

Identifying & Transferring Expertise

Brandie Colón, American Express Cards

Bob Yeager, InterCom

Desired Knowledge or Experience: Introductory level, an interest in instructional design, expertise, and computer-based simulations.

Objectives:

- You will be able to describe strategies for identifying expertise.
- You will be able to identify specific techniques for changing the way people make decisions.
- You will be able to discriminate between traditional and “naturalistic” decision making theories.
- You will be able to describe how a Level 4 (Kirkpatrick) type of evaluation can be conducted.

Brandie Colón has been with American Express for three years in Operations Training supporting and managing multimedia development efforts and projects.

Before that, Brandie spent 1.5 years with Exxon Chemical Co., the Central Training Organization as an Instructional Technologist repurposing interactive videodiscs.

While she pursued her graduate degree at the University of Houston, Brandie was a Teaching Assistant and Teaching Fellow. She trained students and faculty how to use telecommunications and other software applications.

Bob Yeager founded InterCom in 1978 to provide services to improve performance through technology. In the past 21 years, InterCom has developed hundreds of customized computer-based training courses and tools for corporate, government, and academic publishing customers. InterCom has also developed off-the-shelf CD-ROM products in soft-skills training.

Prior to starting InterCom, Bob spent seven years at the PLATO project at the University of Illinois—one of the pioneering projects in technology-based instruction. Prior to that, he spent seven years as a classroom teacher.

From 1982-1992, Bob developed and taught the InterCom Workshop on Computer-Based Training. Over a thousand trainers attended this public and in-house workshop.

Identifying & Transferring Expertise

Goal of this session

In this presentation, we will describe how we identified the expertise of top-performers and developed training materials to transfer their expertise to lower performers.

In the first part of the presentation, we describe WHAT we did. In the second part, we explain HOW we did it.

Situation

When you make a credit card purchase, in most cases the decision to grant credit is made automatically by a computer. In some cases when the decision is not clear-cut, the computer program sends the transaction to a Customer Service Representative (CSR) who has to decide whether to approve or decline the charge.

The reason the call is referred to a CSR may be that the card member missed a payment, or it could be that the card member owes more than he/she can pay. The CSR decides whether the card member is still a good credit risk or a poor one.

Measurement

The decisions the Customer Service Representatives make are tracked to see how the account turns out. The results of the CSR's decisions fall into four categories – two good and two bad:

Good Results	Bad Results
Approved and customer paid	Approved and customer defaulted
Declined and customer defaulted	Declined and customer paid

Ranking

CSRs are ranked by these measures and some CSRs almost always appear at the top of the rankings. They are the "experts."

CSRs have to wait several months before they know whether an account became delinquent and by that time, the CSRs have forgotten the details of the transaction.

Business need

If more CSRs could be taught to make better decisions (like the experts make), overall revenue for the company would be increased.

Identifying & Transferring Expertise

Preliminary Analysis

We investigated and dismissed a number of possible explanations for why the experts always performed better:

- Top-performers might have more knowledge & skills.
- Top-performers might be more experienced.
- Bottom-performers might lack motivation.
- Bottom-performers might need better support tools.
- Bottom-performers might need better management.

None of those explanations held up under scrutiny. So we were left with one explanation that seemed to fit:

- Top-performers think “differently.”

Therefore, we set out to identify what was different and find ways of transferring those differences to all performers.

Later in this presentation will describe the details of how we analyzed the differences and how that analysis led to the strategies we selected.

Intervention

After the analysis stage, we developed testing and coaching strategies designed to transfer expertise. At the heart of all these strategies is a computer simulation. During the simulation, CSRs handle simulated transactions, render a decision, and receive feedback.

Real transactions

The account data used in the simulation are from real accounts. The simulation uses data from real transactions that have been captured and saved while a CSR handles a real call.

“Capturing” real transactions

We built a database of “real” transactions by having CSRs handle transactions at a special PC called a “Capture Station.”

When a call comes in, a “Capture Program” running on the PC copies the screens for that transaction to a database. All the screens the CSR *could* see are copied whether or not the CSR actually looked at them.

Therefore, all the screens from an account are saved exactly as the CSRs saw (or could have seen) them when they made their decision.

It is important to get this information in real-time because the account could change significantly over a short period of time.

Matching

Several months later, the capture program automatically looks up the account to determine whether it is good or bad.

This information is saved with the original transaction enabling the testing and coaching activities to simulate a *real* transaction and provide *real* feedback on the results.

Identifying & Transferring Expertise

Scrubbing	<p>To protect customer privacy, the personal data for each transaction are “scrubbed” which means names, addresses, account numbers, and so forth are replaced with fictional data.</p> <p>The critical information such as account balance, amount being charged, payment history, etc., are retained.</p>
Relative dates	<p>All dates in the account are changed to relative dates. For example, for a transaction captured last July 4, the CSR might see that the customer made a payment one-day earlier on July 3. In the simulation, the computer displays today’s date – for example, April 14, and shows that the payment as having been made on April 13 – one day ago.</p>
Fidelity	<p>It is important that the simulation use <i>real</i> transactions.</p>
<i>Ill-structured domain</i>	<p>First, it is difficult to create transactions for training that are as realistic as the “messy” transactions CSRs encounter in real life.</p> <p>Creating fictional training transactions is good for training basic decision making skills because the account information can be altered to exemplify well-structured decision-making procedures.</p> <p>But it is difficult to create “messy” transactions that mirror real-life; and it is especially difficult to create large numbers of such transactions for practice.</p>
<i>Acceptance</i>	<p>Second, experienced Customer Service Representatives are more likely to accept the feedback for a decision when they know the results are real.</p>

Identifying & Transferring Expertise

Instructional Strategies

We created a testing strategy and five coaching strategies.

Testing strategy

In the testing strategy, the CSR handles 50 or more simulated transactions and sees how each one turned out.

At the end of the session, the CSR sees a summary of how they did using the same measurements that are used on the job.

