Chapter 7
How to Measure Contact Center Skills Using Multimedia Simulations

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7.1 Introduction

Large companies frequently rely on contact centers to address consumer demand for quick and efficient access to information, problem resolution, and to communicate the value of new products or services. Contact centers are fast-paced, technologically sophisticated businesses that route inbound customer inquiries and outgoing solicitations to employees anywhere in the world. Most contact center jobs require employees to interact with customers, whose demeanor ranges from friendly to hostile, while navigating a complex array of databases that provide access to customer and product- and/or service-related information. Contact center employees usually perform these activities under time pressure and with sophisticated systems monitoring their communication style, reliability, and performance. The combination of job complexity, speed, oversight, and an endless stream of customers causes significant psychological strain that overwhelms ill-suited and maladroit employees, leading to burnout, absenteeism, and attrition.

The contact center industry has turned to realistic multimedia simulations, which allow job candidates to play the part of a fictitious contact center representative to evaluate a candidate's contact center skills (e.g., computer, multitasking, and data entry). Leading simulations have evolved from quasi-interactive situational judgment tests (SJTs) to microcosms of modern centers, complete with training, interactive dashboards, timers, and branching that allows candidates to escalate or deescalate a customer's emotional response based on the skill with which they manage the interaction. Asking a candidate to play the part of a contact center representative creates an engaging experience, presents a realistic preview of the job, and provides

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a company's talent acquisition team greater visibility into the candidate's likelihood to perform well in training and on the job.

This chapter discusses the design, development, deployment, and business impact of interactive, multimedia contact center simulations. Before addressing the role of simulations, however, it is important to understand the contact center industry and the complexity of its jobs and environment.

7.2 A Brief History of Contact Centers

Contact centers are an efficient and cost-effective alternative to in-person interaction with consumers. A contact center is a facility or home-based office from which a company's representatives interact with consumers via telephony and other technologies (e.g., e-mail and instant messenger) while accessing databases to help answer questions, solve problems, solicit new business, and myriad other activities (Holman 2003; Merchant 1998). The terms call center and contact center are often used interchangeably, but they are not identical. A call center refers to an environment in which representatives use telephony-based technology to interact with customers whereas a contact center, a term we will use throughout the remainder of this chapter, describes modern environments that use multiple channels to facilitate interaction with consumers. A contact center is typically invisible to the consumer.

Many contact center environments and jobs reflect the application of scientific management principles to white collar work (Russell 2008). As described by Bagnara (2000), the first contact center appears to have opened in the late 1960s in response to a Federal court order requiring Ford Motor Company to create a toll-free phone number to streamline a vehicle recall. In these early centers, jobs required limited knowledge, skills, and autonomy (Callaghan and Thompson 2001), but management also maintained constant oversight of representatives' performance. This organizational structure caused stress (Taylor et al. 2003) and disengagement (cf. Holman 2002).

The 1970s and 1980s brought changes in consumer attitudes toward service and advances in technology that facilitated more efficient call distribution, but contact centers continued to be plagued by rigid management and poor work design (Hauptfleisch and Uys 2006). More modern, less intuitive products (e.g., electronics) created greater demand for quality customer support. Bagnara (2000) suggested that changes in consumers' attitudes affected the nature of incoming calls. The representative's role evolved from resolving claims to supporting products and the customer's lifecycle. Not equipped to handle the shift to product and consumer support technologically or in terms of the knowledge, skills, abilities and other qualities (KSAOs) of front-line representatives, many centers experienced long wait times, plummeting performance, and dissatisfied callers. The emergence of computers, advanced telephony, and automatic call distribution systems in the late 1980s and early 1990s helped improve contact centers' performance. Nevertheless, management practices and job design failed to adapt to the changes, prompting Wickham and Collins (2004) to describe contact centers as "white collar factories."

The contact center industry has grown at an astonishing rate since the mid-1990s, both domestically and abroad, as companies have attempted to connect directly with customers more quickly and inexpensively (Burgess and Connell 2004; Gilson and Khandelwal 2005; Holman 2003; Taylor and Bain 2005). Holman et al. (2007) pointed out that the contact center sector emerged in most countries between 1997 and 2002. A number of factors enabled this growth, such as competition (Ellis and Taylor 2006), improvements in technology and infrastructure (Norling 2001; Van Gass 2003), and reduced costs of conducting business both near- and off-shore.

Management practices and job design remained relatively unchanged even as the contact center industry has advanced technologically and expanded globally. Research suggests that flexible, autonomous service models outperform rigid, predefined processes (Knights and McCabe 1998). Batt (2002) demonstrated that high-involvement work practices produced lower attrition and higher sales than standardized processes. Contact centers that allow for more independence and collaboration benefit from a more engaged and satisfied workforce (Holman 2002; Loveman 1998). In a comprehensive survey of US contact centers, Batt et al. (2004) reported that the industry averaged 33 % annual turnover with a 6 % daily absenteeism rate; outsourced centers experienced 51 % annual turnover and a 10 % daily absenteeism rate. The results also indicated that centers using high-involvement practices experienced significantly lower turnover (25 % annually) and absenteeism (5 % daily). Despite research illustrating the value of creating an environment that fosters discussion and autonomy, the management structure and job design in many centers—especially outsourced centers—continues to reflect a contemporary form of Taylorism (Russell 2008).

The contact center industry has grown from a single center providing claims support in the late 1960s to a $300+ billion global industry. Contact centers reflect companies' attempts to cater to consumer demand for instantaneous high-quality service. Increased competition and pressure to reduce operating costs have forced many companies to move operations offshore and/or outsource operations to companies that specialize in operating contact centers (i.e., business process outsourcing or BPO), though only 14 % of contact centers in the USA are outsourced (Batt et al. 2004). The offshore investment has become an economic boon for many developing countries (Holman et al. 2007). Despite the industry's expanding footprint, sophisticated technology, and potential to differentiate a company's customer service, many centers continue to be plagued by poor job design and managerial practices that demotivate and disengage employees.

7.2.1 Nature of Contact Center Jobs

Contact center jobs tend to be complex, change frequently, and operate at a frenetic pace. Employees perform multiple tasks with frequent interruptions, engage in repetitive movements, and process complex information in noisy environments, often under time pressure, while their performance, communication, and efficiency

are continually monitored (Bakker et al. 2003). These jobs are often highly scripted, routine, and do not give employees control (Bakker et al. 2003; Zapf et al. 2003). A contact center employee sits for extended periods in front of a computer and may be required to wear a hands-free headset (Zapf et al. 2003). The more customers with whom a representative interacts during a shift—either via voice or other medium—the more routine and potentially boring each interaction becomes (Zapf et al. 2003). The work often places emotional as well as mental demands on employees, who must be ready to respond to any number of issues, resolve them quickly, and do so while maintaining a friendly demeanor. Contact center jobs are often associated with high levels of psychological and physiological strain, which lead to burnout, absenteeism, turnover, and other withdrawal behaviors (Bakker et al. 2003; Holman et al. 2002; Sprigg and Jackson 2006; Sprigg et al. 2007; Zapf et al. 1999; Zapf et al. 2003).

