Fall 2006

Encouraging the Returner: Maximizing Benefits from Training Investments in High Turnover Industry

Karl R. Geisler
Western Washington University

Follow this and additional works at: https://cedar.wwu.edu/wwu_honors

Part of the Economics Commons

Encouraging the Returner:

Maximizing Benefits from Training Investments in High Turnover Industry

Karl R Geisler

A Senior Project in Economics for the
Honors Program of
Western Washington University
Fall 2006

HONORS THESIS

In presenting this Honors paper in partial requirements for a bachelor's degree at Western Washington University, I agree that the Library shall make its copies freely available for inspection. I further agree that extensive copying of this thesis is allowable only for scholarly purposes. <u>It is understood that any publication of this thesis for commercial purposes or for financial gain shall not be allowed without my written permission.</u>

Signature _____

Date 12/15/06

I. Introduction

No matter what they make, do, or sell, every single organization in the world relies ultimately on one thing: people. Whether working for a company, a campaign, or a cooperative, the quality of the people involved has a direct impact on the success achieved therein. In an attempt to make the most of the workers that they have nearly every organization across the globe undertakes some level of training. Whether demonstrating how to use a hammer or holding a week-long retreat on corporate culture and structure, it is difficult to find an organization that does not have some form of training or another. Through training the organization hopes to improve the quality or quantity (or both) of the produced output. Training is an improvement in human capital of the organization by means of an investment in the individual.[1] This investment is not without costs. Instructional materials, foregone production of instructors, and travel costs are some of the ways in which organizations pay for training. As with any cost of production, the cost of training must be kept to a minimum for the organization to continue forward in its work. Since organizations create training curricula based on what they think their people might eventually need, it is difficult to measure the exact marginal returns from training. Perhaps the simplest way to maximize the return from training is not to focus on or limit the amount of training each individual receives, but rather to limit the number of people the firm has to train by reducing turnover in the workforce. In industries where turnover is traditionally high, such as retail sales, reduction in that

---

[1] Kline (1993) discusses the commitment that a firm makes in employees by investing resources in training on machines and software. Here training is expanded to include interpersonal skills and company-specific procedures.

turnover could improve the overall well-being of that industry.[2] With applications ranging from strengthening a post-draft military to increasing volunteer hours at the local food bank, turnover reduction has important implications. Here, training investments will be explored in the context of a university's residence life (or 'dorm') system, though extensions to many other applications may easily be made.

II. Example for Analysis

Post-secondary education involves the interaction of many seemingly disparate units. Academics, sports, co-curricular opportunities, and social activities each play an important role in the overall educational experience at a college or university. One such co-curricular endeavor is student employment. Departments on every university campus have come to depend upon work done by undergraduate students in a wide variety of tasks. Unfortunately for those departments, the average undergraduate student spends an only four or five years at the university before moving on. This means that in the best case scenario, where freshman fill all available positions and continue the same job for the tenure of their undergraduate education, departments can expect to lose between one-fourth and one-fifth of their workforce every year. In the Office of Residence Life (OUR) at Western Washington University (WWU), the majority of students employed as Resident Advisors will work in that position for only one or two years. This means that the OUR regularly loses more than half of its workforce annually. Antidote suggests that a similar pattern exists at other universities. If students were hired and trained in their freshman year for employment beginning their sophomore year and those same

---

[2] BLS (2006) provides turnover as a percent of employment. For the period between September 2005 and August 2006, Retail Sales, Accommodation and Food Services, and Leisure and Hospitality had the highest turnover whereas Education, Finance and Insurance, and Wholesale Trade had the lowest industry turnover rates.

individuals continued to work the following three years, turnover could be reduced to one-third of the workforce each year. Should departments such as the OUR concern themselves with retaining individuals from year to year? If so, how should this task be accomplished? Using primarily microeconomic cost-analysis on the former question and game theory for the latter, the OUR of WWU will provide a backdrop for an investigation that has implications in a myriad of industries.