The screenshot displays a simulation interface. At the top left, a green dollar sign character with a face and arms is labeled "Approved". To its right, a green banner reads "You approved \$429.00 good dollars." Below this is a "Your Current Scorecard" table:

Your Current Scorecard			
Good \$ Allowed	429	Good \$ Denied	0
Bad \$ Declined	0	Bad \$ Approved	0

Below the scorecard, a text box states: "The Scorecard shows your totals for ALL transactions in this activity." In the center, a crystal ball displays a monthly statement:

The transaction occurred on 1/13/99 and was approved. This is what happened AFTER that:

	DEBITS	CREDITS	BALANCE	AGE
JAN	1371.00	543.64	2457.57	3
FEB	489.96	2477.03	470.50	C
MAR	684.45	489.96	664.99	C
APR	626.89	0.00	1291.88	3
MAY	904.61	664.99	1531.50	3

Below the statement, it says "Status of Account : ACCOUNT CURRENT AFTER 2 MONTHS". At the bottom right of the crystal ball area is a "Next Transaction" button. On the right side of the interface, there is a vertical toolbar with buttons for "ADCT", "Transaction 1 of 89", "HELP", "EXIT to Menu", "QUIT", and the "AMERICAN EXPRESS" logo.

The "Crystal Ball" screen is used in all strategies to show how the account turned out. In this example, the CSRs can see that they approved "good" dollars because the customer paid the amounts due. The Crystal Ball shows exactly what happened in the account over the next five months.

Diagnostic testing

There are a number of predefined tests that CSRs can take. And new tests can be created specifically for each CSR:

- Diagnostic tests based on the CSRs' performance on previous tests. If they always have trouble on accounts with corporate cards, this creates a test focused on that weakness.
- Self-diagnostic tests allow CSRs to set their own areas they want to practice in.

Identifying & Transferring Expertise

Coaching Strategies

The testing strategy only gives basic feedback on the outcome of the account so we also developed five exercises that gave additional feedback to help CSRs identify specific ways they could change.

Practice



Here are some factors the expert considered.
Predict how an expert would rate each factor.

Factor	Positive	Neutral	Negative
Prob-t			
CBR			
Exposure vs. High remit			
Pay history			
Tenure			

Click inside a box to mark each factor as Positive, Neutral, or Negative.
You can change your answer by clicking in a different box.

When you are finished, click [Done](#)

Positive factors make you want to approve.
Negative factors make you want to decline.
Neutral factors are ambiguous-they don't help, you decide whether to approve or decline.




Practice works like a test, but it also asks CSRs to predict how experts would rate the factors that went into the decision.

After rating each factor, CSRs see feedback that describes how and why the experts rated each factor.

Identifying & Transferring Expertise

What If...?



You approved this transaction. Now, here are some factors that might cause you to DECLINE the transaction.


Consider each one and answer yes or no.

Would you decline this transaction if..

<input type="radio"/>	Q1	The CBR were 714 rather than 614?	
<input type="radio"/>	Q2	The prob-t were 7.8% rather than 13.8%?	
<input type="radio"/>	<input checked="" type="radio"/>	Q3	The CM had made a payment of at least \$5,000?
<input type="radio"/>	<input type="radio"/>	Yes.	
<input type="radio"/>	<input type="radio"/>	No.	

What If...? asks CSRs to render a decision for a transaction and then asks them what would change their decision. From one to seven questions are presented one at a time.

Monday Morning Quarterback



How would you coach this authorizer?

You can select more than one piece of advice.
When you finish, select Done.

<input type="checkbox"/>	You should have weighed the item the CM is purchasing more heavily.
<input type="checkbox"/>	You should have examined the CM's recent purchases.
<input type="checkbox"/>	You should have weighed the CM's high remits more heavily.
<input type="checkbox"/>	You should have weighed the AA Advice more heavily.
<input type="checkbox"/>	You should have weighed the transaction amount more heavily.
<input type="checkbox"/>	You should have weighed the AIRWARN more heavily.
<input type="checkbox"/>	You should have weighed the pay history more heavily.

Monday Morning Quarterback puts the CSR in the role of a team leader who is watching another CSR complete a transaction.

The student decides whether the other CSR made the correct decision, and, if not, what advice would be appropriate to give. It's always easier to see the errors other people make.

Identifying & Transferring Expertise

Able & Likely


These are some of the factors that affect the CM's ABILITY to pay.
Predict how an expert would rate each factor.

Factor	Positive	Neutral	Negative
Exposure vs. High Remit	X		
Recent pay history		X	
Banking information	X		
Income information		X	

Click inside a box to mark each factor as Positive, Neutral, or Negative.
You can change your answer by clicking in a different box.

When you finish, click **Done**

Positive factors make you want to approve.
Negative factors make you want to decline.
Neutral factors are ambiguous—they don't help you decide whether to approve or decline.



Able & Likely are “part-task simulations.” CSRs make their decision in the normal way, but then are asked to focus on one aspect of their decision at a time. First, they decide whether the customer has the ability (“Able”) to pay. Later, they decide whether the payment history indicated the customer was “likely” to pay.

Timed Drill

Here are a few questions on the account you handled.

Click in the box under True, the box under False, or the box under Don't Know.

When you finish, select Done.

	True	False	Don't Know	Penalty Time
The cardmember's CBR score was poor: below 620.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	+00:00
The cardmember's tenure was high: over ten years.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	+00:00
The cardmember's pay history was poor: recently went 60 days late.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	+00:12
The cardmember's exposure was less than twice the high remit.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	+00:06
Banking information showed that the CM could pay the exposure amount.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	+00:06
Credit has NFC'd the account and has notified the cardmember with a letter.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	+00:00

Timed Drill requires CSRs to be both efficient and accurate. They are timed from the beginning of a transaction until they render a decision. Their goal is to minimize their time. Then they answer 4-6 True/False questions about the account. For each question they get wrong, time is added to their overall time for that transaction.

Identifying & Transferring Expertise

Administrative / Management System

We built a management system that makes it easy for team leaders to use this system as part of their normal coaching activities.

Team leaders can assign testing and coaching activities, create special tests for individual CSRs, and monitor their progress. Team leaders can work through transactions with their team-members and give them more personalized feedback.

CSRs can also access the system at special training stations and take any activities they want.

In short, the system is designed to become one more tool available to team leaders as they coach their CSRs, but it's also designed to run on its own in case a team leader doesn't use it.

Evaluation

We are measuring whether this training has any impact on the business goals (Kirkpatrick's Level 4 evaluation).