The industry's growth has forced contact centers to support a variety of jobs that can be performed in different environments (e.g., physical centers and home offices) and across multiple channels (e.g., voice, email, and chat or instant messenger). Unfortunately, little detailed information is publicly available about most contact center jobs' competencies or KSAOs, so Holland and Lambert (2008) created a survey to collect subject matter expert (SME) ratings on 53 competencies. SMEs completing the survey make four ratings per competency (i.e., necessity at entry, practicality of finding it in the labor pool, its potential to distinguish successful from average performance, and likelihood of trouble if ignored), which are combined to form an importance score that allows the 53 competencies to be sorted from most to least important. The survey database includes ratings on 101 contact center jobs by 2,928 SMEs (e.g., supervisors, incumbents, trainers, and managers) from 16 countries and five continents.

The most important competencies for six common contact center jobs and the channels through which those jobs are performed are summarized in Table 7.1. The diversity and sophistication of contact center jobs is illustrated by the number of channels, environments, and competencies rated as important (i.e., 35) for one or more jobs. The first 15 rows of the table highlight universal competencies important for the six jobs, regardless of whether it is performed in a physical or home office. These 15 competencies reflect personal responsibility, effective communication, emotional control, and comfort with change, technology, and simultaneous work activities. The remaining competencies tend to be more specific to a job (e.g., persuasiveness for outbound sales) or environment (e.g., autonomy for home-office jobs). Job and environment-specific competencies play a central role in understanding the unique and/or nuanced differences between jobs that are vital when determining how to assess candidates, whether to hire a candidate, and then into which job to place a new hire that will maximize the likelihood of success.

7.2.2 Challenges Hiring Contact Center Representatives

Contact center jobs place significant demands on the representative, so successful performance reflects an assortment of individual differences variables. The key to

hiring the right contact center representative is to identify the KSAOs that underlie effective performance and measure them accurately. In the remainder of this section, we discuss two of the primary challenges associated with hiring and keeping successful contact center representatives: recruiting and screening.

Recruiting an adequate supply of well qualified candidates is a precursor to hiring the right people. Implementing strategically driven processes to sustain a steady supply of contact center talent is akin to taking out an insurance policy on a center's future. Many centers, unfortunately, seem to favor a just-in-time philosophy—the same approach used to manage physical inventory—in which a pool of "replacements" is identified quickly by posting an advertisement on a job board, rewarding employees for referrals or by calling a staffing office. The problem is that low wages, weak benefits, undesirable shifts, and inflexible schedules force many qualified candidates to seek alternative employment. The final candidate pool often lacks the qualities and skills essential for success in a contact center, but the need to meet hiring goals can outweigh the desire to hire the highest caliber candidates. The result is that hiring managers often take chances on marginal or fringe candidates.

The second obstacle is accurately assessing candidates' likelihood of success. Well-designed screening processes are built on job analysis and empirical validation, create an engaging experience, and are monitored using closed-loop analytics (i.e., continuous statistical analyses linking test or assessment scores to key performance outcomes) to remain aligned with performance outcomes. In our experience, many centers do a reasonable job assessing candidates' knowledge (e.g., computer software and hardware), ability, and personality characteristics. However, when it comes to measuring essential job-relevant skills, far too many centers miss the mark.

The most common jobs in an inbound contact center require a core set of competencies (e.g., first 15 competencies mentioned in Table 7.1), though three of those skills are particularly important. First, in most centers, candidates must possess basic computer navigation skills prior to being hired. The reason is twofold: (1) employment training is generally conducted in a setting that requires the new hire to interact with a computer, and (2) the contact center job almost always requires the representative to toggle between multiple screens, use the Internet, search databases, etc. Candidates lacking basic computer skills struggle with training and frequently fail. For those who successfully complete training, the on-the-job experience can be especially frustrating and often leads to early attrition. Second to computer navigation skills is keyboarding skill. Keyboarding is different from typing skill because it focuses on speed and accuracy of data entry rather than typing formal, punctuated sentences. During calls, representatives input identifying information to access databases necessary to address a customer's questions. After the call has ended, representatives enter notes that summarize the purpose of the call and its resolution. Candidates who lack keyboarding skills often fail to meet productivity goals. Finally, one of the most essential contact center skills is also one of the most difficult to measure—multi-tasking. A fact of life in an inbound, phone-based contact center is that a representative will have to talk and listen to customers while entering information into a database, reading a summary of the customer's account, etc. The skill to "talk and type" or "talk and read" is frequently hailed by industry insiders as an

Table 7.1 Common contact center jobs' core competencies and channels

	Common contact center jobs											
	Customer care		Inbound sales		Technical support		Customer retention		Collections		Outbound sales	
	B&M	W@H	B&M	W@H	B&M	W@H	B&M	W@H	B&M	W@H	B&M	W@H
Competencies												
Compliance	▲	▲	▲	▲	▲	▲	▲	N/A	▲	▲	▲	▲
Listening	▲	▲	▲	▲	▲	▲	▲	N/A	▲	▲	▲	▲
Composure	▲	▲	▲	▲	▲	▲	▲	N/A	▲	▲	▲	▲
Oral communication	▲	▲	▲	▲	▲	▲	▲	N/A	▲	▲	▲	▲
Dependability	▲	▲	▲	▲	▲	▲	▲	N/A	▲	▲	▲	▲
Integrity	▲	▲	▲	▲	▲	▲	▲	N/A	▲	▲	▲	▲
Tact	▲	▲	▲	▲	▲	▲	▲	N/A	▲	▲	▲	▲
Professionalism	▲	▲	▲	▲	▲	▲	▲	N/A	▲	▲	▲	▲
Learning aptitude	▲	▲	▲	▲	▲	▲	▲	N/A	▲	▲	▲	▲
Accountability	▲	▲	▲	▲	▲	▲	▲	N/A	▲	▲	▲	▲
Stress tolerance	▲	▲	▲	▲	▲	▲	▲	N/A	▲	▲	▲	▲
Adaptability	▲	▲	▲	▲	▲	▲	▲	N/A	▲	▲	▲	▲
Multitasking	▲	▲	▲	▲	▲	▲	▲	N/A	▲	▲	▲	▲
Computer skills	▲	▲	▲	▲	▲	▲	▲	N/A	▲	▲	▲	▲
Keyboarding skill	▲	▲	▲	▲	▲	▲	▲	N/A	▲	▲	▲	▲
Problem-solving	▲	▲			▲		▲	N/A	▲			
Openness to feedback	▲	▲	▲					N/A	▲		▲	
Decision-making	▲	▲					▲	N/A	▲		▲	
Detail orientation	▲	▲	▲	▲				N/A				
Probing	▲	▲	▲	▲	▲	▲		N/A				
Computer knowledge		▲		▲	▲	▲		N/A		▲		▲
Autonomy		▲		▲		▲		N/A		▲		▲
Perseverance		▲						N/A		▲	▲	▲
Problem recognition					▲			N/A				
Empathy						▲	▲	N/A				
Conflict resolution							▲	N/A	▲			

Table 7.1 (continued)