III. Improving Returns from Training

As an organization in at high-turnover industry, the Office of University Residences (OUR) of Western Washington University (WWU) has a vested interest in exploring the impact of such turnover on the organization. Students employed as Resident Advisors (RA's) often work only one year, with a minority working two or perhaps even three years. Since RA's act as the principle agents and inputs in providing "secure, comfortable, and affordable housing...within a diverse community that encourages academic success and personal growth," should the OUR concern itself with improving the rate of returning RA's in an effort to provide the best service possible?

A. Equations
To build an accurate picture of the cost of "producing" or training RAs, consider the following variables and equations:[3]

Q_A = Number of new applicants, where $Q_A \geq 0$
Q_N = Number new RAs, where $Q_N \geq 0$
Q_R = Number returning RAs, where $Q_R \geq 0$
Q_T = Number total RAs, where $Q_T = Q_R + Q_N$
$\omega(X)$ = Cost of placing X-type RA, where N = New and R = Returning
γ = Peer effects of returning RAs helping to mentor and to train new RAs
α_F = Fixed cost of new RA class
α_V = Variable cost of new RA class (buttons, copies, group leaders, etc.)
β = cost of training one RA for fall (same for New and Returning RAs)
σ = Cost of new RA selection process, per applicant

---

[3] Katz and Rosen (1998) provides theoretical basis for analyzing costs of production.

The cost of training and placement for a new RA can then be modeled by:

$$C_N = \sigma*Q_A + Q_N* \omega(n) + \alpha + \alpha V*Q_N + \beta*Q_N \quad (E.1)$$

The cost of returning an RA, including both placement and fall training, is expressed by:

$$C_R = Q_R*\omega(r) + \beta*Q_R - \gamma*Q_R \quad (E.2)$$

Total cost of training and placement is simply the sum of (E.1) and (E.2):

$$C_T = C_R + C_N \quad (E.3)$$

Expanded and re-arranged, (E.3) becomes:

$$C_T = \sigma*Q_A + \alpha_F + \alpha_V*Q_N + Q_N* \omega(N) + Q_R* \omega(R) + \beta*(Q_N + Q_R) - \gamma*Q_R \quad (E.3')$$

Marginal Cost of a New RA (the derivative of E.3' with respect to Q_R):

$$MC_N = \omega(N) + \alpha_V + \beta \quad (E.4)$$

Marginal Cost of a Returning RA (the derivative of E.3' with respect to Q_R):

$$MC_R = \omega(R) + \beta - \gamma \quad (E.5)$$

B. Assumptions

As in any model, a framework must be developed to work within. The following

paragraphs explain the clarifying assumptions that will structure the discussion about the

'production' or training of RA's.

(1) At least one new RA must be trained each year.

Even if all RA's would like to continue their position the next year, given that

employment as an RA in the OUR is dependant upon continued enrollment at WWU one

can assume that at least one new RA must be trained each year. To further strengthen

this assumption, consider further that not every RA will return (choosing instead to study

abroad, for example) and that nearly every year an RA will leave the position midyear.

(2) Number of applicants Q_A is exogenous to the OUR.

The firm, OUR, has no control over number of new applicants. Once the position is

advertised, some number of students from WWU apply. The OUR, as with any firm

publicly advertising a position, cannot control who applies, though they can later control

who is interviewed and eventually hired.

(3) Peer Effects are felt only in communities with returning RAs.[4]

Some effect exists from having experience RAs to help along new RAs. If no Returner is

available to help the New RAs, then no peer effect will exist. When present the peer

effect reduces the cost to the OUR through mentorship and modeling of appropriate

behavior.

(4)The Placement Cost for New RAs is greater or equal to that of Returning RAs.

With the strengths and weaknesses of New RAs relatively unknown, at least as much

effort must be used in placing them when compared with the known-quality Returners.

C. Implications
Combining the above equations and clarifying assumptions results in a conclusion on

whether or not the OUR should work to retain RAs. Looking at the marginal costs in the

best-case scenario where $\omega(N) = \omega(R)$, two differences appear between new and

returning RAs. First, new RAs have the added cost of their participation in the new RA

training course. Second, returning RAs benefit the OUR through their peer effect. It

follows logically that the OUR should hire as many returners as possible to maximize the

peer effect while simultaneously reducing the cost of the new RA training course. As the

cost of placement for new RAs is (more realistically) set above that of returning RAs, the

advantages to hiring as many returning RAs as possible becomes even more evident.