As described above, CSRs receive regular feedback on how their decisions turned out. The critical metrics in this feedback are:

- Ratio of "good dollars" approved (accounts in which the customer paid their bill and the CSR approved the charge) to total good dollars handled.
- Ratio of "bad dollars" declined to total bad dollars handled.

Ideally, both ratios should approach 100% meaning that the CSR is approving all the good dollars and declining all the bad dollars.

We are comparing the ratios before and after the training to see if they have improved. We will not have all the data to complete this evaluation until later in the year.

Summary: Where we are at

The system rolled out in November 1999, and is just coming into use as this paper is being prepared.

Early reception from both team leaders and CSRs has been very favorable. The team leaders have scheduled heavy use of the system during the rest of this year with extra time being given to their bottom-performers. In addition, they have set up competitions with rewards for greatest improvement from quarter to quarter.

Identifying & Transferring Expertise

Overview of Part 2 In the second part of this presentation, we will describe the tools we used to analyze expertise, the theory behind the system, and how we used the analysis and theory to build instructional strategies.

Task Analysis Much of the analysis followed traditional instructional system design (ISD) methodology.

To familiarize ourselves with the CSRs' job , we

- reviewed training materials and operation guides.
- interviewed team leaders and stakeholders.

Cognitive Task Analysis To understand the CSRs' thought processes, we used several types of analysis tools:

- observation of CSRs handling real calls and interviews after each transaction; during the interviews, we asked CSRs to explain the decision they had just made.
- open-ended, in-depth interviews during which CSRs talked about their job.
- "think aloud" interviews in which CSRs described what they were thinking as they analyzed an account.
- computer simulations and measurements of specific areas of interest.

Observation and retrospective explanations We sat with CSRs as they took "live" calls and asked them to stop after each call to tell us what they did. Since the CSRs were talking with the customer during the transaction, we could not interrupt the actual transactions. We worked with all levels of performers so we could analyze the differences.

Observations usually took about one hour; we spent about five minutes debriefing the CSRs after each transaction. The observations were spaced out over a long period of calendar time so our procedures evolved as we learned more about the process.

The goal of these observations was to simply understand the decision process the CSRs followed.

Procedure After a CSR completed a transaction, we asked them why they had approved or declined the transaction. We probed for a justification and queried them about their thought processes.

(See Appendix A for the instrument we used).

Identifying & Transferring Expertise

Observation and retrospective explanations (continued)

Results

The observations allowed us to develop a preliminary list of factors CSRs use in making a decision along with an idea of the relative weights they gave to different factors. We also were able to develop some hypotheses about how the CSRs processed the information:

- CSRs use many of the same factors.
- CSRs give factors different weights in different contexts (they are “configural”).
- Different CSRs use different relative weights for the same set of factors.
- CSRs process factors in different sequences.
- Despite the differences, top-performers generally agree on the decision.
- Top-performers remembered “chunks” of information without remembering the exact data. Bottom-performers recalled some of the exact data.

Strengths / Weaknesses

The advantage of retrospective analysis is that CSRs talked about concrete transactions immediately after resolving them so their thoughts were fresh.

The disadvantages are (1) the CSRs may have been biased by making a hindsight analysis of their decision. After they had decided to approve/decline, they may have viewed certain factors as more supportive of their decision than they did when they first analyzed the account.

(2) We noticed that CSRs were “ready” for our questions after a few rounds. They may have been changing their behavior as they analyzed an account so they could better answer the questions they knew were coming.

(3) Since we were working with “live” transactions, we had to take whatever types of transactions came in. Many transactions were similar so there was much redundancy.

Identifying & Transferring Expertise

In-depth Interviews We interviewed twenty CSRs for 60-90 minutes. We asked our project coordinator to randomly draw CSRs from the top 10% of the rankings, the bottom 10%, and around the mid-point. We did not know how individual CSRs were ranked when we interviewed them in order to prevent bias in our interviews.

We prepared a list of 68 questions and organized them by topic area. Many questions were redundant and meant to be alternative ways to extract the same information in case the original question failed to elicit the information we needed; therefore, we skipped over such questions when the primary question succeeded.

The interviews were open-ended. We followed this format about 80% of the time. Two CSRs simply took over the interview and told stories – some of which were useful in providing insights. In some cases, CSRs wanted to talk about areas we had planned for later in the interview; we generally followed their train of thought and circled back later to cover the areas we had skipped over. Some CSRs opened up new areas we had not planned for and we tried to follow those lines of thought.

The interviews were tape-recorded and analyzed later.

Procedure The interview covered three key areas. After a brief warm-up, we asked CSRs to describe their job; secondly, we asked them to describe how they made decisions; and finally, we directly asked them for their ideas on how to improve the decision quality for all CSRs.

We used several techniques in the questions. While most questions asked CSRs to talk about themselves, some questions asked them to project their ideas on other CSRs; for example, “what types of mistakes do you see other CSRs making?” We also asked them to compare and contrast their approach to their job with how they had been trained, how they were coached, and general company policies.

Initially, we probed for evidence that CSRs constructed justifications as they made their decision: “I’ll approve this because he’s been a card member for a long time.” In the course of this probing, we discovered other metaphors used by CSRs to describe their thought process: putting together a puzzle; balancing scales; creating a story of what the card member is doing. Once we had elicited these metaphors from a few CSRs, we tested them out on others.

Identifying & Transferring Expertise

In-depth Interviews

Procedure (continued)

We also asked CSRs to contribute any good stories they had about transactions – either ones they handled themselves or handled by other CSRs.

(See Appendix B for the actual 68 questions).

Results

It was fairly easy to differentiate top-performers from bottom-performers because the top-performers could articulate their decision process. Bottom-performers seemed not to think about how they came to a decision, although they definitely had ideas about how the job *should* be done. For example, several CSRs emphasized the value of good customer service over the analysis of credit worthiness, yet they could not describe how they knew when to override credit considerations for the sake of good customer service.

Top-performers believed they made decisions with fewer pieces of information than bottom-performers. Top-performers reported using an average of 4-5 pieces of information, while bottom-performers averaged 4-8 pieces of information – and this excludes one bottom-performer who claimed to use 20 or more pieces of information. This is consistent with the literature that shows that experts make their decisions based on less information than novices.

Everyone referenced the same factors in their decisions. These factors were the same ones that were highlighted both in training manuals and in the “best practices” sections of the operations manual. But there was no consistency – even among the top-performers – in the sequence they used to examine the factors.

