ACT® WorkKeys®

Content Validity Report

FOR THE CUSTOMER SERVICE REPRESENTATIVE JOB PROFILE

GCOMM
Anywhere, Minnesota

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Executive Summary

Purpose

This content validation report presents the results of an ACT® WorkKeys® profile (job analysis) of the Customer Service Representative (CSR) job at the GCOMM site in Anywhere, Minnesota. The profile was conducted by Filerville Community College's ACT authorized WorkKeys Profiler Margaret Allen, to establish task lists and identify the WorkKeys skills (and corresponding assessments) and skill levels necessary for selection into and effective performance of the CSR job at GCOMM. The results of this project and review of its findings will also help to inform GCOMM's use of WorkKeys to improve the employee selection process for the CSR job.

When developing personnel programs such as selection procedures, it is important to establish that they are appropriate to use for this purpose. Validation is the process of collecting evidence to demonstrate that an employment selection procedure is related to the context of the job. The WorkKeys system uses a content validation strategy. A selection measure has content validity when evidence shows that it representatively samples the important aspects of the job for which the measure will be used.

In developing the WorkKeys Program, including WorkKeys assessments and the job profiling system, ACT has been and will continue to be guided by professional documents such as the *Standards for Educational and Psychological Testing* (2014; developed by the American Education Research Association, American Psychological Association and National Council for Measurement in Education), the *Principles for the Validation and Use of Personnel Selection Procedures* (2018, Society for Industrial and Organizational Psychology); and the *Uniform Guidelines on Employee Selection Procedures* (1978), which have been adopted by the Equal Employment Opportunity Commission (EEOC) and various other federal agencies (Ref: 29 C.F.R. Part 1607).

This report is designed to address the requirements set forth in Section 15c of the *Uniform Guidelines*. The report is organized in a manner to permit direct evaluation of the validity of the WorkKeys assessments. Each section heading corresponds to the section in the *Uniform Guidelines* (e.g., Section 15c(1) of the *Uniform Guidelines* is User(s), location(s), and date(s) of study and the title of Section 1 of the report is the same).

WorkKeys Job Profiling Procedure

WorkKeys job profiling is conducted by Profilers who have been trained and authorized by ACT Industrial/Organizational Psychologists. The profiling procedure is designed to systematically develop accurate profiles and establish content validity through a task analysis that is used to select the tasks most important to a job, and a skill analysis that is used to identify the on-the-job behaviors associated with the WorkKeys skills (and

corresponding assessments) under consideration and to identify the skill levels necessary for entry and effective performance on the job (i.e., cut or passing scores).

Task Analysis

The first step in conducting the profile session was to develop a Final Task List showing the critical tasks of the job. Dr. Allen first developed an Initial Task List using the Department of Labor's O*NET database, GCOMM's job descriptions, resources from similar job profiles, information gathered from the tour of the facility, job shadowing, and interviews. Dr. Allen toured GCOMM's Filerville, Arkansas, location with Jane Phillips, Customer Service Supervisor, on October 16, 2017. Dr. Allen job shadowed Shelley Fisk and Josie Barr, Customer Service Representatives, for four hours the same day. CSRs speak with customers and potential customers by phone or in-person, interview applicants for telephone service, respond to customer questions or complaints (such as billing inquiries), and assist customers in determining the calling plan which would best suit their needs. They receive and process the paperwork for services including installation, turn-on, discontinuance, or changes to service. They also place sales calls to current or potential customers to explain new products or services.

Dr. Allen then met with two groups of Subject Matter Experts (SMEs) to tailor the Initial Task List to make sure that the resulting Final Task Lists accurately and completely described the job. Each group worked to develop one list. The Profiler met with the first group (Group A) of six SMEs on October 18, 2017, and met with the second group (Group B) of seven different SMEs on October 19, 2017. The SMEs in each group worked to add, delete, consolidate, and change the descriptions of tasks, as needed, to make sure they accurately depicted their job as it is performed at their company. Then they independently rated each task in terms of its Importance. The average Importance rating for each task was used to sort the task statements and list them in order, with the most important (or critical) tasks placed at the beginning of the list. Tasks that received an average rating of 2 (i.e., low importance) or lower were grayed out, italicized, and moved to the bottom of the list. The SMEs then reviewed the list to see the final order of the tasks. The Final Task List, with the tasks listed in order of Importance, can be found at the end of this report.