Positive attitude			▲				▲	N/A	▲	▲	▲	▲
Resilience								N/A				▲
Sales aptitude			▲	▲				N/A			▲	▲
Self-confidence			▲	▲				N/A			▲	▲
Self improvement				▲				N/A				▲
Relationship building								N/A			▲	
Persuasiveness								N/A				▲
Ambition								N/A				▲
Flexibility							▲	N/A				▲
Channel												
Voice	●	●	●	●	●	●	●	●	●	●	●	●
Chat/IM	●	●	●	●	●	●	●	●				
E-mail	●	●					●	●	●	●		

Sample sizes range from $N = 10$ for W@H collections to $N = 1{,}385$ for B&M customer care

B&M Brick-and-Mortar, *W@H* Work-at-Home

Competency definitions from job analysis survey are as follows: *Compliance* follows rules, regulations, and guidelines, *Listening* pays attention to what people say without interrupting, *Composure* controls emotions when dealing with hostile people; *Oral communication* communicates in spoken form in a clear and grammatically correct manner, *Dependability* follows through on commitments; can be counted on, *Integrity* adheres to ethical principles, *Tact* recognizes what to do or say to avoid offending others, *Professionalism* displays proper business etiquette, *Learning aptitude* learns and applies new information quickly and accurately, *Accountability* takes responsibility for actions and consequences, *Stress tolerance* manages the physical and emotional effects of pressure, *Adaptability* adjusts oneself to changing conditions or situations (e.g., policies), *Multitasking* works on several tasks at the same time without making errors, *Computer skills* navigates and uses a computer effectively to accomplish tasks, *Keyboarding skill* uses a keyboard to enter information quickly and accurately, *Problem-solving* uses logic and reason to identify solutions to problems, *Openness to feedback* accepts and applies others' feedback to enhance own performance, *Decision-making* makes choices that serve the business and its customers well, *Detail orientation* produces work that is error free and high in quality, *Probing* examines issues closely by asking questions, *Computer knowledge* displays working knowledge of computer hardware and software, *Autonomy* works well with little or no supervision, *Perseverance* remains focused on completing the job and is not easily distracted, *Problem recognition* identifies patterns or trends that may signal potential problems, *Empathy* identifies with and understands another person's situation or feelings, *Conflict resolution* solves disagreements between others diplomatically, *Positive attitude* upbeat person who sees the good in people and situations, *Resilience* rebounds quickly from difficult or stressful situations, *Sales aptitude* positions offers and convinces others to purchase, *Self-confidence* believes in oneself and one's skills and abilities, *Relationship building* establishes connections with others based on respect and trust, *Persuasiveness* convinces others to take a desired action, *Ambition* shows strong desire to achieve results, *Flexibility* changes one's approach to accommodate unique customers' needs

essential factor for an employee to be successful. Employees who struggle to multitask tend to become overwhelmed by the job, fail to meet performance standards, provide poor service, and usually leave the job early in their tenure.

Finding, hiring, and retaining employees with the characteristics necessary for long-term success can provide an organization with a significant competitive advantage (McCulloch and Turban 2007; Sawyerr et al. 2009). The US Department of Labor (2000) recommends a "whole-person approach" to assessment to help ensure adequate measurement of the predictor domain. In many cases, using a variety of assessments is a good strategy (Dunnette 1966) for increasing the defensibility of the pre-hire selection system as a whole (Pulakos and Schmitt 1996), and is supported by research on the incremental validity of various selection methods (Schmidt and Hunter 1998). However, in instances where a particular domain has not been measured well, such as with contact center skills, until the emergence of multimedia simulations in the last decade, adding more assessments to a battery will lengthen the screening process without adding incrementally to prediction.

Once we know what to measure, we must ensure that we measure it well. According to the *Principles for the Validation and Use of Personnel Selection Procedures* (hereafter *Principles*; Society for Industrial and Organizational Psychology 2003), "validity is the most important consideration in developing and evaluating selection procedures" (p. 4). This is because the validity of a pre-hire tool provides evidence of its job relevance, which is essential for defensibility (Equal Employment Opportunity Commission 1978). Thus, in order to know that we have measured what we intended to measure, and that we have measured it well, we must gather validity evidence. In the next section, we briefly explore the history of multimedia simulations.

7.3 Using Simulations to Select Better Employees

Organizations have relied on decision-making processes to identify the best job candidates for thousands of years. Plato described physical and cognitive ability assessments used to determine selection for state service in ancient Greece (Jeanneret and Silzer 1998). Since that time, organizations have experimented with a dizzying array of tools and methods to improve accuracy, such as interviews, graphology, biographical data, personality inventories, general mental ability tests (GMAs), SJTs, and work samples and job simulations. The underlying goals are to design pre-hire screening processes that:

- predict important work outcomes (e.g., job performance and turnover) accurately,
- create a positive candidate experience (e.g., face valid, job related, engaging),
- produce a fair outcome that is unaffected by demographic characteristics,
- reflect cost effective methods, and
- administer easily, particularly when hiring volume is high.

Many assessments fail to meet one or more of the above goals (see Table 7.2). Work sample tests and job simulations represent attractive options based on the first three

Table 7.2 Alternative selection procedures

Reference	Selection procedure	Published validity estimates[a]	Candidate reactions	Potential for adverse impact	Cost to develop	Feasibility for high-volume hiring
McDaniel et al. (1994)	*Interview*	Vary depending on interview type—.18 for unstructured; .24 for structured	Vary depending on nature of questions	Moderate to high (also potential disparate treatment concerns for unstructured)	Moderate to high (costly and time consuming to train interviewers)	Low (one-on-one administration required)
Rothstein et al. (1990)	*Biographical data*	.26	Potential negative (unfair, invasive, or not job related)	Low	Low	Moderate to high
Pearlman et al. (1980)	*General mental ability*	Vary depending on measure—.21 for general mental ability; higher for many specific measures	Vary depending on face validity of test	High	Low	High
Barrick et al. (2001)	*Personality*	Vary depending on characteristic—.21 for conscientiousness	Vary depending on nature of questions	Low	Low	High
McDaniel et al. (2001)	*Situational judgment*	.26	Generally positive (fair, job related)	Low	Moderate to high (time/cost may be better spent on higher fidelity simulations)	High
Roth et al. (2005)	*Work samples*	.26 (Regarded by many researchers as the most valid predictors of job performance)	Positive (fair, job related, engaging)	Low	Moderate to high	High

[a]Values represent sample-weighted correlations

criteria (validity, candidate perceptions, and low adverse impact), but struggle to meet the last two criteria because they can be costly, time consuming, and difficult to develop and/or administer.

Concerns about the accuracy and defensibility of some pre-hire screening procedures prompted challenges to conventional thinking about validation and testing (Guion 1967). Wernimont and Campbell (1968), for example, argued for the adoption of a *behavioral consistency model* over the *classic validity model*, which assumed that assessment scores are only an indicator of future behavior. The behavioral consistency model suggested that by sampling candidates' actual behavior using high-fidelity assessments, rather than relying on indirect signs, researchers could predict job performance more accurately (cf. Guion 1998; Roth et al. 2005). Behavioral sampling reached its height in the 1960s partly due to the growing popularity of managerial assessment centers (Bray and Grant 1966).