Top-performers made decisions earlier in the transaction; they said they generally “knew” what to do almost as soon as they saw the account. Bottom-performers generally felt that they weighed various information before they rendered their decision.

Top-performers took longer handle a transaction, by about 33%. This is contrary to the literature which claims that experts are faster than non-experts. The most likely explanation is that there are rewards for handling more calls. Bottom-performers cannot win the bonuses tied to good decision quality, but they can claim the bonus for handling more calls.

Identifying & Transferring Expertise

In-depth Interviews

Results (continued)

Another explanation for this discrepancy is that top-performers may take more time because they rehearse the account as they store the attributes into long-term memory. We could not measure this, but we did observe behavior that went beyond simply rendering a decision and testing whether it was the best decision; top-performers kept looking at factors well beyond the point at which they had confirmed their decision.

One of the richest pieces of information was when we asked CSRs for metaphors of their decision process. We did not find differences in the metaphors top-performers used from those used by bottom-performers. Almost all CSRs could relate to one of the four metaphors we tested and many clearly preferred certain metaphors such as the puzzle. Only two CSRs resisted comparing their thinking to one of the four metaphors, and both were bottom-performers.

Finally, we failed in eliciting stories. Many CSRs could not think of any stories. The few stories we collected were not centered around critical incidents and were not valuable to us.

Strengths / Weaknesses

The interviews produced a rich source of information for us. We found the CSRs very forthcoming and honest (we did not share the interviews with the management so we heard some interesting insights). We realized that few people ever asked CSRs to talk about what they did and they enjoyed the spotlight.

These types of interviews offered the CSRs a chance to reflect on the process at a higher level instead of reacting to a specific account. They generally rose to that challenge.

On the other hand, the lack of specific accounts made it difficult to get into any details about how they process transactions. We were hoping to identify more factors during these sessions, but could not get down to that level of detail without referencing an actual account.

Finally, anyone in this type of interview situation wants to demonstrate that they are good performers both to themselves and to the interviewer. Their perceptions of how they handle accounts were biased by their desire to look good in the interview. We needed to filter for those affects.

Identifying & Transferring Expertise

Think aloud

In this exercise, all CSRs worked with the same set of ten transactions so we could compare performance on the same transactions.

We worked with 18 CSRs drawn from both top and bottom-performers (but not middle). This allowed us to determine the differences in how top- and bottom-performers analyzed accounts

These interviews took between 45-90 minutes and a few CSRs did not complete all ten transactions after 90 minutes.

Procedure

We gave CSRs screen prints of the screen they would see at the start of a transaction. The CSRs asked us for other screens they wanted to see; they also asked us for answers to questions they might ask the customer.

The CSRs used a yellow highlighter pen to mark the fields on the paper that they were looking at. As they did that, they talked about what they were thinking as they analyzed the account.

After they made their decision, we clarified things we didn't understand – especially places in which we felt the CSR had skipped quickly over factors. We needed to know whether they looked at a factor but didn't have time to verbalize it, or whether they really ignored it.

We challenged the CSRs about specific factors. For example, we would say, "You said their pay history looked pretty good. What does "pretty good" mean?"

Finally, we probed about what would change their decision. If the CSR had approved, we asked them what might have caused them to decline the transaction, and vice versa.

(See Appendix C for the format we followed).

Identifying & Transferring Expertise

Think Aloud (continued)

Results

In general, top-performers had two characteristics that differentiated them from bottom-performers. First the top-performers tended to arrive at a preliminary judgment sooner than bottom-performers. They said things like, “This account looks pretty good....” or “Uh oh, I’ve got some problems here....” This practical exercise confirmed what the CSRs claimed to do during the in-depth interviews.

Bottom-performers tended to identify several specific factors before they arrived at a tentative judgment. Different CSRs focused on different factors, but the same bottom-performers tended to focus on the same factors for every transaction.

The second difference was that top-performers searched for disconfirming evidence while bottom-performers searched for confirmation of their preliminary judgment.

This exercise revealed an interesting phenomenon that influenced the instructional strategies. Top-performers could easily engage in contrapositive thinking (in fact, they did it naturally while analyzing an account) while bottom-performers were highly resistant to it.

We also identified several “chunks” of patterns – combinations of cues categorized under one concept. We focused on two of these chunks:

- 1) Is the customer *able* to pay? Does he/she have the money?
- 2) Is the customer *likely* to pay? Is his/her payment history good or bad?

We tested these concepts and found that both top- and bottom-performers used concept #2 (likely), but that top-performers gave more weight to concept #1 (able) than bottom-performers did.

Strengths / Weaknesses

The primary benefit of the think aloud protocol is that the CSRs revealed the stages of their thought process before they rendered a final decision. CSRs usually needed to ask for additional screens so they had to explain what they were looking for before they had a chance to see it.

Using real transactions allowed us to probe the details of their thought process in ways the in-depth interviews could not. CSRs use configural thinking and approach every transaction slightly differently depending upon the data on the initial screen. Without a real account in front of them, they could not explain their thought process.

Identifying & Transferring Expertise

Think Aloud

*Strengths /
Weaknesses
(continued)*

The major disadvantage of think aloud exercises is that CSRs cannot talk as fast as they think. We had to probe later to determine whether they had really ignored certain factors, or whether they had simply neglected to mention them as they moved on to other factors.

Computer weighting exercises

We created a prototype computer simulation using twenty of the early transactions that had been captured. This simulation had multiple purposes including determining whether we were faithfully simulating the real system.

Eighteen top-performers went through this exercise. We only used top-performers because our goal was to identify the specific factors and weights used by experts.

Each exercise took between 45-90 minutes. Some CSRs took a long time in answering the questions after each transaction.

Procedure

CSRs handled a simulated transaction, typed their decision, and then answered questions about the factors that went into that decision. The computer program tracked the screens the CSRs accessed.

We generally removed ourselves to a distance that allowed us to observe the CSRs as they worked through the exercise, but was far enough away to discourage the CSRs from asking us questions and possibly influencing their answers.

There were several types of questions:

- Measures of the level of certainty about their decision.
- Questions about the relative weights the experts assigned to various factors.
- Chunking questions in which CSRs were asked to agree or disagree with the ways we had chunked certain information.