Skill Analysis

A skill analysis to identify the on-the-job behaviors associated with the WorkKeys skills under consideration and to identify how the skills are used on the job was then conducted. The SMEs reviewed four WorkKeys skills and determined that four skills are required. The skills required are: Applied Math, Graphic Literacy, Workplace Documents, and Workplace Observation. The skills were considered one at a time, and the SMEs completed their discussion of one skill before going on to the next. The Profiler gave each SME a copy of the WorkKeys skill definition, read the definitions aloud, and then answered any questions the SMEs had. Once the SMEs understood the definition of a skill and had determined its relevance to the job, they independently identified the important tasks on their Final Task List that require the skill and explained how they use the skill to complete the identified task. For a task to be considered in the

next step to set the skill level (i.e., cut or passing score), the majority of the SMEs had to agree that the task required the skill (see Appendix D for a table linking tasks of the job to the WorkKeys skills).

The Profiler then presented detailed descriptions of the WorkKeys skill levels to the SMEs (see Appendix B) which included examples of problems or situations employees deal with at each level. Next, the SMEs determined which skill levels are necessary at job entry and for effective performance. The profile results shown in Table 1 indicate skill requirements for job entry and the profile results shown in Table 2 indicate the skill requirements for effective performance. Following the *Uniform Guidelines on Employee Selection Procedures* (1978), entry into the CSR job at GCOMM was defined as an employee's first day in the job. Employees should be expected to come into the job with the skills shown; they are not expected to learn these skill levels while in the job. The final entry-level skill requirements reported here are recommended as cutoff (or passing) scores on the WorkKeys assessments for entry into the job. Effective performance is the point at which an employee performs competently without continuous supervision. GCOMM defines this as being when a CSR has completed the four weeks of classroom training followed by five weeks of on the-job training with a mentor, can handle an average of 15 calls per hour, and receives ratings of "good" from the supervisor on all monitored calls. This level of performance is typically achieved after completing the required training, mentoring, and a total of three months in the job. The final results shown in Table 2 indicate skill requirements for effective performance and may be used for training purposes.

Table 1. Entry – Level Skill Requirements for the Job

WorkKeys Skill	Skill Level Range	Group A	Group B	Final Entry Level
Applied Math	3–7	4	4	4
Graphic Literacy	3–7	4	4	4
Workplace Documents	3–7	4	4	4
Workplace Observation	1–5	2	2	2

Table 2. Effective Performance Level Skill Requirements for the Job

WorkKeys Skill	Skill Level Range	Group A	Group B	Final Effective Level
Applied Math	3–7	4	4	4
Graphic Literacy	3-7	4	4	4
Workplace Documents	3–7	4	4	4
Workplace Observation	1–5	2	2	2

Results and Recommendations

There are several issues to consider before using the skill levels established by the profile to set expectations for employees and potential employees in the CSR job.

- The WorkKeys assessment scores should be used in conjunction with other criteria as determined by GCOMM (e.g., interviews, employment history, application reviews) when making selection or other high-stakes employment-related decisions.
- GCOMM is not required to administer WorkKeys assessments for all of the skills included in the profile. Administering WorkKeys assessments along with using other selection measures (e.g., structured interviews) for the screening of applicants into the profiled job should provide sufficient information. GCOMM may want to consider administering assessments only for those skills most relevant to the job.
- For selection and promotion purposes, GCOMM should consider using WorkKeys assessments for the following skills: Workplace Observation, and Graphic Literacy. If GCOMM chooses to administer additional assessments, the following skills should be considered: Workplace Documents or Applied Math. This recommendation is based on the number of important/critical tasks identified by the SMEs as requiring each skill. If GCOMM would like to use different WorkKeys assessments, the Profiler should be consulted regarding the number of important tasks associated with each related skill. The reasons for assessing individuals on those skills should then be documented.
- For training and development purposes, GCOMM should consider using WorkKeys assessments for the following skill areas: Workplace Observation, Graphic Literacy, Workplace Documents, and Applied Math. Training on skills at the beginning of the list may provide more impact than training on skills at the end of the list because the skills at the beginning of the list are more relevant to performance of the job.
- If GCOMM would like to use the profile results for hiring applicants at any additional locations, then GCOMM should consider conducting one or more profile sessions across these locations. The purpose of this is to have adequate representation of incumbents and of the work performed at the additional location(s). If the job does not yet exist at a location (e.g., a new facility), but the jobs are anticipated to be the same (i.e., using similar equipment), then these profile results can be used for selection purposes until subject matter experts at the new facility become available. At that time, profiling should be conducted at the new facility to confirm that the job requirements are the same.
- The use of assessment scores for making decisions regarding reductions in force should be carefully considered. Use of actual measures of employee performance such as performance appraisal results and attendance records should be taken into account when making decisions of this nature.
- If the selection system does not yield enough qualified candidates, modification of the selection system or a component of the selection system may increase the size of the applicant pool. Recruiting efforts could be increased (e.g., by increasing

