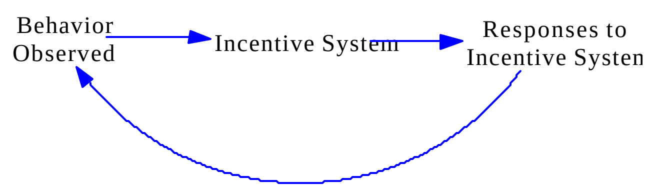


Figure 2—Basic Feedback loop

2.4. The Structure of the System Dynamics Model

In the conceptualization and formulation phases of the system-dynamics modeling method, correspondence to the concepts in the literature was pursued. In general, while using the system dynamics modeling approach, structural coherence is developed. Structural correspondence was achieved by relating the constructs of the literature to mathematical formulation of the interrelationships.

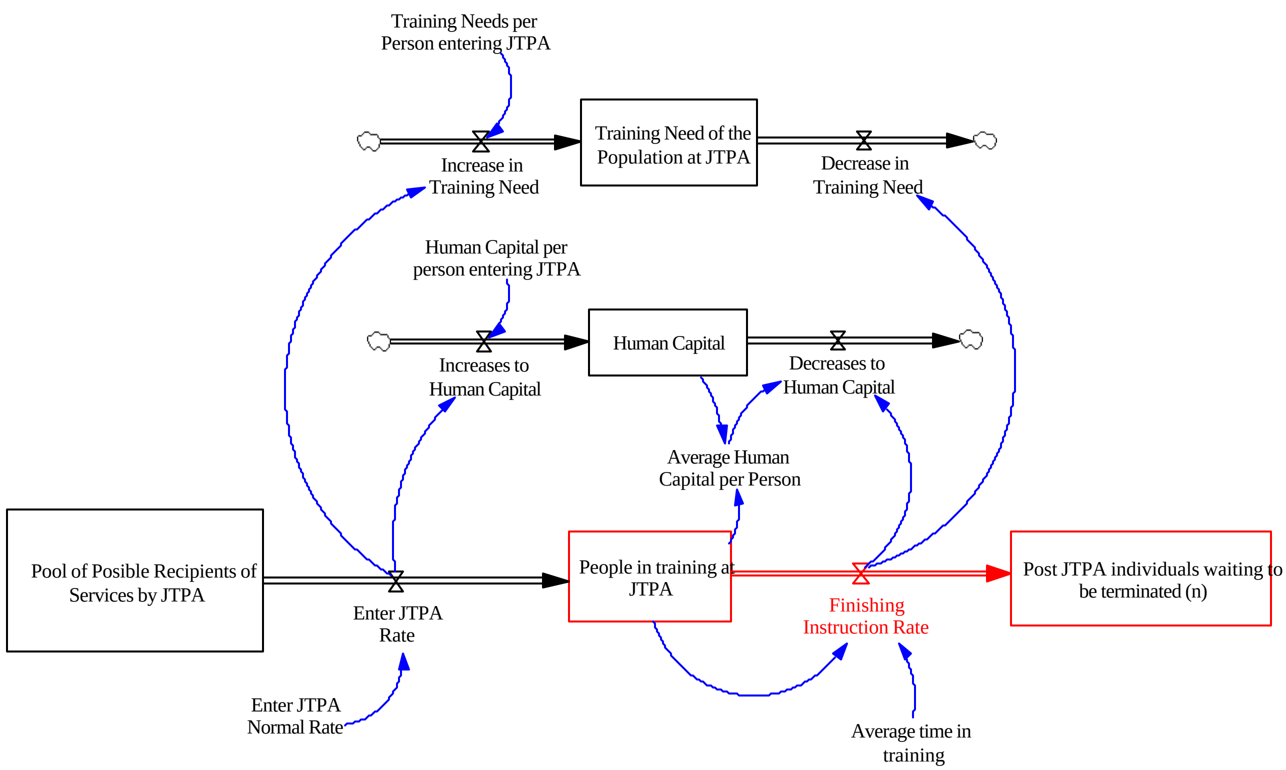


Figure 3—JTPA Internal Flows and Co-Flows

In general, correspondence theory focuses on empirical accuracy, while coherence theory focuses on internal consistency (for a detailed explanation of the concepts of coherence and correspondance see Hammond, McClelland and Mumpower, 1980; Hammond, 1996). Generating behavioral correspondence with the observed patterns of behavior is one of the goals of the modeling effort, however, numerical correspondence is not intended at this phase of the modeling process.

Figure 3 shows JTPA's internal flows and co-flows. This part of the structure captures the interrelations that the stock of *Human Capital* and the stock of *Training Needs of the Population* have with the stock of *people in training* and to the stock of post JTPA individuals. *Human Capital* and *Training Needs* are modeled as co-flows of *People in Training* because it can be seen as a characteristic of each individual that 'passes' through the JTPA system. Each individual who passes through the JTPA system would have certain *training needs* and *human capital* that would change over time because of the influence of the training programs.

The termination process (shown in Figure 4) is captured in the model as follows. *Post JTPA individuals waiting to be terminated (n)* represent the stock of all individuals ready to be terminated from the program because they have finished their training. There are three possible ways to be terminated (or moved) from that stock. The first way is by acquiring a job through the *termination by employment rate* which is a function of the *average time to become employed*. The *average time to become employed* depends on the actual *time to become employed* and the *average human capital per person* (see Appendix 1 for all equations of the model). The average human capital per person is a measure of the capacity of the individual; it modifies the average time to become employed. If the individuals are 'better' on average, *the time to become employed* is modified, allowing more people to leave the *waiting to be terminated* stock by means of employment. The second way to leave the *waiting* stock is through *termination rate* that moves individuals to the *Not Employed Terminated Individuals (Nu)* stock. This stock accumulates individuals that are terminated because their 90-day idle period has expired and they have not yet become employed. The last way to leave the waiting stock is through the *end of the year termination rate,* that according to the *graduating rule*, moves individuals out of the *waiting* stock into the *Not Employed Stock*.