Published articles often classify simulations as a type of a work sample without discussing the rationale or criteria on which the decision was based. A commonly accepted definition of work sample comes from Ployhart et al. (2006), who state that "a work sample test is a test in which the applicant performs a selected set of actual tasks that are physically and/or psychologically similar to those performed on the job" (p. 538). However, one important difference between these two approaches is that a candidate completing a work sample will perform a subset of a job's tasks, often in the actual environment and using the requisite tools and equipment, whereas a candidate completing a simulation will perform job-related activities in a fabricated environment. Nevertheless, disentangling research on work samples from research on job simulations is nearly impossible because much of the published literature subsumes simulations under the "work sample" label.

There are at least four benefits of using job simulations or work samples in employee selection (Callinan and Robertson 2000; Robertson and Kandola 1982). First, work samples are among the most valid predictors of job performance (Hunter and Hunter 1984; Reilly and Warech 1993; Roth et al. 2005), outperforming GMA in at least one large-scale meta-analysis (Schmidt and Hunter 1998). Earlier meta-analyses included a smaller-scale review (Hunter 1983) of work sample tests in relation to supervisor ratings of performance in non-military samples and a review of work sample studies published from 1964–1982 (Schmitt et al. 1984). The Hunter (1983) and Schmitt et al. (1984) studies reported mean corrected correlations of .42 and .38, respectively. These results align with Roth et al.'s (2005) more recent meta-analysis that reported a mean corrected coefficient of .39. Finally, a frequently cited meta-analysis examining the validity of assessment centers (Gaugler et al. 1987), which consist primarily of work samples and simulation exercises, reported mean corrected coefficients of .53 (ratings of employee potential) and .36 (actual job performance).

Second, simulations appear to cause less adverse impact than some other types of assessments, such as GMA. Schmitt et al. (1996) reported that GMA scores routinely reflect a difference of 1.00 standard deviation (SD) favoring White over minority candidates whereas work samples show a difference of only .38 SD between White and African–American candidates, and virtually no difference between White and Hispanic–American candidates. More recent research (Bobko et al. 2005; Roth

et al. 2008) suggests that subgroup differences may be higher than Schmitt et al. estimated (e.g., Roth et al. reported a .73 SD difference between African–American and White candidates), though still lower than the difference produced by GMA. The relatively modest group differences probably contributed to Ployhart and Holtz's (2008) suggestion that simulations represent one way to avoid or decrease adverse impact in the selection process. Furthermore, an analysis of Federal court cases (Terpstra et al. 1999) that found work sample tests had been defended successfully in six of the seven cases on record.

Third, job simulations and work samples show high face validity (Callinan and Robertson 2000; Cascio and Phillips 1979) and are viewed favorably by candidates (Hattrup and Schmitt 1990; Hausknecht et al. 2004; Vance et al. 1989). According to Hausknecht et al. (2004), positive candidate reactions are influenced not only by face validity and job relatedness, but also by the perceived validity of the selection procedure. A recent meta-analysis of candidate reactions (Anderson et al. 2010) confirmed earlier findings that candidates preferred work samples over GMA, biographical data, and personality inventories.

Finally, simulations provide candidates with a realistic job preview (Callinan and Robertson 2000) because they often mirror important aspects of the job on which they are based. As early as 1973, O'Leary touted the use of job simulations, citing two primary benefits: (1) they help the organization learn important information about a job candidate's suitability based on demonstrated behaviors and skills and (2) they "[enable] the applicant to learn something important about the job's suitability . . . (p. 148)."

There are three major challenges associated with the design and deployment of multimedia simulations. The first challenge is that it is difficult to create a simulation capable of immersing a job candidate into a series of high-fidelity scenarios, particularly in complex jobs (Callinan and Robertson 2000; Lievens and De Soete 2012). Creating an artificial setting that replicates a work environment, complete with realistic situations, encounters, interactions and problems, is a painstaking process that requires the design team to draw on the collective expertise of many SMEs and complete numerous iterations to perfect the product. The time and effort required to build a realistic simulation that accurately measures a candidate's job related skills is one reason behind the rise of low-fidelity simulations or SJTs (Motowidlo et al. 1990), which use noninteractive, job-relevant vignettes to assess what candidates would do in different scenarios.

The second challenge concerns hurdles associated with administering a multimedia simulation across a diverse technological landscape. The technology that enables a simulation to work properly usually requires testing computers to meet or exceed certain technical specifications (e.g., hardware, software, and Internet access). Adhering to the minimum technical requirements is simplest in company-owned or proctored testing centers, though Internet firewall and other security-related monitors periodically interfere with a candidate's ability to access and complete a simulation. As more companies have adopted remote-testing policies (i.e., allowing candidates to test from home), the number of candidates affected by technical glitches has

skyrocketed due to incompatible equipment, missing or an incorrect version of software, poor or slow Internet connection speed, and user error (Barak and English 2002; Garland 2012; Tippins et al. 2006). According to some estimates (Fluck et al. 2009; FurstPerson 2012), as many as 20–40 % of candidates testing from home experience some type of technical issue while completing a simulation. Although it appears rare for a technical glitch to affect a candidate's score on a simulation, these nuisances may negatively impact the candidate's experience and perception of the prospective employer.

The last major challenge associated with simulations is the cost to design and develop them. It takes a team hundreds of hours to understand a job, identify its essential functions and skills, and parlay that knowledge into a storyboard and production-ready script. The implication is that companies often spend tens of thousands of dollars before beginning to produce the simulation (Roth et al. 2010). After hiring actors, graphic designers, instructional designers, creating beta versions of the tool and, eventually, a final production-ready product, the investment in a simulation is often between $100,000 and $500,000 or more, depending on its length and the complexity.

The challenges associated with multimedia simulations undermined their popularity in the past (Callinan and Robertson 2000; O'Leary 1973; Schmitt and Mills 2001), but improved technologies (e.g., broadband, Adobe® Flash®, and HTML5) minimized two of the major barriers to entry (i.e., administration and cost), thus paving the way for a new generation of high fidelity assessments.

During the 1990s, job simulations required companies to install sophisticated software on every computer being used to administer the assessment. The installation requirements limited the locations from which a candidate could complete the simulation, and a company's internal security settings frequently complicated the process. Adding to the problem was that the multimedia files used by many simulations required significant random-access memory (RAM) and hard drive space to operate properly, and many testing computers failed to meet the minimum requirements. In addition, releasing an update or launching a new version of a simulation required the software to be reinstalled on every computer, creating new technical challenges and complex version-control issues with every release.

Improvements in the speed and reliability of Internet access during the late 1990s and early 2000s, along with advances in software technology, enabled web-based delivery of job simulations. Delivering simulations via the Internet alleviated some of the hardware and version-control problems, but not many computers used standard internet communication ports at the time. Therefore, companies selling pre-hire screening simulations during these formative years had to work closely with a customer's IT team, sometimes for weeks at a time, to configure Internet access. Widespread availability of broadband Internet access (68 % of US households reported having broadband access in 2010; US Department of Commerce 2011) and the use of standard internet ports helped address one of the constraints surrounding web-based delivery of simulations. A second development, software supporting web-based multimedia applications without requiring a simulation to be installed on

a local computer (e.g., Flash® and Silverlight®), helped overcome most of the remaining administrative hurdles. In fact, today, the most common technical problems encountered by candidates are easily corrected with a free software update.