advertising efforts to cover a larger geographic area), requirements of the job could be modified, or training could be adjusted to address skill gaps. If the job is modified, the Profiler should be consulted to reevaluate the profile.

- For the WorkKeys assessments to be as useful as possible, their placement within the selection process should be considered carefully. In general, selection tools should be used in an order that allows the most economical and efficient measures to be placed at the beginning of the process. For example, if an employer's selection battery consists of (a) one-on-one interviews and (b) WorkKeys assessments, the employer may wish to administer the assessments prior to conducting interviews. One-on-one interviewing of candidates may take significantly more staff time, so administering assessments to groups of candidates first may be more efficient because it can reduce the number of interviews.

Section 1

User, Location, and Dates of Study

This content validation report presents the results of an ACT WorkKeys® job profile (job analysis) of the Customer Service Representative (CSR) job at the GCOMM (GCOMM) site in Anywhere, Minnesota. The profile was conducted by Filerville Community College's ACT authorized Profiler, Dr. Allen.

Dr. Allen met with the first group (Group A) of six subject matter experts (SMEs) on October 18, 2017, and met with the second group (Group B) of seven different SMEs on October 19, 2017.

Section 2

Problem and Setting

A. Setting

The focus of this study is on GCOMM's CSR job in Anywhere, Minnesota.

B. Current Selection Procedures

To hire applicants into the CSR job, GCOMM reviews applications and conducts interviews. New hires attend four weeks of classroom training and then complete comprehensive on-the-job training for the next five weeks. During the on-the-job training, trainees are placed with an experienced worker and continue to learn the responsibilities of the job as coached, demonstrated, and critiqued by their peer trainer. At the end of three months in the job, CSRs are evaluated by their supervisor and must receive ratings of "good" on all monitored calls in order to retain their position. GCOMM anticipates adding WorkKeys assessments to this procedure.

C. Purpose of the Study

GCOMM intends to implement the WorkKeys system, which includes the job profiling procedure documented here and the job-related WorkKeys skill assessments. The WorkKeys system is used to determine an individual's levels of proficiency in specific skill areas and to identify pools of qualified applicants who have achieved the levels of proficiency needed to perform a specific job, as determined through a job analysis using the WorkKeys job profiling procedure. GCOMM can use the results of this study to support the inclusion of the WorkKeys assessments in the selection procedure for the CSR job. The WorkKeys system can also be used to identify skill gaps among applicants and incumbents, and to design training to eliminate such gaps. GCOMM may use the effective performance skill levels as training goals for the CSR job.

A. Analysis of the Job Using the WorkKeys® Job Profiling Procedure

The WorkKeys job profiling procedure is a method of job analysis designed to help businesses identify the WorkKeys skills (and corresponding assessments) and the skill levels employees need in order to perform a particular job effectively as well as to establish content validity. It also gives individuals a clear picture of the skill levels they need if they are to qualify for and be successful in the jobs they want. When combined with the assessments, instructional support, and reporting, job profiles allow employers to make appropriate hiring and training decisions and allow individuals to make appropriate decisions about jobs and identify areas they need to strengthen as they pursue their education and career goals. The WorkKeys job profiling procedure is designed to systematically develop accurate profiles through a task analysis that is used to identify the tasks most critical to a job, and a skill analysis that is used to identify the skills and skill levels required for entry-level and for effective performance of that job (i.e., cut or passing scores).

Dr. Allen met with the first group (Group A) of six subject matter experts (SMEs) on October 18, 2017, and met with the second group (Group B) of seven different SMEs on October 19, 2017. During the profile sessions, the groups developed task lists that accurately and completely describe the job. The SMEs reviewed four WorkKeys skills and determined that four are required: Applied Math, Graphic Literacy, Workplace Documents, and Workplace Observation.

The results from the task analysis (including the development of the Final Task List) and the skill analysis (including the identification of the WorkKeys skills required for the CSR job) are described in this section of the report. The discussion and identification of the appropriate skill levels are presented in Section 5 of this report. The SME demographic information for the profile and incumbent population totals for the job are provided below.