CSRs could also make free-form comments about any transaction or question. For example, CSRs might suggest another factor they considered that was not on our list.

(See Appendix D)

Identifying & Transferring Expertise

Computer weighting exercises (continued)

The absolute values of the weights were widely scattered even though all the CSRs were top-performers. We normalized the weights and found enough correlation to build a description of the decision process used by the experts.

Results

We were able to validate a core set of factors that top-performers used in their decision making process. This set of factors was configural – they didn't always look at the same factors for every account, and we were able to identify some of these conditions.

And we validated three primary ways in which experts chunked information: ability to pay, likelihood of paying, and fraud. We tested other "chunks" but did not get sufficient agreement on them to use them in the instructional strategies.

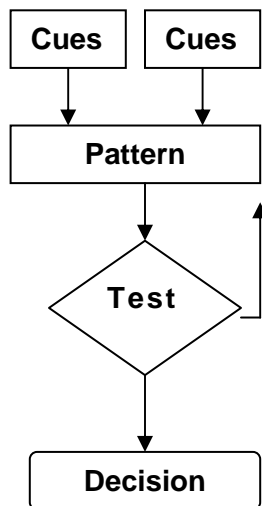
Strengths / Weaknesses

The primary advantage of this technique is that it provided quantitative, objective measurements of the factors we had identified in previous exercises. All CSRs handled the same 20 transactions so we were able to compare their performances.

The major weakness of this approach was that CSRs seemed to anticipate the questions after a few transactions. They may have changed their decision-making process in anticipation of the questions.

Identifying & Transferring Expertise

How expertise works



To understand how we translated our analysis into instructional strategies, it will be useful to describe how we think expertise works.

When an expert customer service representative starts a transaction, the CSR recognizes cues that trigger the retrieval of a pattern of a good or bad account.

The pattern never matches the current account exactly. Therefore, the CSR begins to test the pattern against the current transaction by focusing his/her attention on the anomalous cues.

The CSR has to decide whether the anomalies are acceptable, or whether to retrieve a different pattern. All this happens in seconds.

Once the CSR has validated the pattern, he/she makes a decision consistent with the pattern. Patterns for good accounts are approved, patterns for bad accounts are declined.

Recognition of the pattern determines the decision that is consistent with that pattern.

Bottom-performers

Bottom-performing CSRs have developed inappropriate, incomplete, and insufficient patterns. They also fail to test the patterns against the current transaction, and they are resistant to discarding a pattern and starting over.

Bottom-performers attend to the wrong cues because they lack an adequate repertoire of patterns to match cues against. They resist abandoning a pattern because they don't have adequate alternatives. Therefore, instead of testing the anomalies, bottom-performers tend to search for cues that *confirm* the pattern.

Differences between top-performers and bottom-performers

Bottom-performers have (almost) all the same knowledge and job-related skills that top-performers have. But –

- top-performers organize their knowledge/skills differently than bottom-performers into a larger repertoire of patterns; and,
- top-performers do a better job of testing patterns.

How are patterns formed?

Patterns develop with experience within a domain. New patterns are integrated with previous life-experiences so two top-performers will apply different patterns to the same account. They usually make the same decision, but they arrive at that decision in slightly different ways.

Since the patterns are different, the cues that trigger the patterns are different as well.

Identifying & Transferring Expertise

Implications for training – What NOT to do

Experts do not follow the “rational” decision model when they make a decision. The rational model includes identifying alternatives, evaluating them, and selecting the option with the greatest utility.

Experts don’t go through that process – they simply “know” what to do. They “recognize” the pattern and respond appropriately.

Therefore, we cannot train expertise by cramming more and more knowledge, skills, and procedures into their heads. Experts acquire more knowledge and skills through experience, but these are “situated” knowledge and skills that must become part of an overall response pattern.

Implications for training – What to do

Expertise can be developed in four ways:

- extended practice with good feedback;
- focus attention to cues identified by experts;
- calibrate the weights for the cues;
- practice *testing* patterns.

Developing Instructional Strategies

The findings from the analysis stage identified the types of strategies we needed to develop to transfer expertise.

Practice, practice, practice

The most important factor in developing expertise is to provide real-life practice with real-life feedback. Practice without feedback is not enough for most people.

Therefore, every activity has practice and feedback as its focal point. CSRs always start by working on a transaction, always decide whether to approve or decline, and always see how the account turned out in real life.

The testing activities are simply practice with feedback. The coaching activities intervene with other forms of feedback unique to each activity.

Attention to cues

Two coaching activities, *Practice* and *Able & Likely*, focus CSRs’ attention on the factors that make up a decision

Since we believe that patterns develop uniquely for each individual, we don’t believe we can teach the patterns *per se*, but we can foment the development of patterns by directing attention to the cues preferred by experts.

Identifying & Transferring Expertise

Developing Instructional Strategies (continued)

Calibration

Practice, Able & Likely, and *Monday Morning Quarterback* ask CSRs to predict how the experts would weight various factors.

This exercise, including feedback that explains the expert's weighting, allows CSRs to gradually calibrate their weights to those of the experts.

In early tests, we have seen bottom-performers express surprise (and some resignation) when they saw that the experts discounted one of the factors they valued highly.

Contrapositive thinking

What If...? provides practice in the type of contrapositive thinking that is needed to *test* patterns.

The goal of the lesson is to give CSRs experience in looking for disconfirming evidence rather than always looking for confirming factors.

Chunking

Both *Able & Likely* and *Timed Drill* were developed to foment chunking several cues into one category.

Able & Likely require CSRs to evaluate customers' ability to pay separately from their likelihood of paying.

Timed Drill can only be done successfully if CSRs "chunk" several cues into one concept. There are too many cues to remember as individual values. The *Drill* does NOT ask for specific values, but only general ranges of values.

For example, if the customer's monthly salary is \$15,000, the True/False statement would be, "The customer's monthly salary is greater than \$10,000." (True)

Appendix A: Observation & Retrospective Explanations

This is the form we used during observations of CSRs.