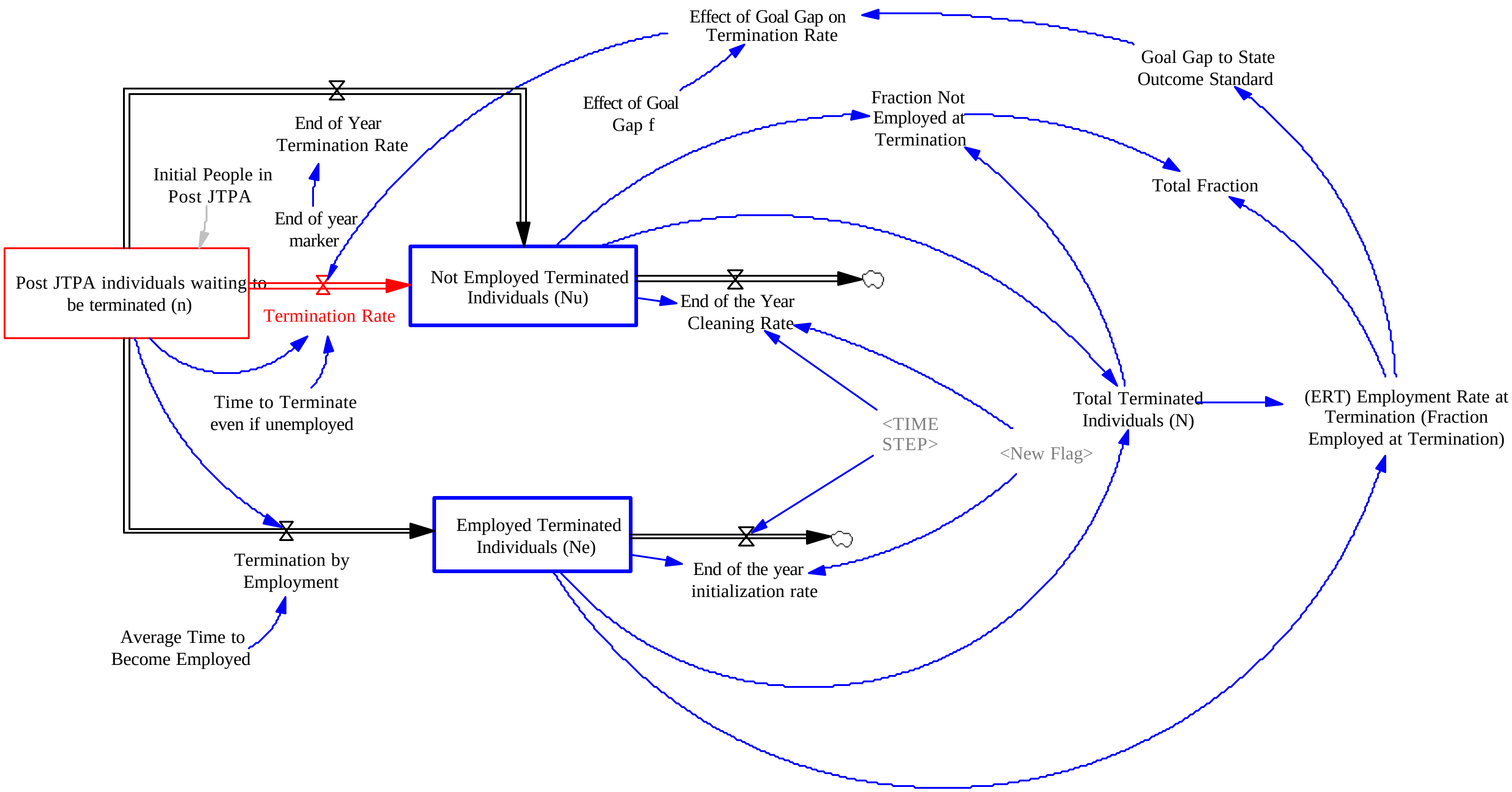


Figure 4—Termination and Accomplishment Computation

JTPA's graduating rule is a key decision rule to get the observed behavior. As shown in Figure 5, *graduating rule* is influenced by several variables to be able to address the three modes of termination explained in the work of Courty and Marschke (2002). Equation (1) shows the complete formulation for the graduation rule.

"Graduating Rule (n1)"=IF THEN ELSE(Goal Gap to State Outcome Standard>=0, "Post JTPA individuals waiting to be terminated (n)",IF THEN ELSE(("Employed Terminated Individuals (Ne)"/("Total Terminated Individuals (N)" +"Post JTPA individuals waiting to be terminated (n)"))>="State Outcome Standard (S)", "Post JTPA individuals waiting to be terminated (n)", ("Employed Terminated Individuals (Ne)"/"State Outcome Standard (S)")-"Total Terminated Individuals (N)")) (1)

Units: people

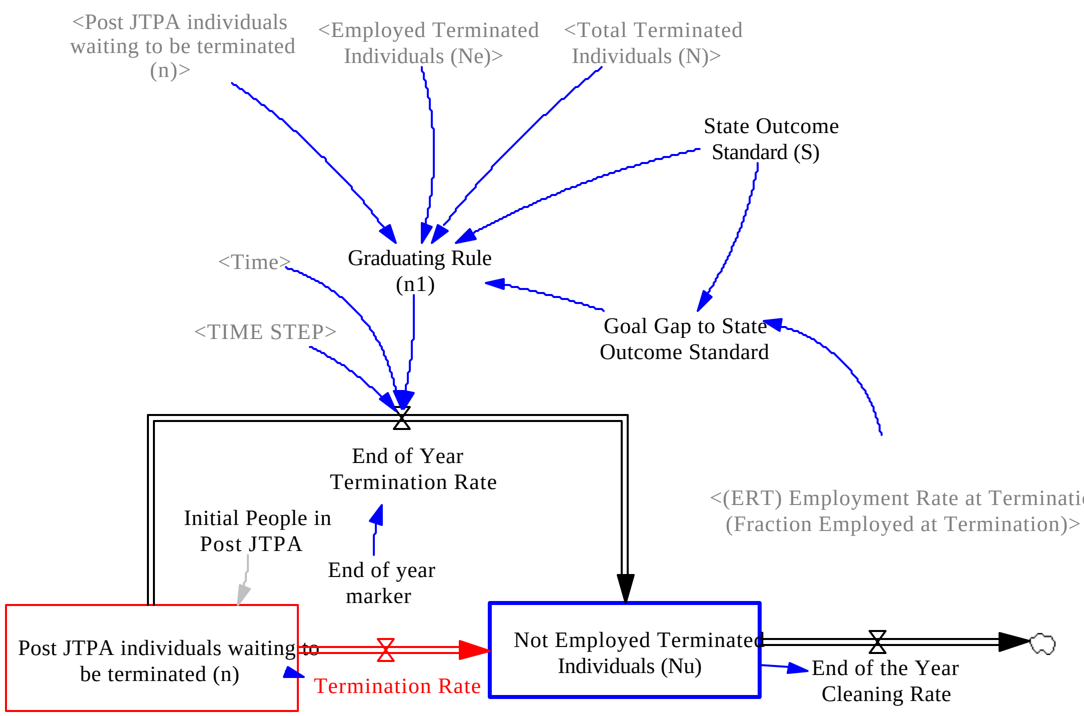


Figure 5—Graduating Rule

In the formulation of the *graduating rule* is the first time that information about the gap—*goal gap to state outcome standard*—that exists between actual performance and the state standard is feedback to the process. The use of that information as part of the decision rules that administrators of the centers utilize to make more 'efficient' use of their resources is crucial. Another important use of that information, that is not modeled here, is to influence the inflow of individuals to the system.