Job Status	Population	Group A	Group B
Incumbent	100	6	7

Gender	Population	Group A	Group B
Female	58	3	4
Male	42	3	3

Racial/Ethnic Group	Population	Group A	Group B
African American/ Black, Non-Hispanic	24	2	1
Asian-American or Pacific Islander	8	0	1
Caucasian/White, Non-Hispanic	42	3	3
Mexican-American/ Chicano	16	1	1
Other	10	0	1

Years in Profiled Job	Group A	Group B
Average	20	13
Highest	35	17
Lowest	2	1

Years with Company	Group A	Group B
Average	22	14
Highest	35	20
Lowest	3	1

Age	Group A	Group B
Average	54	41
Highest	60	49
Lowest	28	20

B. A Complete Description of the Work Behaviors and Their Associated Tasks

Creating an Initial Task List

To profile the job, the Profiler first developed a comprehensive Initial Task List using the Department of Labor's O*NET database, GCOMM's job descriptions, resources from similar job profiles, and information gathered from a tour of the facility.

Conducting the task list review

To develop the Final Task List, the Profiler met with the SMEs to edit the Initial Task List to make sure the task statements accurately and completely described the work required of incumbents. The SMEs then evaluated each task on the task list in terms of its Importance. The average Importance rating for each task was used to sort the task statements and list them in order, with the most important tasks placed at the beginning of the list. The SMEs

then reviewed the list to see the final order of the tasks. The Final Task List(s) are shown at the end of this report.

C. Method of Determining the Measure of Importance

Importance refers to the significance of the task to overall job performance. The SMEs are asked to consider what may happen if the task is not performed properly (excluding the effect of gross negligence or intentional sabotage). Each SME is asked to rate each task on a 6-point scale from 0 (This task is not performed) to 5 (This task is critical/extremely important to the job I perform). The Importance Rating Scale shown below is given to the SMEs when they make their Importance ratings. The average Importance rating for each task was used to sort the task statements and list them in order, with the most important tasks placed at the beginning of the list. Tasks that received an average rating of 2 or lower were grayed out, italicized, and moved to the bottom of the list. The SMEs then reviewed the list to see the final order of the tasks.

Importance Rating Scale	
Step 1	Read each task statement.
Step 2	If the task is NOT performed as part of your job, write a zero (0) in the box next to the task statement. If the task is performed as part of your job, think about how important the task is to your job. Importance refers to the significance of the task to overall job performance. In evaluating Importance, consider what may happen if the task is not performed properly. (Exclude the effects of gross negligence or intentional sabotage.)
Step 3	Choose the Importance statement that best describes how important the task is to your job. Write the number of that Importance statement in the box next to the task statement.
Importance Level	
0	This task is not performed.
1	This task is not very important to the job I perform.
2	This task is of low importance to the job I perform.
3	This task is important to the job I perform.
4	This task is very important to the job I perform.
5	This task is critical/extremely important to the job I perform.

D. Collecting Data and Calculating Ratings for the Work Behaviors

After carefully examining and editing the Initial Task List, the SMEs rated each task according to its Importance. The average Importance rating was used to sort the tasks, placing the most important tasks at the top of the list. The SMEs then reviewed the list to see the final order of the tasks. The Final Task List(s) are shown at the end of this report.

E. Operational Definitions of the WorkKeys Skills

The WorkKeys skill definitions are provided in Appendix B.

F. Method Used to Determine the Relationship Between Each of the Skills and the Tasks Required on the Job

The SMEs completed a skill analysis to identify the on-the-job behaviors associated with the WorkKeys skills under consideration and to describe how the skills are used on the job. The skills were reviewed one at a time, and the SMEs finished the analysis for one skill before going on to the next. The Profiler gave each SME a copy of the WorkKeys skill definition, read the definition aloud, and then answered any questions the SMEs had. Once the SMEs understood the definition of a skill and had determined its relevance to the job, they independently identified the important tasks (i.e., those tasks that received ratings of 3/important or higher) on their Final Task List that require the skill. Then, the SMEs discussed how they use the skill to complete the identified task. Based on this discussion, the Profiler documented the Important/Critical tasks for which a majority of the SMEs agreed that the skill is required for task performance. See Appendix D for a table linking tasks of the job to the WorkKeys skills.