Animation authoring software has reduced the costs of building multimedia simulations. Building a simulation in the 1990s was typically a custom project that required a programmer to spend countless hours writing code. New technologies, such as Flash®, simplified and streamlined the authoring process. The efficiency gained from more advanced authoring software has reduced the investment required to build elegant multimedia simulations. For a more extensive treatment of the technologies available for simulation developers, we refer the interested reader to Chap. 4 (Hawkes, this book).

7.4 Contact Center Simulations

The nature of contact center work makes it challenging to identify candidates with the greatest likelihood of success. The work is complex and varied, and qualified candidates must possess a multitude of skills, abilities, and personality characteristics. As such, contact centers provide the ideal context for examining the value of accurate, high-quality pre-hire assessments that simulate the complex nature of the work to evaluate candidates' job relevant skills (Frisch 1998).

Contact centers have used simulations to evaluate job candidates' skills for more than a decade. Much of this work has been obscured from public view because organizations in the test publishing and contact center industries gained competitive advantages from designing and using simulations. The following review of published literature on contact center simulations, therefore, summarizes only a fraction of the work on these tools. Highlighting the disconnect between research and practice is that there appear to be fewer than a dozen peer-reviewed empirical articles on contact center simulations, but a Google® search on the term "contact center simulations" produced over 300,000 results.

Some of the earliest published research on contact center simulations stems from the work of Sidney Gael, Donald Grant, Douglas Bray, and their colleagues at AT&T in the late 1960s and early 1970s. The AT&T team created an interactive job simulation to study customer service representatives (Gael and Grant 1972) and telephone operators (Gael et al. 1975). Participants received detailed training on how to use job aides, equipment, and perform the job properly before participating in the study. The simulation began with a call from an administrator, playing the role of a fictitious customer, to a participant. Participants interacted with the caller and used job aides and equipment to manage the call. A second group of administrators observed participants' behavior and evaluated their performance. Perhaps reflecting the time and cost associated with conducting these simulations, the AT&T team used scores from the simulation as a criterion measure in their studies. In the service representative study, the predictor battery included "a role playing interview modeled after tasks performance by [Service Representatives] in telephone contacts with customers"

(p. 136), which significantly correlated with training proficiency and job performance measured by the simulation.

In one of the only other peer-reviewed articles examining the validity of contact center simulations in pre-hire screening, Schmitt and Mills (2001) studied service representatives using a "high-fidelity computerized job simulation" to measure job relevant skills. Similar to the simulations used by Gael and colleagues three decades years earlier, trained assessors evaluated candidates while completing a realistic telephone-based role-play initiated by other assessors acting as customers. During the role-play, candidates used computers to navigate databases while handling the fictitious customer's call, which corresponds to the work contact center employees perform today. Schmitt and Mills found that scores on the job simulation significantly predicted on-the-job performance ($r = .32$).

More recent contact center simulation studies adopted methods similar to those used by Gael and Grant (1972), Gael et al. (1975), and by Schmitt and Mills (2001). However, these studies focused on emotional labor (Rupp and Spencer 2006), self-regulatory behaviors (Zyphur et al. 2007), and emotional regulation (Chi et al. 2011; Goldberg and Grandey 2007) rather than on the validity of simulations in pre-hire settings.

Although most recent studies do not improve the field's understanding of simulations as predictors of post-hire performance, they provide a glimpse into the evolution and ever-increasing complexity of these tools. Murthy et al. (2008), for example, used interactive, multimedia simulation software, complete with branching technology (i.e., programming that moves the customer engagement closer toward or farther from resolution based on the quality of the participant's decisions), to train employees how to interact with different types of customers in a realistic, yet low-stakes setting. The confluence of three streams—technological advances, pressure to more closely mirror the complexity of person-to-person interactions, and creating an immersive and interesting candidate experience—forced the field to blend test construction and film production into a unified development model.

7.4.1 Designing a Modern Contact Center Simulation

The value of a contact center simulation as a pre-hire screening tool is predicated, at least in part, on its ability to immerse a candidate into a particular job. Achieving such a high level of fidelity requires multidisciplinary collaboration to ensure the simulation conveys a job's essential duties and measures a candidate's performance accurately. The steps involved in developing a contact center simulation are shown in Fig. 7.1.

Designing a modern contact center simulation represents a significant undertaking that generally proceeds sequentially through the ten steps shown in the figure. The time that it takes to complete the steps varies based on the type of job, availability of resources, access to data, and the complexity of scoring and reporting, but a moderately complex three-call version of a contact center simulation can be designed, developed, validated, and released in 8–12 months at a cost of $150,000 to $300,000.

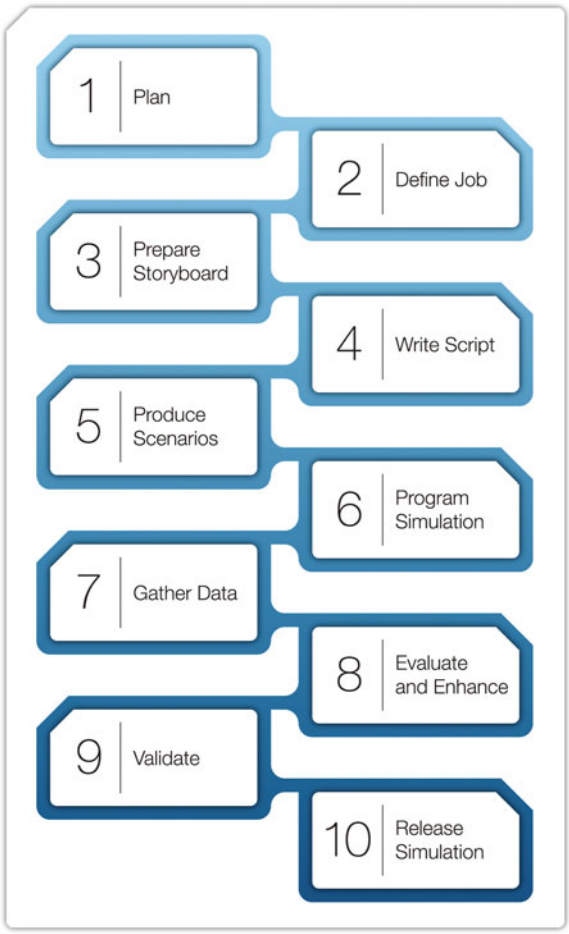

Fig. 7.1 Contact center simulation development steps

7.4.2 Profile of a Modern Contact Center Simulation: CC Audition®

Two factors inspired development of CC Audition® (FurstPerson 2006; Holland and Lambert 2011). First, providing staffing services to the contact center industry allowed FurstPerson, Inc. to experience firsthand the challenges of identifying candidates capable of performing well and remaining in a contact center job for more than a couple of months. The company's leadership team believed that the difficulty of making successful temporary placements represented an opportunity to differentiate its practices by using pre-hire screening tools that would improve the performance and tenure of temporary staff. After reviewing the assessment landscape and best practices at the time, the company attempted to adopt a holistic measurement strategy that

focused on identifying the unique blend of personality characteristics, biographical factors, skills, and GMA essential for successful performance and retention. However, we recognized almost immediately that the lack of well-designed, high-fidelity contact center skills assessments in the market was a gap that needed to be closed.