Time to Become Employed, *Profile of Individual entering JTPA services,* and *Enter JTPA rate* were modeled using stochastic processes to be more realistic. Figure 6 shows the structure used to generate Pink Noise variations for Time to Become employed, identical structures with different parameters were used for the other stochastic variables. Noise measures our ignorance about what elements influence the affected variable. Variations around the average values of a variable are usually modeled as some type of random process (see Appendix B in Sterman, 2000). Random number generators such as the normal function yield new values every time step and successive values are independent. The values generated by a normal function are said to be IDD (independently and identically distributed). However, the assumption of independence does not hold in the real world and therefore it is necessary to model noise as a process with inertia or realism, meaning that values depend in some fashion on history. Pink noise captures that dependence realism.

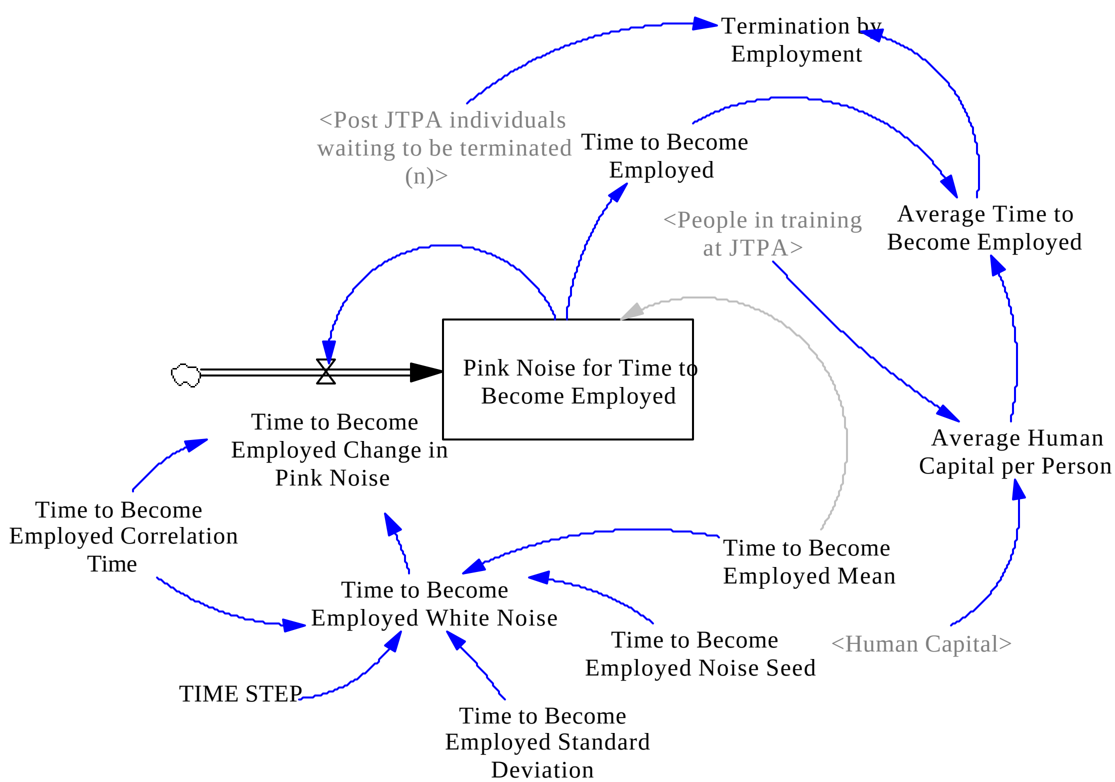


Figure 6—Termination by Employment Structure

Total termination rate is computed by adding the three ways out of the *waiting* stock, *termination rate*, *end of year termination rate*, and *termination by employment*.

Figure 7 shows the non-linear relationship that the *load on instruction capacity* has on the *average time in training* affecting the *finishing instruction rate*. The ‘normal’ length of training is 3.5 months. The assumption of this formulation is that when you have people in the system that require less training, the *load on the system* and the *average time in training* will decrease to a minimum of 1 month. If the requirements grow, pressuring the capacity, the average time con grow up to 12 months.

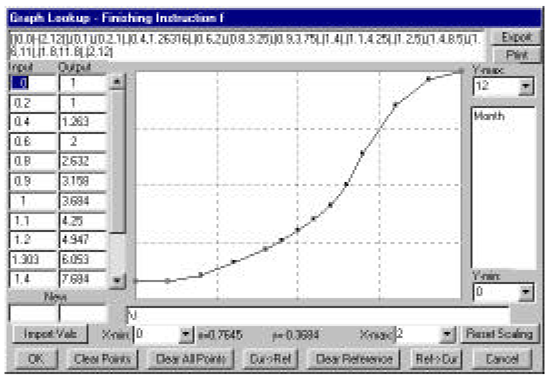


Figure 7—Profile Structure

2.5. The Different Types of Individuals Tested

Two different types of individuals were created to explore the impact that the ‘creaming effect’ would have on behavior. A ‘normal’ individual is simulated in the ‘current’ and ‘base’ runs, and a ‘better’ individual with less training needs is simulated in the ‘cream’ run. The only difference between the two is their entering profile. The ‘normal’ individual is formulated having a profile mean of **0** and a profile standard deviation of **0.25**. The ‘better’ individual has a profile mean of **–0.075** (7.5% below average on training needs) and a profile standard deviation of **0.125** (half the variation of the normal individual representing a more ‘compact’ group with respect to needs).

2.6. The Behavior

2.6.1. An Initial Run

An initial run was simulated using a constant—deterministic—entering rate of 250 individuals per month. The behavior observed is shown in Figures 8, 9, and 10.