G. Relationships Between Each of the Skills and the Final Task List for the Job

Applied Math

WorkKeys Applied Math is the skill people use when they use mathematical reasoning and problem-solving techniques to solve work-related problems. Employees may use calculations and conversion tables to help with the problems, but they still need to use math skills to think them through.

The two groups of SMEs indicated that Applied Math skills are used to perform 30% (Group A) and 26% (Group B) of the critical tasks on their Final Task Lists, respectively.

According to the SMEs, CSRs use Applied Math skills when they:

- handle customer complaints by making an adjustment to their monthly bills, such as to subtract an errant charge from the total of the bill and explaining the corrected total of the bill ($155 total bill - $10 errant charge = $145 corrected total);
- help customers understand their bills by explaining the calculation of charges on the bill such as taxes, fees, toll charges, subtotals ($155 + $8 taxes = $163);
- sell services or upgrades to business or residential clients and use one or two operations of mathematics to determine the estimated monthly charge for one option compared to another (such as to compare a voice-only plan of $50, to a voice plus data plan of $75, or to a voice plus equipment plan of $80);

- quote prices for customized plans by adding and subtracting the price of services and/or equipment and then adding to obtain the new total charges;
- determine cost differences between GCOMM's prices and competitor's prices by adding up the prices entered on the GCOMM Price Quote worksheet and subtracting total from current amount paid by customer to competitor ($185 - $175 = $10 saved); and
- train new CSRs by listening to their customer calls, completing the same steps of mathematics used by the CSR during the call, and then comparing their answers with the trainee's answers.

Graphic Literacy

The WorkKeys Graphic Literacy skill is the skill people use when they work with workplace graphics such as tables, graphs, charts, digital dashboards, flow charts, timelines, forms, maps, and blueprints. Employees use this skill when they find, summarize, compare, and analyze information to make decisions using workplace graphics to solve work-related problems.

The two groups of SMEs indicated that WorkKeys Graphic Literacy skill is required for performing 100.0% (Group A) and 100.0% (Group B) of the critical tasks on their Final Task Lists, respectively.

According to the SMEs, CSRs use Graphic Literacy skills when they:

- communicate with customers to select and purchase telephone services using pricing charts and Price Quote Worksheets;
- update customer accounts by updating or deleting information from various fields of computer screens (e.g., to make address, service plan, or other changes on Client Information, Services, or Payment History screens);
- open new customer accounts by entering information (e.g., name, address, service(s) requested, whether customer has previous history with GCOMM, employment information) into fields of GCOMM's New Accounts System or by referring to a completed Application for Service and transferring data from the application into the system;
- process customer refunds over phone with customer or by referring to Refund Request Form and entering approval/denial for refund by filling in pertinent fields such as to enter checkmarks (e.g., reason for refund/denial) or filling in applicable approval code (e.g., "021" for charges less than $5) in the customer's account;
- sell services to new/existing clients using computer printouts (containing tables of prospect data) and service plan information (e.g., pricing charts, Price Quote worksheets), and completing Follow-up Contact Form at conclusion of call;
- share new product and service information with existing and potential customers using marketing materials (tables, charts) and the Sales Goals Projection Report;

- handle billing complaints using troubleshooting diagrams, Call Charge Logs, scripts (graphics sections);
- set-up payment schedule for delinquent account by entering data into sequential fields of Delinquent Account Catch-Up (DACU) screens to arrange for customer payment including customer data (name, account number, address), amount in arrears, beginning date for late payment, special circumstances; and
- train/coach new Customer Service Representatives (using both the training version and then actual versions of the graphics listed above).

Workplace Documents

WorkKeys Workplace Documents is the skill employees use when they read and use written text in order to do a job. The written texts include messages, emails, letters, directions, signs, notices, bulletins, policies, websites, contracts, and regulations. It is often the case that these workplace communications are not necessarily well written or targeted to the appropriate audience. Workplace Documents materials do not include information that is presented graphically, such as in charts, forms, or blueprints.

The two groups of SMEs indicated that the WorkKeys Workplace Documents skill is required for performing 33.3% (Group A) and 27.0% (Group B) of the critical tasks on their Final Task Lists, respectively.