---

[4] De Bartolome (1990) defines peer effects as "the presence of the more able" having a "large favorable effect" on the less able, "perhaps by imparting higher motivation." On the job experience is transferred from returning employees to new employees through informal ongoing training. The example that returning employees set, according to de Bartolome, significantly affects the work of new employees.
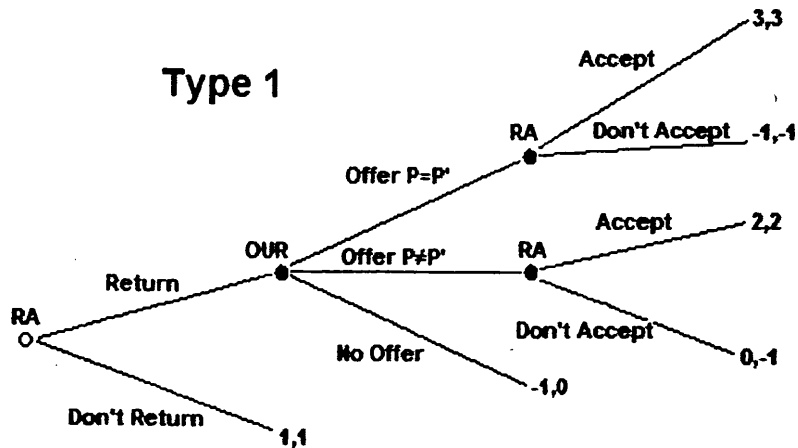
IV. Market Structure and Selection

A. Current Structure

Having established that it is in the best interest of the organization to return as many

people as possible from year to year, the question of how to best accomplish this task

comes to the forefront. Since the decision to return to or continue within an organization

involves strategic interaction between a principal (an employer, for example) and an

agent (such as an employee), it makes sense to engage this question of how to retain

employees from a game-theoretic perspective. Four things must be defined in order to

properly go about such an analysis: players, rules, payoffs, and strategies. Using the

above framework from the OUR, the two players are defined as the OUR professional

staff (which includes Resident Directors, or RDs) as the principal and RAs as the agent.

The RA will choose first whether or not to return, followed by the decision by the OUR

to offer a position (P) or not, with the RA making the final move deciding whether or not

to accept the offered position. Since there are various communities in which a position

can be offered, it is assumed that each RA prefers one or more positions (P') over all

others.[5] In view of the fact that difficulties arise both in quantifying and in generalizing

valuations of P and P', payoffs will be given ordinally rather than cardinally. This

formulation allows for easy comparison of outcomes even though an empirical "best-

response" cannot be readily calculated. The following three examples consider different

possible characteristics of RAs who desire to return. Most – if not all – returners can be

classified by one of these three types, with the payoffs listed to the RA first and the OUR
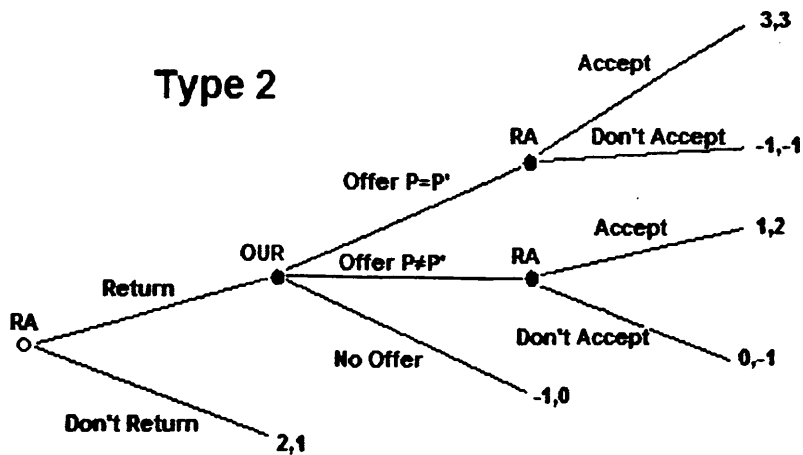
second:[6]

---

[5] Krautmann and Oppenheimer (1994) puts forth the idea that preferences exist within individuals, which are "affected by things like location-specific amenities."