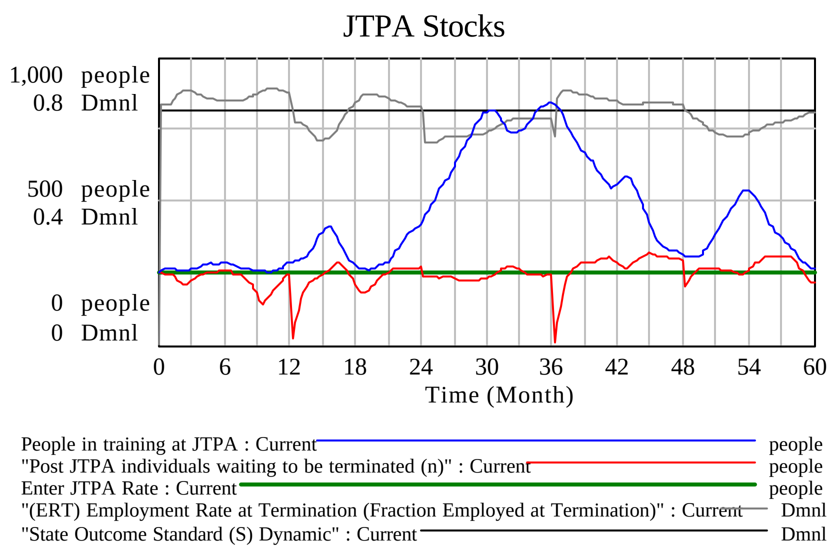
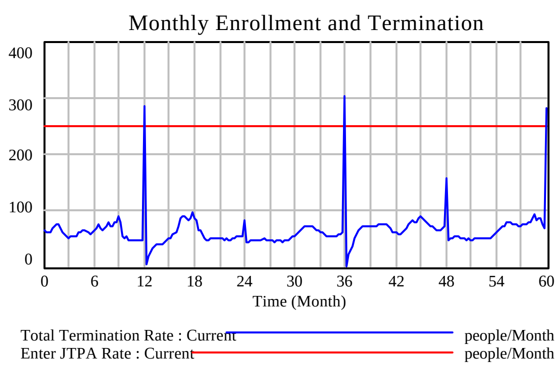


Figure 8—JTPA Stocks—Current Run



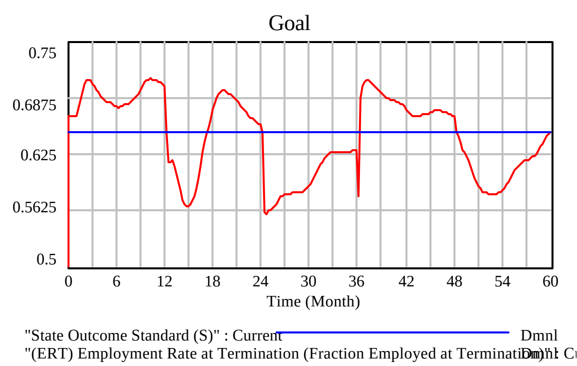


Figure 9—Termination and Enrollment

Figure 10—Goal and Performance—Current Run

As one can see, the behavioral outcome of the simulation is similar to the one reported by Courty and Marschke (1997) specially with respect to the total termination rate behavior (Figure 9).

2.6.2. The Base Run

The model simulates 60 months (5 years) of behavior with a time step of one week (dt=0.25). A second run was produced using stochastic entering rate (the average is still 250 individuals per month). Figures 11, 12, and 13 show the result of the simulation.

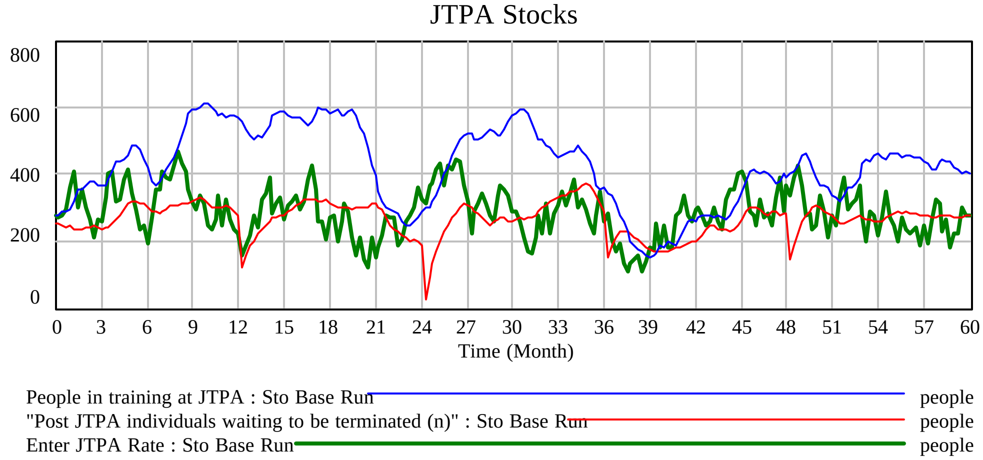


Figure 11—JTPA Stocks—Base Run

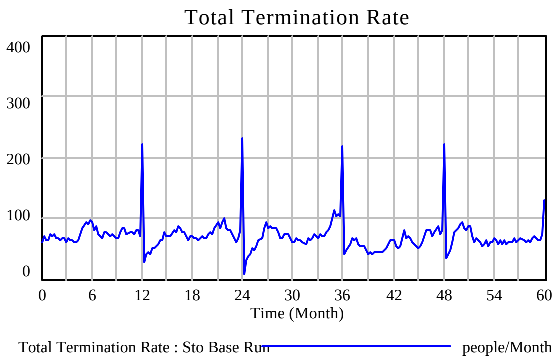


Figure 12—Total Termination Rate—Base Run

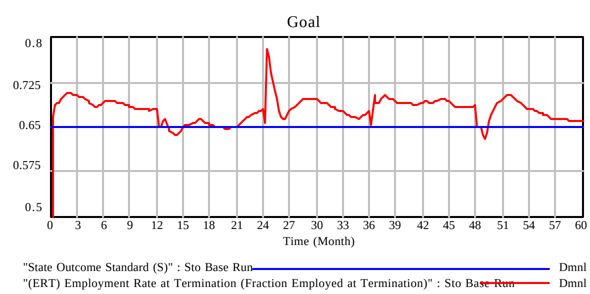


Figure 13—Goal Achievement—Base Run

In this 'base' run we can see that the behavior obtained is consistent with the report from Courty and Marschke (1997) and more 'realistic' with respect to the entering rate. The goal is now more consistently achieved by the use of the decision rule.

After the ‘base’ run was obtained, a ‘cream’ run was generated using the ‘better’ individual profile to capture the ‘creaming’ effect described by Courty and Marschke (1997; 2002). Again, the model simulates 60 months (5 years) of behavior with a time step of one week (dt=0.25). Figures 14, 15, and 16 show the result of the simulation.