According to the SMEs, CSRs use reading skills when they use the following materials:

- CSR Procedure Manual – which is read and the information is then applied to perform a variety of tasks including resolving customer inquiries or complaints, processing requests for refunds, initiating work orders, and selling new/additional products and services to clients;
- prepared scripts (which outline typical conversations with customers) – which are read and the content understood so that the CSR can convey the content convincingly to the customer and be able to respond to customer questions;
- help screens – the content of which has been read and understood by the CSR so that during a call they can quickly scan the relevant help screen and then provide an answer to the customer (in his/her own words preferable to reading answer to customer);
- product brochures or notices, marketing materials, and company update memos – which are read and the information applied in order to prepare for sales calls or to recommend additional services to customers during routine calls; and
- training materials – which are provided during the 4 weeks of classroom training (and include print and online resources) that describe the job and the resources used on the job including procedures, job aids (e.g., help screens, glossaries) marketing materials, scripts, and forms.

Workplace Observation

The WorkKeys Workplace Observation skill is an employee's skill in visually observing a workplace event, noticing details, and remembering instructions, procedures, processes, and demonstrations in order to generalize to workplace situations that may be similar or very different from what was observed.

The two groups of SMEs indicated that Workplace Observation skills are used to perform 100.0% (Group A) and 100.0% (Group B) of the critical tasks on their Final Task Lists, respectively.

According to the SMEs, tasks that CSRs perform using Workplace Observation skills can be grouped into the categories of learning the tasks of the CSR job, performing the tasks of the CSR job, and mentoring the tasks of the job.

Specifically, CSRs use Workplace Observation skills when they:

- **Learn the job**
  - CSRs use Workplace Observation skills when they complete their 4-weeks of classroom training.
  - CSR tasks are demonstrated via video-based scenarios, online step-by-step instructional software, and role-play activities.
  - Trainees learn the job by observing demonstrations and then practicing, either individually or in group settings, and receiving constructive feedback from the trainer(s) and their peers.
  - Group activities involve observing one's peers take practice calls.
  - Individual activities include taking practice calls with the Simulator by observing variables such as lights (such as those that indicate incoming calls), timers (which indicate the length of the call), and panel displays (such as those which indicate whether the caller is a current customer).
  - CSRs also use observation skills as they mimic the steps shown in online tutorials in order to learn the functions of the Customer Service software.
- **Perform the job**
  - CSRs work at workstations where they use information displayed through numerous computer screens and following established procedures to accomplish their tasks.
  - They have to watch for error messages, incomplete record messages, and incorrect codes.
  - CSRs find information on one computer screen and remember that information in order to take action on a different screen (such as to open the customer's account, notice the account has been 'flagged,' and take action by documenting a payment plan (on the

DACU screen of their account) before completing the customer's request to add any additional services.

- They use Workplace Observation skills as they handle complicated customer complaints which may require them to retrieve information from multiple screens (e.g., monthly statement, payment history, services list), incorporate what they've seen on those screens, and take action such as by removing a charge(s) or by telling the customer that because of their inconsistent payment history, that they will have to return their account to good standing before adding any new services.
- Workplace Observation is used to take action by documenting Incidents on the Follow-up Contact form based on observations made during a call.

- **Mentor other CSRs to perform the tasks of the job**
  - GCOMM has a 5-week mentoring program for new CSRs once they have completed the 4-week training program. Experienced CSRs complete training so that they can participate as mentors.
  - Over the 5-weeks, the mentors guide their mentees through planned activities designed to grow their skills as a CSR.
  - Mentors observe new CSRs and take action based on those observations (e.g., to watch new CSRs while they are on the phone with customers and make sure that the new CSRs enter the information correctly into forms and computer screens and take action by discussing the aspects of the task that were performed incorrectly).

Skill definitions and skill levels

The Final Task List(s) for the CSR job are shown at the end of this report in the appendix. The mean Importance ratings and skill requirements are also shown. A checkmark in a skill column means that, according to the SMEs in the profile session, the task in that row requires that skill. Tasks shown in gray italics are of low importance (i.e., they received averages ratings below 3) and they did not influence the skill levels set for the profile. The skill and skill level definitions are shown in Appendix B. WorkKeys terms are defined in Appendix C.

A. Title, Form, And Publisher

Titles and Forms

ACT recommends using individual assessments as specified in the Executive Summary. Representative titles and forms are listed in the table below, but are updated regularly. Contact ACT Customer Service for information on the most current forms at all times.