At the end of each transaction, ask the CSR to log off the system and answer these questions:

1. Why did you decide to approve / decline? (We need to record the language they use in detail.)
2. Explain how you came to that decision. (Probe for salient factors, thought processes, sequences, and contingencies.)
3. What fields / information were most important in making that decision?
4. Did you discount any information? (Probe for advice from the expert system, previous actions on the account, payment history, etc.)
5. Why did you access the screens you did? What information were you looking for on each screen? Did you find it?
6. Clarify any factors that are ambiguous.
7. Challenge the weights the CSR gave to salient factors. (How important was the customer's payment history for this transaction? etc.)
8. What might have changed your decision?
9. (At the end, after an interval) How much information can you still remember about the account?

Appendix B: In-depth Interviews

CSR Name _____ Date/Time _____

Introduction & Explanation *(Given verbally at the start of the session)*

We've been asked to develop some training materials that will help CSRs improve their rankings by giving them more practice in making decisions in specific areas. Today, we're hoping you can help us by talking about how you do your job and what you think is important.

In general, we're going to cover three areas: describing what you do; describing how you think about what you do; and telling us how you think decision-making can be improved. Don't worry if you can't answer all our questions. We don't expect every person to be able to answer every question we ask.

Warm-up

1. How long have you been a Customer Service Representative?
 2. What did you do before you were a CSR?
 3. How do you like this type of work?
 4. What do you think of what we're trying to do? Is it possible?
-

Part 1: Describing what you do

(a) Walk through

5. Walk us through a transaction. What do you look at? What are you trying to find out?
6. Can you remember a specific transaction you handled recently? Describe how you handled it.
7. *When you first take a transaction, what do you do?*
8. *Given a specific code, simulate with us what you need to know (we'll give you answers); and give us a judgment*

(b) Specific questions about screens & information

9. What information you typically look at for every transaction?
10. Give us examples of other information you look at depending on the type of transaction.
11. Check off the list of screens you most commonly access. (Handout, not included in this sample)
12. How many screens do you access in a normal transaction? What is the range of screens you might access for easy/difficult transactions?

Identifying & Transferring Expertise

13. How much time do you spend on a normal transaction? What is the range of time you might access for easy/difficult transactions?
 14. What causes you to spend more or less time?
 15. *What screens do you spend the most time on?*

 16. What percent do you agree with the detailed advice from the expert system?
 17. What percent do you approve / decline?
 18. Is there a pattern to approving / declining? Do you ever feel you've approved / declined too many in a row?

 19. What percent of time do you follow recommendation of expert system? Why do you not follow it?

 20. How much information do you use to make a decision? (I'd like a number like "7"). What are they?
 21. Does the information you use to make a decision vary case by case?
 22. What information do you always use?
 23. Can you give examples of information that you might use only for certain cases?

 24. Do you combine or "chunk" information together to make it easier to remember? Examples.

 25. Is some information more important than other information?
 26. How do you know when you have enough information? Is there such a thing as too much information?
 27. *What information is most useful in making a decision?*
 28. *What are the critical pieces of information you look for?*

 29. Does the sequence in which you gather information affect your decision?

 30. How long does a transaction take?
 31. What causes a transaction to take longer / shorter?
 32. *Do you have enough time on a transaction?*
 33. What would you do if you had additional time?

 34. When do you / why do you pend a transaction? What are the issues around this? Would you like to do it more/less?
-

Identifying & Transferring Expertise

Part 2: Thinking about what you do

35. How do you think you come to a decision? Describe the thought process you use.
 36. When do you make a judgment? Early / late in the process?
 37. Do you look for additional information after you have started to form a judgment?
What type of information do you look for?
 38. When you make a decision, do you try to explain it to yourself? If so, how?
 39. Do you ever have intuitions about transactions? Any idea of what causes that?
 40. What part does subjective information play when you talk with merchants or customers?
 41. How certain are you of your decisions in cases? E.g., out of 10 transactions, I think X are pretty certain.
 42. When in doubt, how do you resolve the doubt?
 43. *How comfortable are you with your decisions? Do you worry you approved/declined incorrectly?*
 44. How is what you are doing in reality different from what you were trained to do?
Why?
(a) Things you DON'T DO; (b) NEW things you do that you weren't taught.
 45. *How is what you are doing in reality different from what your managers/coaches tell you / want you to do? Why?*
 46. What are the most important things you've learned about being a CSR? What types of things made you say, "aha!"? I wish they would have told me that!
 47. What facts / concepts do people NOT know that YOU know?
 48. How do you balance customer service issues with risk?
 49. If you are going to make a mistake, which is better / worse: (a) Decline a good customer, (b) Approve a customer who goes into collections.
 50. Describe what makes a transaction tough to decide? Easy?
 51. *What are the no-brainer decisions to approve/decline?*
 52. Are small dollar amounts to be charged easier/harder than big dollar?
 53. Do you ever have to approve the same person twice? Does that affect your decision?
-

Identifying & Transferring Expertise

Part 3: Improving Decision-Making

54. What makes a "good" CSR?
55. What helps you improve your decisions? Coaching? Feedback from metrics?
56. *What would do the most to help CSRs improve their decision-making?*
57. What are the obstacles to doing a good job?
58. What is the difference between people who rank high in the metrics and those who rank low?

59. What mistakes do other CSRs make? Why do people on your team not achieve higher rankings?
60. Have you ever heard of CSRs using their personal values to make a decision?
61. Are you influenced by information you can see about how other CSRs treated this account?
62. *Have you picked up customers who were recently approved, but you don't think the customer should have been approved the first time? Now the customer needs another approval. What do you do?*

63. What does it take to rank high in the metrics?
64. Are the metrics a fair measure of what you do?
65. What's the most difficult metric to succeed on? Easiest one?
66. Are you measured on other things besides the standard metrics? Do those other things interfere with getting good metrics? (E.g., number of transactions / hour vs. need to spend more time on a transaction)

67. If you could change how the approval system works, what would you do?

68. Tell us stories about transactions you remember and why you remember them. Tough decisions; risks that turned out good/bad; mistakes you make yourself or see others make; or what "good customer service" means; have you used creative solutions?

Appendix C: Think Aloud Procedure

During our observation of Customer Service Representatives, we were able to ask them to print screens from actual transactions they were handling. We asked them to make a print when a transaction seemed to be unusual.

We identified ten interesting transactions and made copies of those screens. We worked with eighteen CSRs individually and asked them to use the paper screens to resolve the transactions. CSRs took between 45-90 minutes to work through the ten cases.