[6] Dixit and Skeath (2004) provides the basic structure for the examination of extended form games.
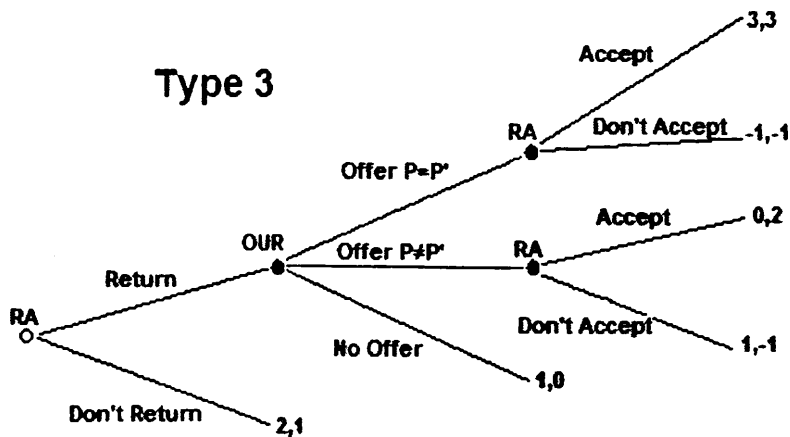
Type 1

Accept — 3,3

RA — Don't Accept — -1,-1

Offer P=P'

OUR — Offer P≠P' — RA — Accept — 2,2

Return — Don't Accept — 0,-1

RA

No Offer — -1,0

Don't Return — 1,1

Type 1 RAs show motivation to return, even if the preferred placement, P', is guaranteed to not be offered.

Type 2

Accept — 3,3

RA — Don't Accept — -1,-1

Offer P=P'

OUR — Offer P≠P' — RA — Accept — 1,2

Return — Don't Accept — 0,-1

RA

No Offer — -1,0

Don't Return — 2,1

Type 2 RAs are slightly more difficult to please from the OUR point of view. Once an RA of this type has committed to return, they would accept any placement offered to them. On the other hand, at some given probability that P is not P'– denoted Prob(P ≠P')– this type of RA will deem that the option to not return has a better payoff than the weighted average of taking some position P.

Type 3

Accept — 3,3

RA

Don't Accept — -1,-1

Offer P=P'

OUR

Return

Offer P≠P'