WorkKeys Assessment	Paper and Pencil	Internet
Applied Math	J91AH J92AH J93AH J94AH J01AH (Retest)	WKAM02101CD0 WKAM02102CD0 WKAM02103CD0 WKAM02104CD0
Applied Technology	G10FG A08FF	A30911 A40311
Business Writing	N/A	J01BW H01BW
Graphic Literacy	J91AI J92AI J93AI J94AI J01AI (Retest)	WKGL00101CD0 WKGL00102CD0 WKGL00103CD0 WKGL00104CD0
Workplace Documents	J91AJ J92AJ J93AJ J94AJ J01AJ (Retest)	WKWD00101CD0 WKWD00102CD0 WKWD00103CD0 WKWD00104CD0
Workplace Observation	NA	A01WO C01WO

Publisher

ACT, Inc. with its headquarters in Iowa City, Iowa.

B. Validity In General

When the word "validity" is used in a testing context, it frequently refers to the three-part model of validity: content validity, construct validity, and criterion-related validity (Guion,

1980). Most of what has been written and reported with respect to the valid use of test scores has used these three concepts. Almost every measurement textbook uses these concepts as the basis for its organizational structure (Anastasi, 1982; Hopkins, Stanley, & Hopkins, 1990), and they are a central feature of the *Uniform Guidelines on Employee Selection Procedures* (1978): "For the purposes of satisfying these guidelines, users may rely upon criterion-related validity studies, content validity studies, or construct validity studies" (CFR 41, 60-3).

The *Standards for Educational and Psychological Testing* (AERA, et al., 2014) uses these concepts when it describes methods of collecting data for validating the uses of test scores, but it describes validity as a unitary concept supported by evidence. Instead of focusing on types of validity, it discusses the same concepts in terms of the accumulation of validity evidence. *The Principles for the Validation and Use of Personnel Selection Procedures* (SIOP, 2018) also embraces this view. So while the *Guidelines* talks about "criterion related validity," the *Standards* talks about "evidence of the relation of test scores to a relevant criterion" (p. 17). While the *Guidelines* talks about "content validity," the Standards talks about "evidence based on test content" (p. 14). And when it comes to "construct related validity," the *Standards* explains that this is established by "the validity argument" (p. 21), which "integrates various strands of evidence into a coherent account of the degree to which existing evidence and theory support the intended interpretations of test scores for specific uses." (p. 21). Evidence may be accumulated in a number of ways. What is relevant is that validity is established as a whole. The value of each way of collecting evidence is determined by its appropriateness to the situation, not by any inherent value of its own.

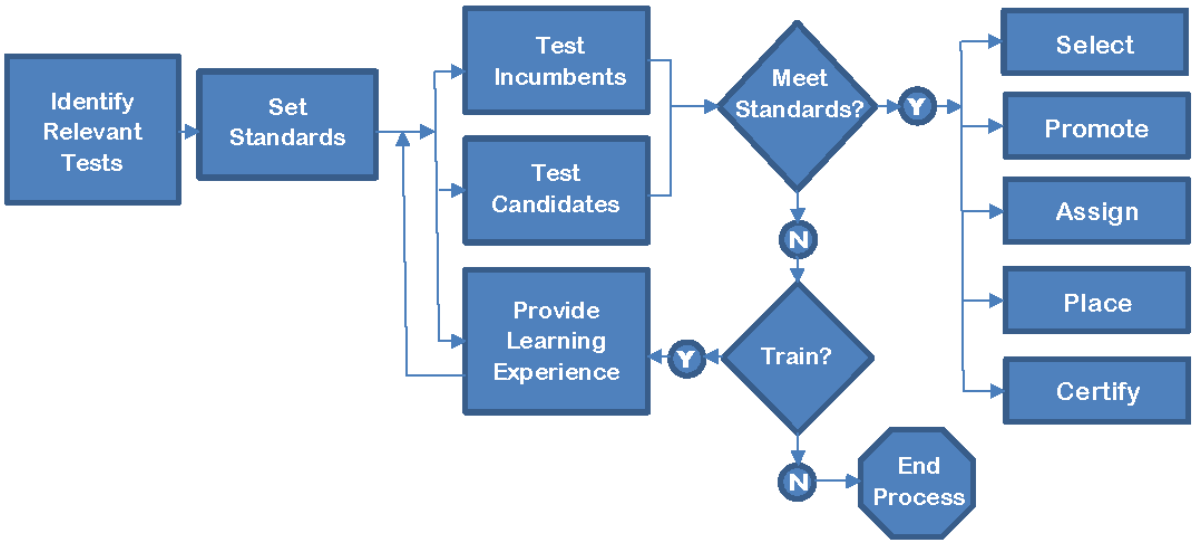
The *Standards* (pp. 11–14) explains that the need for validity evidence is based on the assumption that a test is going to be used for a purpose, and it is necessary to provide evidence showing that it is appropriate to use the test for that purpose. When a test is administered and a score is reported, it is necessary to determine what the score means within the context in which it is being used. This is done by accumulating evidence that shows what the test score means. Validity refers to the degree to which the evidence supports the interpretation of the scores for proposed uses of tests. This is what is validated, not the test itself. Therefore, the validation process involves accumulating relevant evidence to provide a sound scientific basis for the proposed score interpretations. Validation is achieved when a scientifically sound validity argument has been presented. Such an argument is one that supports the intended interpretation of the test scores by showing what they mean within a specific context. The validation process is unitary in that when the evidence is collected and analyzed, the results will be described in terms of one concept, "validation," and not in terms of the three concepts mentioned above. Any or all of the three may be used as evidence, but none should be viewed as an end in itself. In this, the *Standards* differs from the *Guidelines*, the requirements of which can be met by establishing validation using any one of the three types of validity it specifies.