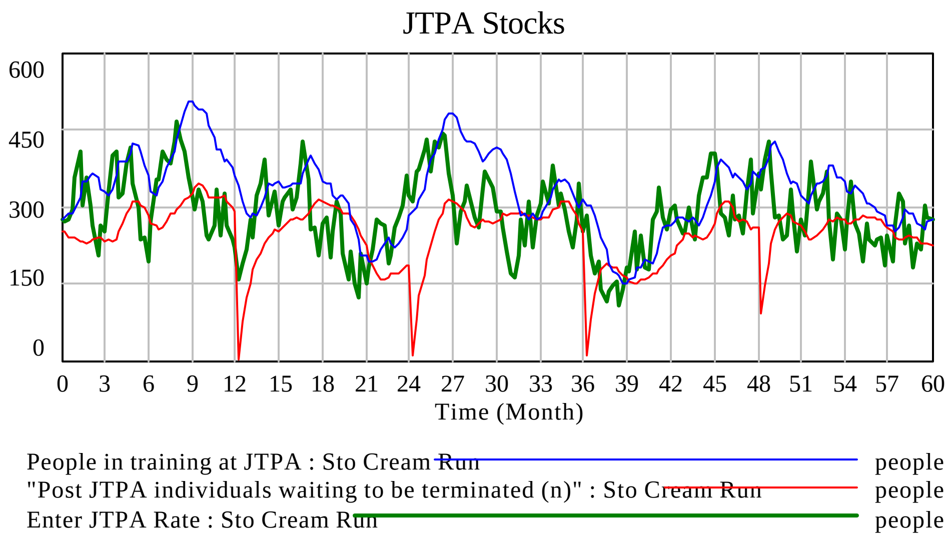
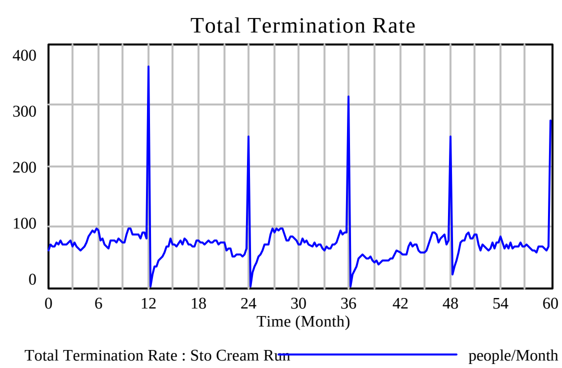


Figure 14—JTPA Stocks—Cream Run



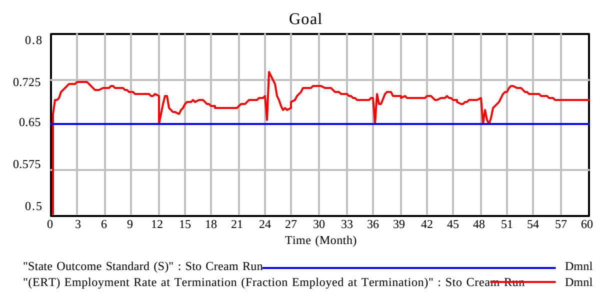


Figure 15—Total Termination Rate—Cream Run

Figure 16—Goal Achievement—Cream Run

In this new run, terminations are consistently higher in number and the goal is achieved more consistently through time. Figure 16 shows that the performance output in the case of the ‘cream’ run is never below the state standard (65%).

To see more clearly the differences generated by the different types of individuals going through the system, five graphs are presented. Figure 17 shows the difference in performance outcome crated by the ‘creaming’ effect. The ‘cream’ run is consistently above the ‘base’ run meaning that the outcome is consistently better. However, performance is measured only once a year decrementing the ‘real’ gain from ‘creaming’.

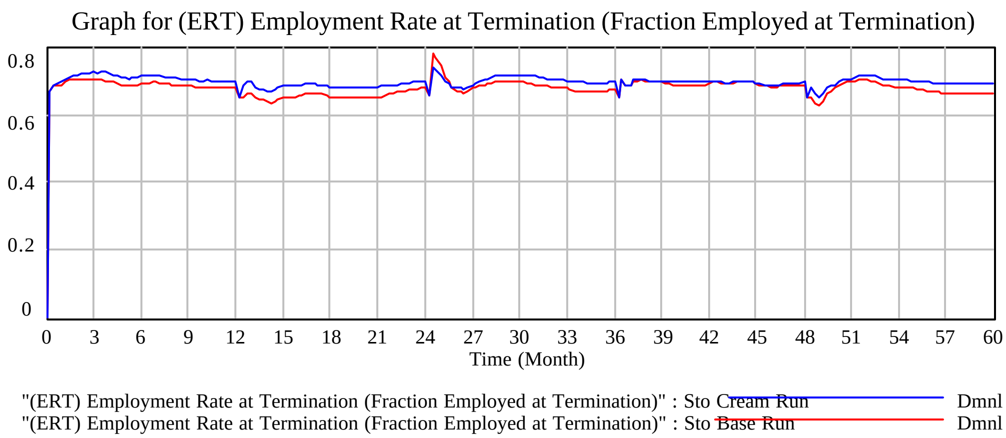
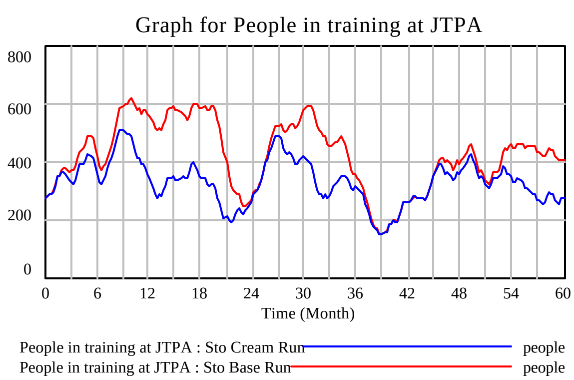


Figure 17—Goal Achievement—Comparative

Figures 18 and 19 show the differences in the volume of the inventories in the system. When ‘creaming’, on the average, people in training is less. In the case of Post-JTPA individuals is not as clear but it seems to be the case too. Statistical analysis of the numerical output of the simulation should be conducted to quantify the differences.



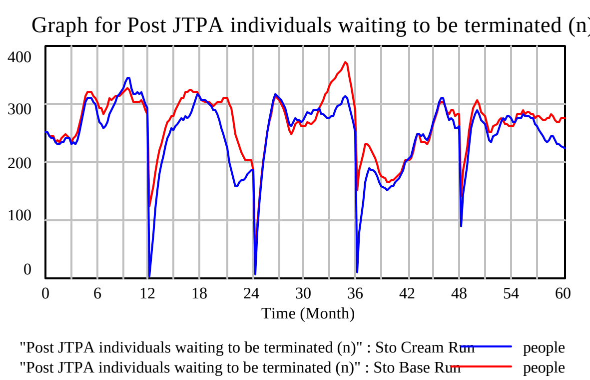


Figure 18—People in Training

Figure 19—Post JTPA individuals

Average Training Needs and *Average Time to become employed* (shown in Figures 20 and 21) are also affected by the 'creaming' effect. *Average training need per person* and *average time to become employed* are consistently lower in the 'cream' run. The differences should be statistically analyzed to explore further implications.