The goals of this instrument were to (a) identify factors that went into a decisions; (2) begin to develop a weighting scheme for the factors; and (c) identify larger concepts CSRs used to organize the factors.

This was the procedure we used.

1. Present the initial screen to the CSR and require that the CSR ask for other screens he/she wanted to see.
2. Ask the CSR to use a yellow highlighter pen to mark the fields he/she was looking at.
3. Ask the CSR to describe aloud what he/she was doing and thinking.
4. Ask the CSR to decide whether he/she would approve or decline a transaction.
5. Clarify any ambiguous actions or thoughts that arose during the talk-through. CSRs tended to act faster than they talked so we needed to fill in the gaps.
6. Challenge the CSR about information they did use ("Why did you look at the credit bureau rating?") and information they seemed to ignore ("Why didn't you check on banking history?") These questions were based on a preliminary list of factors we had developed.
7. Ask the CSR what would have changed his/her decision? Our primary goal was to identify the weights a CSR placed on factors, but we also discovered that many bottom-performing CSRs had a great deal of difficulty in answering this question: they were unable to imagine anything changing their mind.

Appendix D: Computer Simulation & Rankings

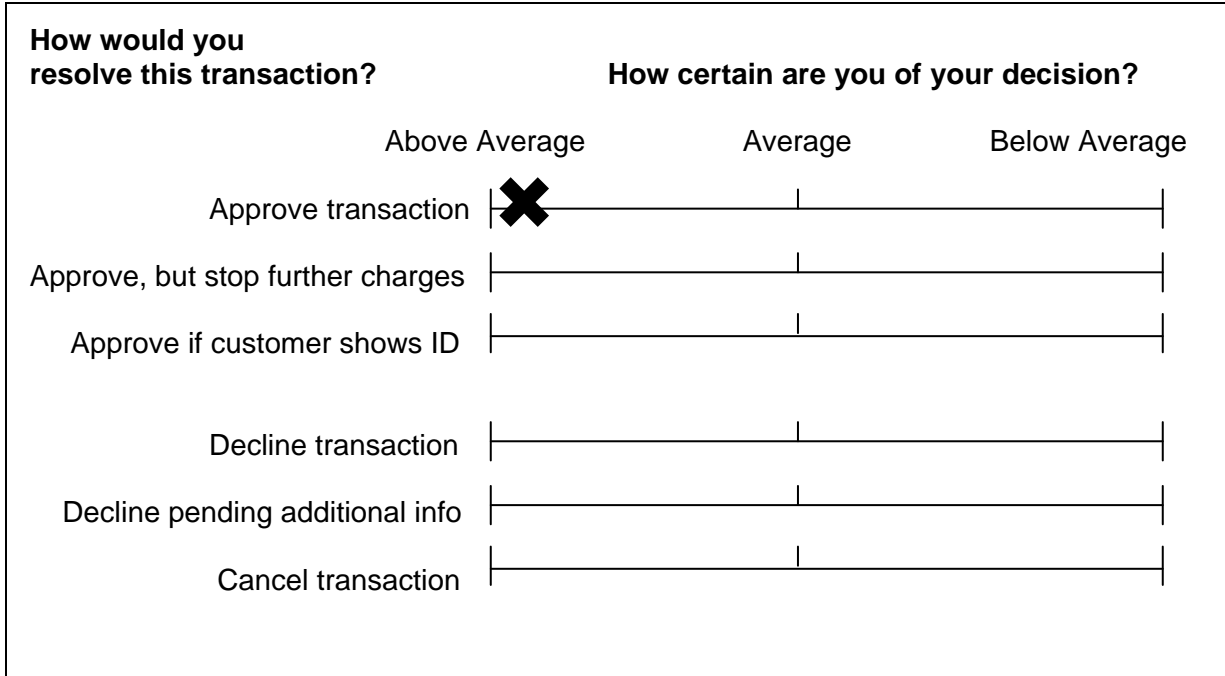
Customer Service Representatives (CSRs) resolved twenty real transactions that had been “captured” and saved the previous month. The CSRs could only view a limited number of screens and part of this test involved identifying additional screens they needed to see.

CSRs viewed the simulated transaction on a PC. They could call up additional screens they wanted to see (which were tracked). When they were ready to render a decision, they clicked on a button that took them to a series of questions like the three shown below. At any point while answering the questions below, the CSRs could go back and look at the transaction.

There was also a “Comments” button on all screens that allowed CSRs to add the details of their thinking process. We did not require them to make comments, but many CSRs used this feature extensively and provided good information.

Screen #1: We tried to get the CSRs decision and their level of certainty. Unfortunately, we found no consistency in the ways CSRs expressed their level of certainty so those data were not used.

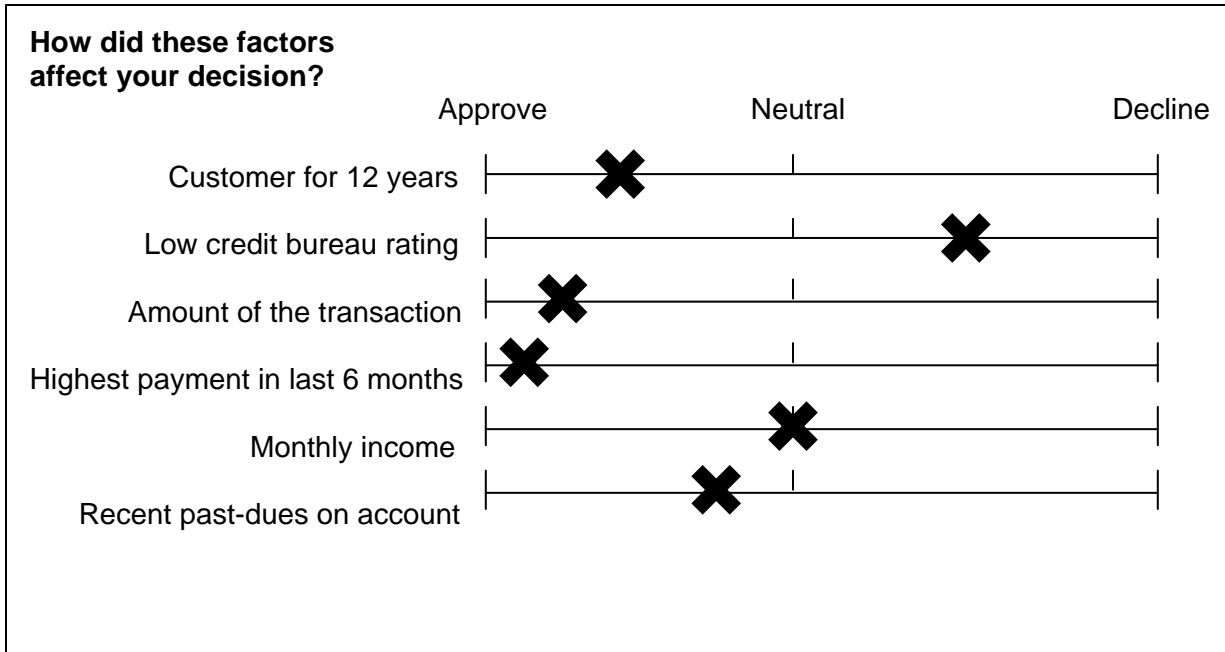
CSRs used a mouse to click on the line. They could change their answers.