Second, we saw potential value in combining elements from the video game industry with modern test design to create an engaging, fun candidate experience that portrays the contact center job realistically while measuring essential skills accurately. The notion of creating a "fun" candidate experience received enthusiastic endorsement from contact center recruiting teams, which frequently struggled to move large volumes of candidates through the entirety of the hiring process. Ultimately, the need for a high-fidelity contact center skills assessment that provided candidates with an informative and entertaining experience laid the groundwork for CC Audition®.

The simulation's development mirrored the steps outlined in Fig. 7.1. The process began by collecting data to clarify (a) contact center jobs' essential tasks and duties, (b) the types of inquiries fielded by representatives, and (c) the competencies required to perform the job(s) well. The industry- and job-related intelligence helped the design team prepare eight unique storyboards (e.g., interactive voice scripts, contact center dashboards, and knowledge bank). A customer advisory board reviewed the storyboards for accuracy, realism, and relevance to contact center jobs. After incorporating the advisory panel's feedback into the scenarios, the team drafted a module to teach job candidates, regardless of previous contact center experience, how to perform the representative's job in the simulated contact center. The design team then partnered with actors to record audio files and programmers to develop a beta version of the simulation. Finally, field testing permitted the design team to finalize scoring and evaluate the simulation's psychometric properties and validity.

The simulation is a multimedia assessment that predicts contact center representatives' job performance. An interactive dashboard places candidates in a fictitious contact center, whether in a physical contact center (Fig. 7.2) or from a home office (Fig. 7.3), in which they play the part of a contact center representative. The format of the simulation contains a training module (Fig. 7.4), sample customer call to practice the job in a low-stakes setting, and then between one and three scored customer engagements (Fig. 7.5). The simulation measures a candidate's critical contact center skills (see Table 7.3).

The simulation was designed to measure contact center skills consistently and accurately. Its success delivering on these objectives depended on its internal psychometrics and external validity. Reliability summarizes the consistency of the simulation's measurement. A selection tool that fails to measure its intended constructs reliably is probably inappropriate to use in high-stakes decision making processes, such as hiring. Table 7.4 presents two estimates of the simulation's reliability: (a) Cronbach's (1951) alpha, a well-accepted statistic for estimating consistency of measurement across test items and (b) test-retest reliability, which reflects the stability with which a test measures a construct across repeated administrations to the same candidate. Cronbach's alpha and test-retest reliability coefficients reflect acceptable reliability at .70 or higher, good reliability at .80, and excellent reliability at .90 or greater (Nunnally 1978). Both Nunnally and the US Department

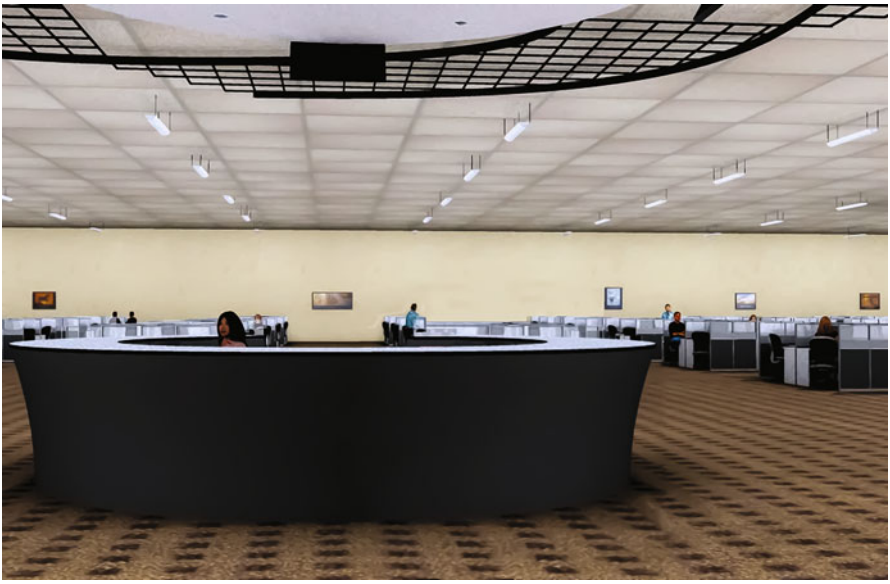

Fig. 7.2 Brick-and-mortar contact center simulation

Fig. 7.3 At-home contact center simulation

Fig. 7.4 Simulated contact center training

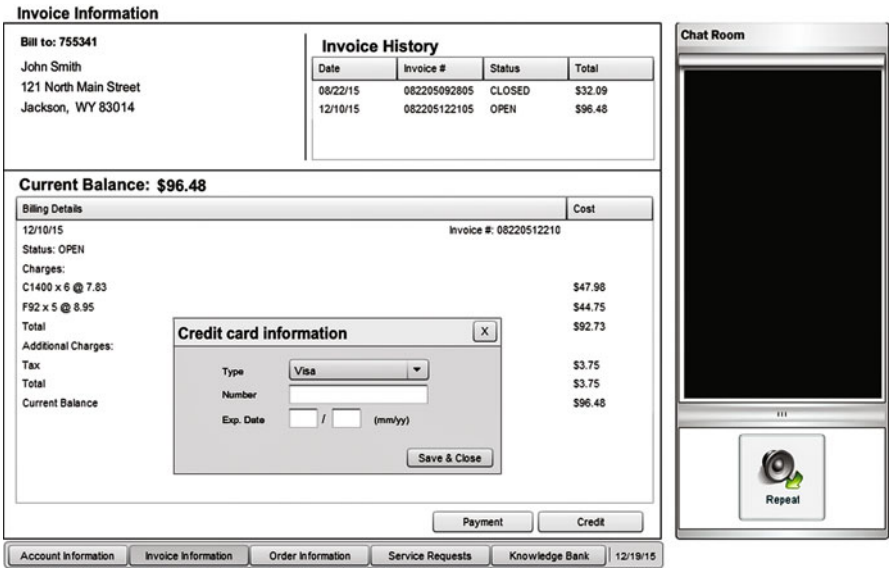

Fig. 7.5 Simulated customer account interface

of Labor (2000) argued that the type of reliability, type of measure, and the way in which the measure is being used are essential considerations when evaluating whether an instrument possesses a satisfactory level of reliability. According to the US Department of Labor's guidelines on interpreting reliability coefficients, an acceptable test-retest reliability coefficient may be lower than .70 for constructs that

Table 7.3 Competencies measured by CC Audition®

Competency	How it is measured
Computer skills	Computer skills are assessed by requiring candidates to complete actions such as accessing customer payment and order information, navigating between multiple screens, and searching for information using a knowledge bank
Accuracy	Accuracy skills are assessed by evaluating a candidate's attention to detail (e.g., following procedures) and entering information and data correctly
Multitasking	Multitasking skills are assessed using proprietary timers that track the speed at which a candidate performs multiple activities correctly
Customer service potential	Customer service potential is measured by the quality and efficiency of the customer engagement
Sales potential	Sales potential is measured based on the candidate's success identifying sales opportunities, positioning the proper offer, and influencing the customer's decision by overcoming resistance and suggesting alternatives