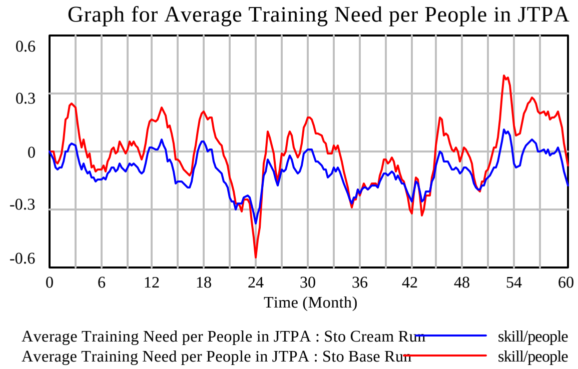


Figure 20—Average Training Need per People

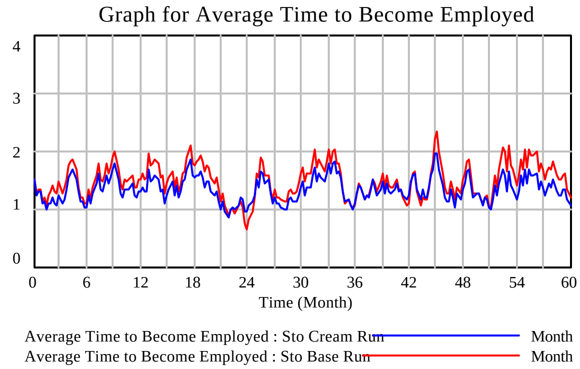
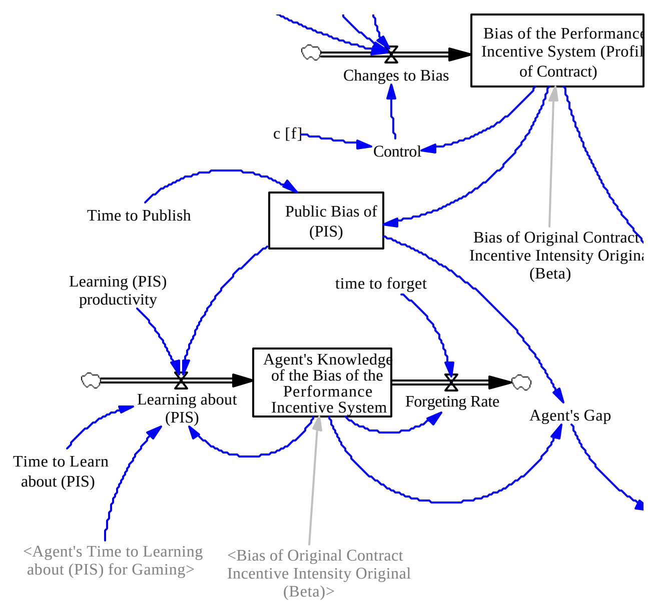


Figure 21—Average Time to Become Employed

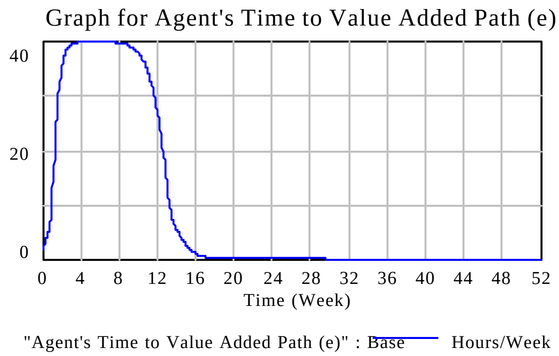
2.7. The Incorporation of Learning Mechanisms

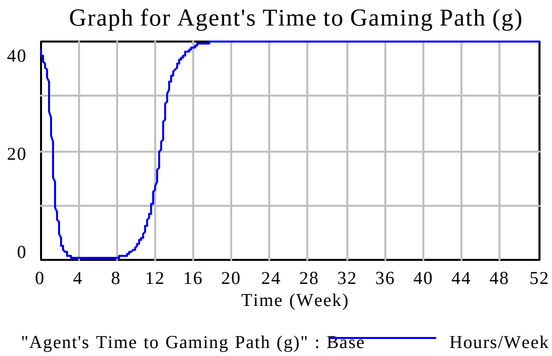
2.7.1. Additional Structure

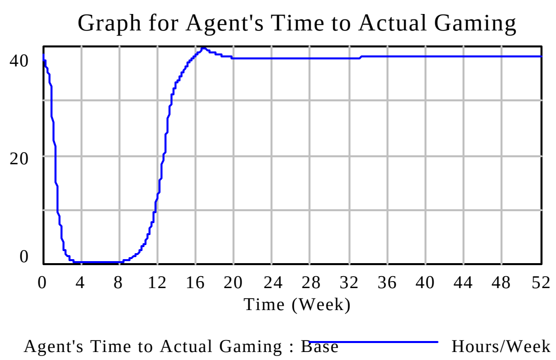


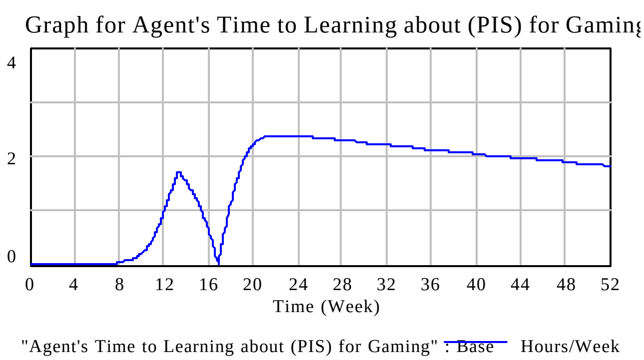
2.7.2. New Behavior

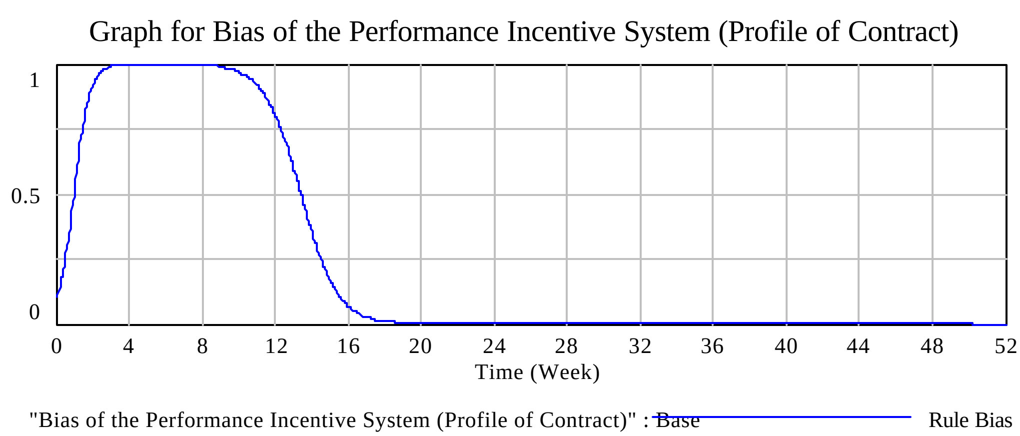
Agent’s simulated effort distribution.