RA

Accept — 0,2

RA

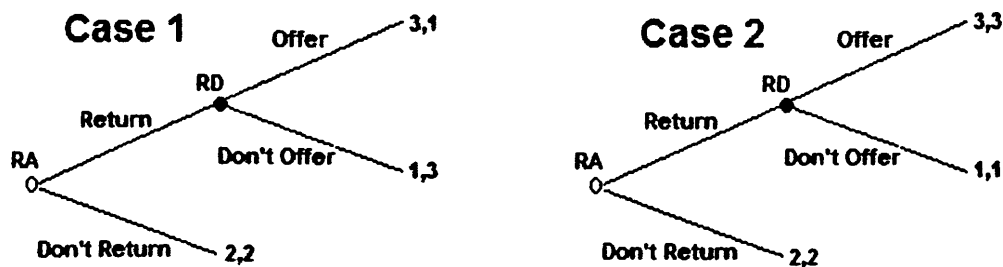Don't Accept — 1,-1

No Offer

1,0

Don't Return — 2,1

RAs of type 3, like those of type 2, base their decision to return on some probability that they will be given one of their preferred placements. Unlike RAs of type 2, however, type 3 RAs would prefer to not accept an offer of placement should the offer be other than their preferred placement. The type 3 returner places an even greater importance on the probability of being offered their preferred placement than their type 2 counterparts. Given these three types of returners and their strategies, what should the OUR do? The literature suggests some kind of pre-game signal be used to indicate the type of RA each potential returner, but even this is not without problems. The OUR currently attempts to take into account the preferences of potential returning RAs by just such a signal. The RA who considers returning is asked by their supervising RD which placements would be preferred. Unfortunately, RDs are faced with a conflict of interest in that they must represent the preferences of their current RAs while concurrently working to create a new staff-team for the following year. Compounding this tension, RAs are only offered a single placement which they must accept or reject. This leads to a potentially two-fold disappointment. First, RAs that might have been great returners are either discontent with where they end up, or they simply quit. The latter gives way to the second disappointment, where the RD depending on the quitting RA is left with one less

returning staff member. Recall that, as shown above, the best outcome for the OUR is to return as many RAs as possible. So again, what should the OUR do?

B. Proposed Selection Model

The frictions with the current system come from two main sources: a conflict of interest, and the one-shot nature of the placement. By allowing RAs to act directly in their best interest and work directly with their potential supervisors, both of these frictions can be resolved. RAs could apply directly to the RD of the community (or the RDs of the communities) which they would prefer.[7] RAs could apply to each community in which they would like to work – signaling their preferences – and RDs would be able to act accordingly.[8] This new selection process can be modeled by the following:

Case 1

Offer — 3,1
RD
Return
RA
Don't Offer — 1,3
O
Don't Return — 2,2

Case 2

Offer — 3,3
RD
Return
RA
Don't Offer — 1,1
O
Don't Return — 2,2

Now that RAs only apply to communities (or to RDs) that they prefer, the difference between case 1 and case 2 lies in RD's payoffs. In case 1, the RD turns down the application to return of the RA. In case 2, the RD and RA 'match,' resulting in best outcome for all parties. In these two cases, RAs still apply to RDs from whom they will be rejected – which could result in excessive administrative costs that outweigh the benefits of returning more RAs. A pre-game signal where RDs and RAs expose whether

---

[7] The added cost of applying to each community in which the RA wants to work should decrease the number of such applications, with RAs only applying to those RDs with whom they have the greatest chance of success. Guasch and Weiss (1981) explores the phenomenon of self-selection from which this assertion comes.

[8] Farrell and Rabin (1996) proposes that "given people respond to it, talk definitely affects payoffs." Such talk is particularly effective when the parties involved have "no reason to lie."

or not they 'match' would reduce this excessive paper process.[9] The pre-game signal might be facilitated by an open house of sorts where prospective returners sound out their preferred RDs. This raises a third case, where uncertainty exists for the RD in whether or not an RA would 'match' or not. This third case can be modeled as a probability of being either case 1 or case 2. In any event the signal would reduce the amount of cases known to be of type 1, presumably matching as many returners as possible in an efficient, open-market manner.

C. Further Market Effects of the Proposed Selection Model

Each community served by the OUR has distinct characteristics which make it either preferred or not by potential returning RAs. Conceivably, some communities could be desired by a number of RAs that is greater than the number of positions there, or perhaps no one prefers a given community. This conveys valuable information to those in charge at the OUR.[10] The OUR could act to change the amount of remuneration for positions on the basis of desirability, as measured by the number of applicants. The OUR might seek, for example, to increase compensation for those positions that are seen as less desirable as a result of, say, a perception of higher conduct levels within a community or the more stringent programming standards of a given RD.[11] Such actions would even out the number of returners in each community, and coupled with the absolute increase in RAs due to better matching of preferences, the OUR decreases the cost of training new RAs while improving the quality of the service that they provide to the campus.

---

[9] Such a pre-game signal is facilitated when RDs and RAs both want the same thing: good employee/employer compatibility. Crawford and Sobel (1982) find that "there may be a good case for presuming that direct communication is more likely to play an important role, the more closely related are [the] agents' goals."

[10] Riley (1979)

[11] Weiss (1980) argues that wages should exhibit downward rigidity should the firm want to reduce labor turnover. In other words, paying more for less desirable placements is not equivalent to the same as paying less for more desirable placements.