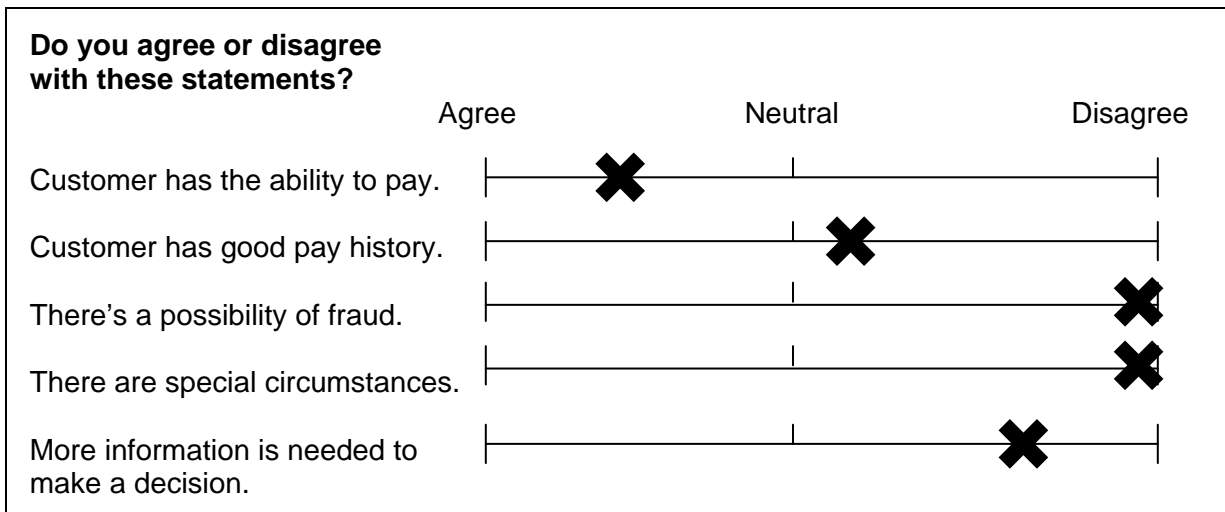
Identifying & Transferring Expertise

Screen # 2: We had identified several dozen potential factors that went into a decision and a primitive weighting algorithm. This screen selected a subset of factors for each transaction and asked CSRs to express their weights.

The screen below yielded a weight from 0 (decline) to 100 (approve). Those weights were normalized and extreme values were discarded. The results were used to develop the final list of factors.



Screen #3: This screen tested the concepts we had identified as being ways in which CSRs organized (or “chunked”) the large number of factors that entered into their decision.



Identifying & Transferring Expertise

For further information, we recommend these books:

Klein, Gary (1998). *Sources of Power: How People Make Decisions*. Cambridge, MA: The MIT Press.

Gary Klein is one of the leaders of the “Naturalistic Decision Making” (NDM) movement. This book is an excellent, highly recommended explanation of that school of thought. Klein is especially good at integrating the new insights from the NDM school with the Behavioral Decision Making research spawned by Kahneman & Tversky.

Dreyfus, H.L. (1992). *What Computers STILL Can't Do: A Critique of Artificial Reason*. New York: Harper & Row.

This book, originally written in 1972, was almost clairvoyant about the problems that the artificial intelligence movement would encounter over the next two decades. While Dreyfus' primary target is the positivist bias in artificial intelligence research, much of what he says can be applied to how we have approached training during the past fifty years. His breadth of philosophical and psychological knowledge allows him to create strong arguments that should have been heeded thirty years ago.

Clark, Ruth (1998). *Building Expertise: Cognitive Methods for Training and Performance Improvement*, Washington, D.C.: International Society for Performance and Instruction.

Anything Ruth Clark writes is worth reading twice. This book is especially useful because she explains theories of expertise and shows how theory can be turned into practice. Her book takes a broader view of expertise than is taken in this paper so it has wider applications.

Winograd, Terry, and Fernando Flores (1986). *Understanding Computers and Cognition: A New Foundation for Design*, Reading, MA: Addison Wesley.

Winograd was one of the stars of the artificial intelligence community in the 1970's, and was one of the first to acknowledge that the approach he had been taking was severely bounded – just as Dreyfus had predicted almost 15 years earlier. This landmark book explains why he changed his mind and – like Dreyfus' book – contains many ideas that can be apply to training.

Damasio, Antonio R. (1994). *Descartes' Error: Emotion, Reason, and the Human Brain*, New York: Avon Books.

Damasio's book explains how the brain physically works. He argues that “Descartes' Error” – essentially banishing emotions from the concept of rationality – has led us astray, and he presents case studies of people with brain damage to demonstrate his thesis. His perceptualist description of how we process cues inspired the way we described how people form and test patterns.

Seamster, Thomas L.; Redding, Richard E.; Kaempf, George L. (1997). *Applied Cognitive Task Analysis in Aviation*. Aldershot: Avebury Aviation.

This is a very practical book about a very serious topic close to all our hearts: how to train all pilots (and other aviation personnel) to achieve the skill-levels of expert pilots. Seamster *et al.* define the various methods for cognitive task analysis (identifying what is going on inside an expert's head) and give specific, applied examples of how to use these methods. This is one of the few books on Cognitive Task Analysis.