3. Conclusions

This simulation experiment generated useful behavioral information about the dynamics of JTPA enrollment and termination, learning processes, selection of systems of rules, and impact of rule-following preferences. Insights obtained from the study include: (1) JTPA behavior can be explored using dynamic models that capture the dynamics over time. (2) Feedback effects from the gap between actual performance and the level of the state standard are crucial to determine the termination rate and the entering rate. (3) The 'creaming' effect should be studied further to analyze the possible impacts on system's overall performance. Finally, (4) exploring the possible consequences of different performance policies and decision rules can be done in an expedite way using system dynamics models.

4. Future Research

Possible future research lines in this exiting area are numerous. One very important is to get numerical correspondence to reality by grounding the model in JTPA generated data. Numerical correspondence—what Forrester calls replicating time series of the past—is not one of the most important validity tests in system dynamics modeling (see Forrester and Senge, 1980). However, in the eyes of people that confront the situation from a pragmatic standpoint, is a very powerful test of validity and to gain confidence in the model. The inclusion of feedback from the *goal gap* to *entering rate* should be considered.

5. References

Courty, Pascal and Gerald Marschke (1997). "Measuring Government Performance: Lessons from a Federal Job-Training Program." The American Economic Review **87**(2): 383-388.

Courty, Pascal and Gerald Marschke (2002). "An Empirical Investigation of Gaming Responses to Explicit Performance Incentives." Journal of Labor Economics **Forthcoming**.

Fernandez-Armesto, Felipe (1997). Truth: A History and a Guide for the Perplexed. New York, Thomas Dunnes Books.

Forrester, Jay Wright and Peter M. Senge (1980). Tests for Building Confidence in System Dynamics Models. System Dynamics. e. al. New York, North-Holland. **14:** 209-228.

Frankel, Barbara (1986). Two extremes on the Social Science Commitment Continuum. Metatheory in Social Science. R. A. Shweder. Chicago, The University of Chicago Press**:** 353-361.

Hammond, Keneth R. (1996). Human Judgment and Social Policy: Irreducible Uncertainty, Inevitable Error, Unavoidable Injustice. New York, Oxford University Press.

Hammond, Kenneth R., Gary H. McClelland and Jeryl Mumpower (1980). Human judgment and decision making : theories, methods, and procedures. New York, Praeger.

Richardson, George P. (1996). System Dynamics. Encyclopedia of Operations Research and Management Science. C. M. Harris. Boston, MA, Kluwer Academic Publishers**:** 656-660.

Sterman, John D. (2000). Business Dynamics: Systems Thinking and Modeling for a Complex World. Boston MA, Irwin McGraw-Hill.

6. Appendix 1

Model Equations

"(CE) Cost per Employment"=ZIDZ(Training year expenditures, "Employed Terminated Individuals (Ne)")
Units: dollars/people

"(ERT) Employment Rate at Termination (Fraction Employed at Termination)"=
ZIDZ("Employed Terminated Individuals (Ne)", "Total Terminated Individuals (N)")
Units: Dmnl

Average Human Capital per Person=Human Capital/People in training at JTPA
Units: skill/people

Average time in training=Finishing Instruction f(Load in JTPA instruction capacity Normalized)
Units: Month

Average Time to Become Employed=Time to Become Employed*(1+Average Human Capital per Person)
Units: Month

Average Training Need per People in JTPA=Training Need of the Population at JTPA/People in training at JTPA
Units: skill/people

Decrease in Training Need=Finishing Instruction Rate*Average Training Need per People in JTPA
Units: skill/Month

Decreases to Human Capital=Average Human Capital per Person*Finishing Instruction Rate
Units: skill/Month

Effect of Goal Gap f([(-1,0)-(1,1)],(-1,1),(0,1),(1,1))
Units: Dmnl

Effect of Goal Gap on Termination Rate=Effect of Goal Gap f(Goal Gap to State Outcome Standard)
Units: Dmnl

"Employed Terminated Individuals (Ne)"= INTEG (Termination by Employment-End of the year initialization rate, 0)
Units: people

End of the Year Cleaning Rate=IF THEN ELSE(New Flag=1, "Not Employed Terminated Individuals (Nu)"/TIME STEP, 0)
Units: people/Month

End of the year initialization rate=IF THEN ELSE(New Flag=1, "Employed Terminated Individuals (Ne)"/TIME STEP, 0)
Units: people/Month

End of year marker=12
Units: Month

End of Year Termination Rate=IF THEN ELSE(MODULO(Time, End of year marker)=0:AND:Time<>0, "Graduating Rule (n1)"/TIME STEP, 0)

Units: people/Month

Enter JTPA Normal Rate=275
Units: people/Month

Enter JTPA Rate=Enter JTPA Normal Rate*(1+Pink Noise for entering JTPA)
Units: people/Month

Entering JTPA Change in Pink Noise=(Entering JTPA White Noise-Pink Noise for entering JTPA)/Entering JTPA Correlation Time
Units: Dmnl

Entering JTPA Correlation Time=1
Units: Month

Entering JTPA Mean=0
Units: Dmnl

Entering JTPA Noise Seed=123456
Units: Dmnl

Entering JTPA Standard Deviation=0
Units: Dmnl

Entering JTPA White Noise=Entering JTPA Mean+Entering JTPA Standard Deviation*((24*Entering JTPA Correlation Time/TIME STEP)^0.5)*RANDOM UNIFORM (-0.5, 0.5, Entering JTPA Noise Seed)
Units: Dmnl

FINAL TIME = 60
Units: Month

Finishing Instruction f([(0,0)-(2,12)],(0,1),(0.2,1),(0.4,1.26316),(0.6,2),(0.8,2.63158),(0.9,3.15789
),(1,3.68421),(1.1,4.25),(1.2,4.94737),(1.30275,6.05263),(1.4,7.68421),(1.6,10.2105),(1.8,11.5789),(2,12))
Units: Month

Finishing Instruction Rate=People in training at JTPA/Average time in training
Units: people/Month

Flag=IF THEN ELSE(MODULO(Time, Time period to be out of incentive system)=0:AND:Time<>0, 1, 0)
Units: Month

Fraction Not Employed at Termination=ZIDZ("Not Employed Terminated Individuals (Nu)", "Total Terminated Individuals (N)")
Units: Dmnl

Fraction Terminated=ZIDZ(Total Termination Rate, "Last Total Terminated Individuals (N)")
Units: Dmnl