VI. Further Complications

The proceeding sections show that the organization is best-served when they retain more

people from year to year, and that the best way to keep people is by allowing them to act

for themselves in market-based competition. In the application of these findings the

market, however, a few complications arise.

A. RD/Community Conflict
One such complication is that RDs may or may not return to the same community from

year to year. In such a case would the RD pick returning staff members for the

community in which they work now, or for the community in which the RD will be

working? A "cut-and-choose" method would most evenly spread out talent amongst

different staffs.[12] Equivalent to one child cutting a doughnut and another picking first

which piece to take, the cut-and-choose method encourages a fair distribution. The

"cutting" step would consist of each RD working to create the best community possible

for the community in which the RDs are currently placed. The "choose" step, then,

would be either a random assignment of RDs to communities or through some other

process deemed fair by all the RDs involved.

B. Cost of RA-RD Interaction
Bargaining has costs, even if the only cost is the time lost to the individuals involved. It

is conceivable that the sheer number of returning applications to each RD could make

such a system of direct, market-based application so costly as to outweigh the

advantages.[13] To avoid this, a limit on the number of returning applications each RA can

submit to RDs could be implemented. Such a rule would also encourage RAs to partake

---

[12] Dawson (1997)
[13] Cramton (1991) talks in depth about the "transaction cost of bargaining."

in a pre-application signaling process with RDs, increasing the likelihood that the applications they do submit would yield positive results.

VI. Conclusion

While this paper has focused on high-turnover industry, applications extend much further. The uncertainty of tomorrow makes it impossible for organizations to train their people in exactly what they will need to know. Training must supply a set of useful tools or techniques that the individual can then apply to whatever situation might arise. The skills taught vary by organization, but one thing remains constant: retaining trained people from this time period to the next improves the return from training. By keeping current employees, the firm not only has to pay less for overall training, but it also reaps the benefits of experience and peer effects. Often the problem lies within the structure of the organization, as it restricts the ability of well-qualified people to return from year to year. Introspective analysis as to the particularities can result in a more streamlined process, though the exact details would differ in each organization. Perhaps this means instituting regular wage increases, or perhaps adjusting the process through which individuals are chosen to return for another season. Whatever the particular solution, the organization requires a certain flexibility with regards to returners. People like options, and the more options that they are given to return, the more likely they will. Only in retaining more highly-qualified people can the best outcomes be achieved. After all, it is the people that ultimately make or break the organization.

References

Bartolome, C. de. "Equilibrium and Inefficiency in a Community Model with Peer Group Effects." *Journal of Political Economy* 98(1990): 110-133

Cramton, P. "Dynamic Bargaining with Transaction Costs." *Management Science* 37(1991): 1221-1233

Crawford, V.P. and Sobel, J. "Strategic Information Transmission." *Econometrica* 50(1982): 1431-1451

Dawson, B. "A Better Draft: Fair Division of the Talent Pool." *College Mathematics Journal* 28(1997): 82-88

Dixit, A. and Skeath, S. *Games of Strategy*. London: W.W. Norton & Company 2004.

Farrell, J. and Rabin, M. "Cheap Talk." *Journal of Economic Perspectives* 10(1996): 103-118

Gausch, J.L. and Weiss, A. "Self-Selection in the Labor Market." *American Economic Review* 71(1981): 275-284

Katz, M.L. and Rosen, H.S. *Microeconomics: Third Edition*. Boston: McGraw-Hill 1998.

Klein, B. "Market Power in Antitrust: Economic Analysis after *Kodak*." *Supreme Court Economic Review* 3(1993): 43-92

Krautmann, A. and Oppenheimer, M. "Free Agency and the Allocation of Labor in Major League Baseball." *Managerial and Decision Economics* 15(1994): 459-469

Bureau of Labor Statistics. *US Employee Turnover Rates*. Released 11 October 2006 (as reported by http://www.nobscot.com/survey/index.cfm)

Riley, J.G. "Noncooperative Equilibrium and Market Singalling." *American Economic Association* 69(1979): 303-307

Weiss, A. "Job Queues and Layoffs in Labor Markets with Flexible Wages." *Journal of Political Economy* 88(1980): 526-538