Table 7.4 CC Audition® reliability estimates

Study sample	*N*	Type of reliability	Reliability estimate
Contact center representatives from insurance, financial services, and outsourcing organizations	168	Cronbach's alpha (α)	.94
Candidates applying to a variety of contact center organizations	457	Cronbach's alpha (α)	.95
Candidates who applied more than once to a contact center organization	376	Test-retest (r_{tr})	.75

Table 7.5 CC Audition® meta-analytic validity results

Criterion	k	*N*	Avg *N*	r_{obs}	SD_r	ρ_v	ρ	SDρ	% VE	90 % CV
AHT	34	6,471	190	.19	0.09	.32	.37	0.16	46	.22
CSAT	19	3,153	158	.14	0.07	.30	.34	0.17	53	.17
QA	24	5,937	247	.18	0.10	.36	.41	0.25	66	.30
Sales	8	924	116	.19	0.08	.32	.37	0.16	64	.21

k number of studies, *N* number of participants across *k* studies, *avg N* average number of participants within each study, r_{obs} mean observed validity, SD_r *SD* of observed correlations, ρ_v operational validity (corrected for range restriction and criterion unreliability only), ρ true validity at scale level (corrected for range restriction and predictor-criterion unreliability), SD_ρ *SD* of true validity, *% VE* percentage of variance explained, *90 % CV* credibility value, *AHT* average handle time per call; *CSAT* customer satisfaction, *QA* call quality, *Sales* sales performance

are expected to vary over time (e.g., skills that are likely to improve with practice and experience). In contrast, for Cronbach's alpha, Nunnally cautions that "in those applied settings where important decisions are made with respect to specific test scores, a reliability of .90 is the minimum that should be tolerated" (p. 246). The estimated alpha and test-retest coefficients suggest that the simulation is measuring constructs consistently, both internally and across repeated measures.

Demonstrating consistent measurement, though a necessary condition, does not ensure the simulation measures the intended construct(s). Accumulating criterion-related validation results provides evidence that candidates' simulation scores relate to important on-the-job outcomes, such as work productivity, work quality, or employee retention. According to the *Principles* (Society for Industrial and Organizational Psychology 2003), "validity is the most important consideration in developing and evaluating selection procedures" (p. 4) because it supports its job relevance, utility, and legal defensibility (Equal Employment Opportunity Commission 1978). A summary of meta-analytic validity coefficients for the simulation, across contact center jobs and four common performance metrics, is presented in Table 7.5. The table illustrates the simulation's ability to predict a broad array of criteria, which range from QA (quality assurance; $\rho = .41$), an index summarizing a representative's adherence to formal protocols, to CSAT (customer satisfaction; $\rho = .34$), based on post-call attitudinal survey data gathered from customers. The results correspond to those reported by Schmitt and Mills (2001), though a noteworthy difference is that this simulation does not incorporate trained assessors but the simulations within the Schmitt and Mills analysis did.

The simulation's operational validity, an estimate of an assessment's validity in practice, places it among some of the most valid predictors in employee selection today. Although the simulation's operational validity tended to be slightly lower than GMA ($\rho_v = .37$; Schmidt et al. 2006), it exceeded the estimates for work samples ($\rho_v = .26$; Roth et al. 2005) and Big Five openness ($\rho_v = .20$), conscientiousness ($\rho_v = .19$), and emotional stability ($\rho_v = .17$) factors (van der Linden et al. 2010). These results, albeit preliminary, are encouraging and will hopefully stimulate more research into the potential value of multimedia simulations in contact center employee selection.

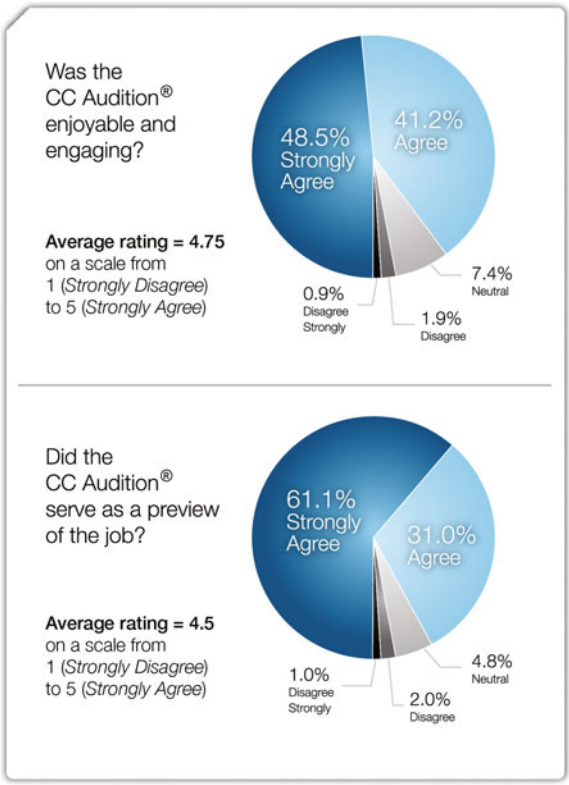

Fig. 7.6 Contact Center Candidate Survey Feedback

In addition to designing a reliable, valid assessment, the team also attempted to develop a simulation that would deliver an engaging candidate experience. Job seekers spend hours conducting job searches and completing pre-hire applications and assessments. An organization that is able to create a fun and interesting pre-hire process may be better positioned to hire its most coveted recruits. Figure 7.6 highlights survey results from more than 5,200 contact center job candidates. On a scale from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*), respondents rated the simulation as engaging and enjoyable (M = 4.74) and a realistic preview of the job (M = 4.50). The feedback reinforces the potential for multimedia contact center simulations to enhance the candidate experience while providing a lifelike window into the job, thus potentially encouraging ill-suited candidates to opt out of the process.

7.5 Conclusion

Multimedia simulations are valuable indicators of a candidate's likelihood to succeed in a contact center's frenetic and intense environment. Contact centers are often characterized by low pay, poor management practices, and rigid, punitive policies. The culture of dysfunction that tends to permeate many centers creates innumerable challenges for talent acquisition teams that must balance the need to "fill seats" with the desire to hire qualified candidates. The need to more accurately select candidates capable of performing well in contact center jobs helped inspire the development of multimedia simulations. Modern simulations allow candidates to experience life as a contact center representative while auditioning for a job from anywhere in the world, and give an organization's talent acquisition team direct visibility into a candidate's potential to achieve on-the-job success. Amid a constellation of problems that characterize many contact centers, multimedia simulations represent a promising tool to help centers identify the most skilled job candidates who will succeed in a complex and challenging role.

7.6 Case Study

7.6.1 Using a Multimedia Simulation to Improve Customer Engagement

Acquiring and retaining customers in the ultra-competitive telecommunications' industry depends on a company's pricing, product, and customer service strategies. Consumer behavior appears to be more influenced by rational and practical considerations, such as saving money, acquiring the latest devices, and/or escaping poor service, than brand loyalty. A company's success distinguishing its brand will ultimately hinge on building a passionate customer following. This review describes a multinational telecommunications company's (referred to as Telecom Z) attempt to begin enhancing customer engagement by using a multimedia simulation to improve the quality of its front-line representatives.