Goal Gap to State Outcome Standard="State Outcome Standard (S)"-"(ERT) Employment Rate at Termination (Fraction Employed at Termination)"
Units: Dmnl

"Graduating Rule (n1)"=IF THEN ELSE(Goal Gap to State Outcome Standard>=0, "Post JTPA individuals waiting to be terminated (n)",IF THEN ELSE(("Employed Terminated Individuals (Ne)"/("Total Terminated Individuals (N)"+"Post JTPA individuals waiting to be terminated (n)"

))>="State Outcome Standard (S)", "Post JTPA individuals waiting to be terminated (n)", ("Employed Terminated Individuals (Ne)"/"State Outcome Standard (S)")-"Total Terminated Individuals (N)"))
Units: people

Human Capital= INTEG (+Increases to Human Capital-Decreases to Human Capital, Initial Human Capital)
Units: skill

Human Capital per person entering JTPA=Human Capital per person Normal*Profile of Individual entering JTPA services
Units: skill/people

Human Capital per person Normal=1.33
Units: skill/people

Increase in Training Need=Enter JTPA Rate*Training Needs per Person entering JTPA
Units: skill/Month

Increases to Human Capital=Enter JTPA Rate*Human Capital per person entering JTPA
Units: skill/Month

Initial Human Capital=0
Units: skill

Initial JTPA instruction capacity=1000
Units: people

Initial number of People in JTPA=274.51
Units: people

Initial People in Post JTPA=250
Units: people

INITIAL TIME = 0
Units: Month

Initial Training Need=0
Units: skill

JTPA instruction capacity=Initial JTPA instruction capacity*(1+step(Size of the change in JTPA Capacity
, Time to Change JTPA Capacity))
Units: people

"Last Total Terminated Individuals (N)"=DELAY FIXED("Total Terminated Individuals (N)", TIME STEP, 0)
Units: people

Load in JTPA instruction capacity Normalized=(Load on JTPA instruction capacity/Load on JTPA instruction capacity Normal)*(1+Average Training Need per People in JTPA)
Units: Dmnl

Load on JTPA instruction capacity=People in training at JTPA/JTPA instruction capacity
Units: Dmnl

Load on JTPA instruction capacity Normal=1
Units: Dmnl

New Flag=DELAY FIXED(Flag, 0, 0)

Units: Month

"Not Employed Terminated Individuals (Nu)"= INTEG (+Termination Rate-End of the Year Cleaning Rate+End of Year Termination Rate, 0)
Units: people

People in training at JTPA= INTEG (Enter JTPA Rate-Finishing Instruction Rate,Initial number of People in JTPA)
Units: people

Pink Noise for entering JTPA= INTEG (Entering JTPA Change in Pink Noise,Entering JTPA Mean)
Units: Dmnl

Pink Noise for profile entering JTPA= INTEG (Profile Entering JTPA Change in Pink Noise,Profile Entering JTPA Mean)
Units: Dmnl

Pink Noise for Time to Become Emp loyed= INTEG (Time to Become Employed Change in Pink Noise,Time to Become Employed Mean)
Units: Dmnl

Pool of Posible Recipients of Services by JTPA= INTEG (-Enter JTPA Rate, 100000)
Units: people

"Post JTPA individuals waiting to be terminated (n)"= INTEG (Finishing Instruction Rate-Termination Rate-Termination by Employment-End of Year Termination Rate, Initial People in Post JTPA)
Units: people

Profile Entering JTPA Change in Pink Noise=(Profile Entering JTPA White Noise-Pink Noise for profile entering JTPA)/Profile Entering JTPA Correlation Time
Units: Dmnl/Month

Profile Entering JTPA Correlation Time=1
Units: Month

Profile Entering JTPA Mean=0
Units: Dmnl

Profile Entering JTPA Noise Seed=123456
Units: Dmnl

Profile Entering JTPA Standard Deviation=0
Units: Dmnl

Profile Entering JTPA White Noise=Profile Entering JTPA Mean+Profile Entering JTPA Standard Deviation*((24*Profile Entering JTPA Correlation Time/TIME STEP)^0.5)*RANDOM UNIFORM (-0.5, 0.5, Profile Entering JTPA Noise Seed)
Units: Dmnl

Profile of Individual entering JTPA services=Pink Noise for profile entering JTPA
Units: Dmnl

SAVEPER = TIME STEP
Units: Month [0,?]

Size of the change in JTPA Capacity=0
Units: Dmnl

"State Outcome Standard (S)"=0.65
Units: Dmnl

"State Outcome Standard (S) Dynamic"="State Outcome Standard (S)"
Units: Dmnl

Termination by Employment=ABS(ZIDZ("Post JTPA individuals waiting to be terminated (n)", Average Time to Become Employed))
Units: people/Month

Termination Rate=(("Post JTPA individuals waiting to be terminated (n)"/Time to Terminate even if unemployed)*Effect of Goal Gap on Termination Rate)
Units: people/Month

Time period to be out of incentive system=12
Units: Month

TIME STEP = 0.25
Units: Month [0,?]

TIME STEP 0 = 0.25
Units: Month

TIME STEP 1 = 0.25
Units: Month

Time to Become Employed=Pink Noise for Time to Become Employed
Units: Month

Time to Become Employed Change in Pink Noise=(Time to Become Employed White Noise-Pink Noise for Time to Become Employed)/Time to Become Employed Correlation Time
Units: Dmnl/Month

Time to Become Employed Correlation Time=1
Units: Month

Time to Become Employed Mean=1.5
Units: Dmnl

Time to Become Employed Noise Seed=123456
Units: Dmnl

Time to Become Employed Standard Deviation=0.2
Units: Dmnl

Time to Become Employed White Noise=
Time to Become Employed Mean+Time to Become Employed Standard Deviation*((
24*Time to Become Employed Correlation Time/TIME STEP)^0.5)*RANDOM UNIFORM(
-0.5, 0.5, Time to Become Employed Noise Seed)
Units: Month

Time to Change JTPA Capacity=6
Units: Month

Time to Terminate even if unemployed=3

Units: Month

Total Fraction="(ERT) Employment Rate at Termination (Fraction Employed at Termination)"+
Fraction Not Employed at Termination
Units: Dmnl

"Total Terminated Individuals (N)"="Employed Terminated Individuals (Ne)"+"Not Employed Terminated Individuals (Nu)"
Units: people

Total Termination Rate=(End of Year Termination Rate+Termination Rate+Termination by Employment)*
TIME STEP
Units: people

Training Need of the Population at JTPA= INTEG (+Increase in Training Need-Decrease in Training Need, Initial Training Need)
Units: skill

Training Needs per Person entering JTPA=Training Needs per person Normal*Profile of Individual entering JTPA services
Units: skill/people

Training Needs per person Normal=1.25
Units: skill/people

Training year expenditures=1e+006
Units: dollars