Telecom Z sits at the intersection of old and new technologies. On one hand, its intricate network of wires, cables, fiber, and wireless technologies gives consumers uninterrupted, on-demand access to programming, information, and other people virtually anywhere in the world. On the other hand, front-line representatives often deal with a difficult job, inflexible processes, unfriendly policies, and weak leadership. These behind-the-scenes challenges led to longer customer calls, more repeat calls because a problem was not resolved correctly, and lower customer satisfaction.

An inconsistent, fragmented front-line representative hiring process contributed to the company's customer service problems. With tens of thousands of representatives dispersed geographically, Telecom Z's pre-hire approach shifted from one uniform process to several independent processes over time, usually reflecting the preferences

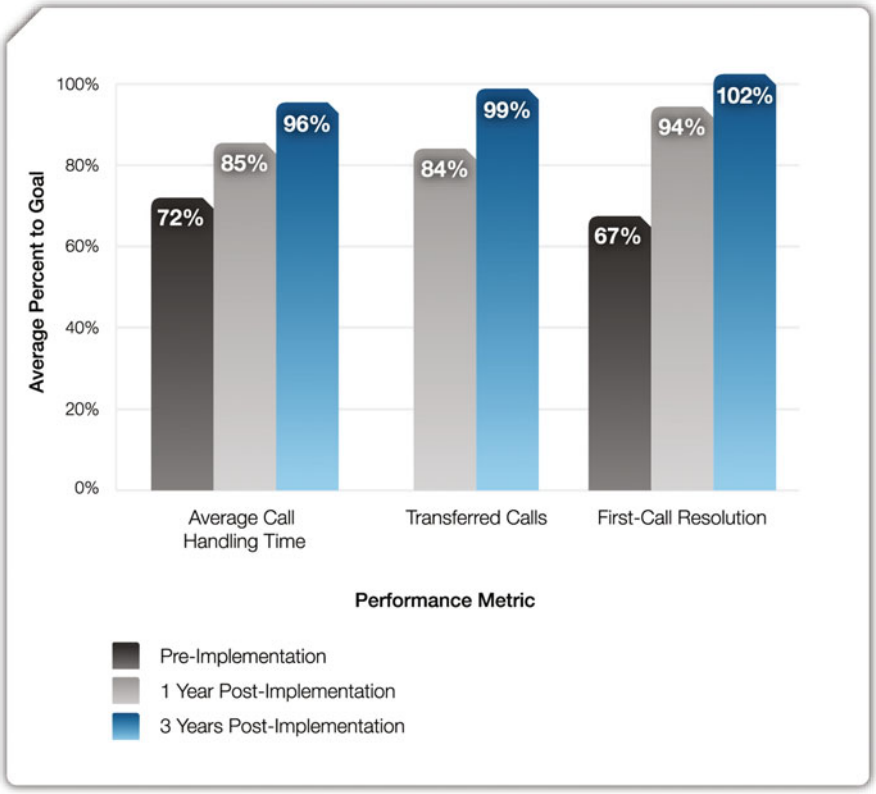

Fig. 7.7 Impact of CC Audition® on Telecom Z's performance over time

of a business unit's leadership team. The inconsistency prevented performance-based comparisons of the various pre-hire approaches.

One component of Telecom Z's customer engagement strategy involved standardizing its front-line representative hiring process. A comprehensive job analysis, encompassing hundreds of participants, identified the core KSAOs required by the representatives' jobs, some of which included computer navigation skill, multitasking skill, ability to learn and apply information, and customer service orientation. A review of alternative pre-hire screening tools capable of measuring the representative jobs' essential KSAOs suggested that Telecom Z consider incorporating a multimedia contact center simulation.

Telecom Z conducted a large-scale concurrent validation study of the simulation to gauge its potential to improve call handling, problem resolution, and customer engagement. The results, based on more than 1,000 representatives, supported the validity and utility of the simulation. Based on the strength of the findings, Telecom Z incorporated the simulation into its pre-hire process in all of its contact centers.

Telecom Z has achieved significant performance improvements since implementing the simulation (Fig. 7.7). The simulation's results are summarized in terms of

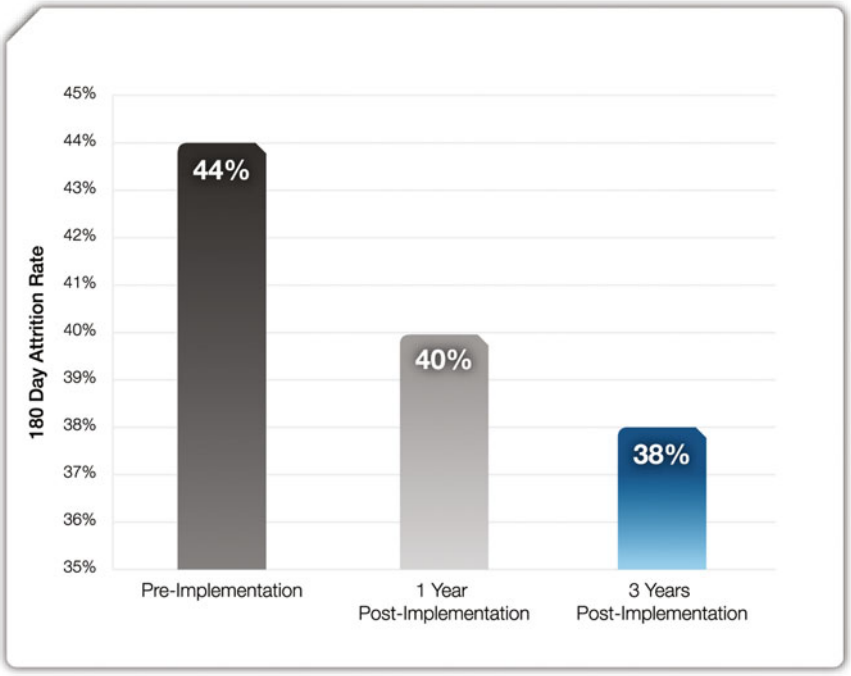

Fig. 7.8 Impact of CC Audition® on Telecom Z's attrition over time

the average percent to goal (i.e., average representative performance relative to the goal set by Telecom Z—100 % or higher means the representatives have achieved or surpassed the minimum expectation on that metric). The simulation has been instrumental in helping Telecom Z improve AHT (33 %) and Repeat Calls (52 %) while simultaneously driving down 180-day attrition (14 %; see Fig. 7.8). These performance gains translate into 8,588 fewer hours of handle time and 16,200 fewer repeat calls per month. When the performance gains are combined with the reductions in attrition, Telecom Z is receiving a return on its investment of approximately 3,300 %.

Although Telecom Z's results provide a solid, data-based case for using multimedia simulations, no pre-hire tool can deliver results in vacuum. Telecom Z's results reflect a collaborative partnership in which data are continually analyzed and reviewed to ensure the simulation is delivering maximum value to the business.

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