Different uses of the WorkKeys system

Education and businesses can use WorkKeys scores for a variety of purposes. For example, potential educational uses of WorkKeys scores include identification of proficiency status,

identification of educational needs, program evaluation, certification, and guidance and vocational counseling. The examinees in this setting include learners of all kinds in settings such as general education, vocational education, college preparation, and special certification programs. Potential business score uses include identification of training needs, training program evaluation, certification, and selection of individuals to be hired, promoted, or transferred. The examinees in this setting include a wide range of potential job applicants as well as incumbent employees. These individuals may range greatly in such characteristics as age, socioeconomic status, language background, and educational history. Specifically, the WorkKeys scores can be used by education and businesses as support for their decisions. The figure below provides a depiction of how the WorkKeys system can be used to provide a rationale that supports a variety of judgments made with the assessments. Essentially, the figure illustrates the process from identification of which tests to use, to setting standards of test performance, administration of the tests to examinees, and making decisions based upon whether or not the individuals meet the standards. For example, assume that a business is interested in using the WorkKeys tests for selection of applicants into a job. To begin, they identify the WorkKeys skills that are required for the job (identify relevant tests) as well as the required level of performance of that skill (set standards) using the results of a job profile. Then, using the WorkKeys tests for the required skills, the employer administers tests to job candidates and compares the scores to the standards set by the profile. Candidates who meet the standard may be selected for employment, or if the selection system were structured in hurdles, the employer would move the candidates to the next stage of the selection process. Candidates who do not meet the standards would be removed from the employment selection process and could be referred to an organization that provides skill remediation.

Using the WorkKeys System for Decision-Making Support



C. WorkKeys Content Validity Evidence

When developing personnel programs such as selection procedures, it is important to establish that they are appropriate to use for this purpose. Validation is the process of collecting evidence to demonstrate that an employment selection procedure is related to the context of the job. The WorkKeys system primarily uses a content validation strategy. A selection measure has content validity when evidence shows that it representatively samples the important aspects of the job for which the measure will be used. The use of WorkKeys assessments, as specified in the Executive Summary, has been validated in accordance with the EEOC's *Uniform Guidelines on Employee Selection Procedures* (1978).

According to the *Standards*, important validity evidence can be obtained from an analysis of the relationship between a test's content and the constructs it is intended to measure. Test content includes themes, wording, and the format of the items, tasks, or questions on the test (p. 14). Each WorkKeys assessment has been built by first defining a hierarchical skill scale and then creating test items to be representative of both the skill area and each skill level within that skill area. This process is described below.

Selection of skills

In developing the WorkKeys system, ACT consulted with employers, educators, and labor organizations to develop a list of generalizable workplace skills that are used in a wide range of jobs, are teachable in a reasonable period of time, and facilitate job analysis (ACT, 1992). In 1992, the initial WorkKeys skills were selected on the basis of a review of the literature relating to employer-identified skill needs (Agency, 1989; ACT, 1987; Bailey, 1990; Carnavale, Gainer, & Meltzer 1990; Center, 1990; Conover, 1991; Educational Testing Service, 1975; Electronic Selection Systems, 1992; Greenan, 1983; SCANS, 1990) and a

survey of employers and educators who participated in the design of the WorkKeys system. The latter were from seven states (Illinois, Iowa, Michigan, Ohio, Oregon, Tennessee and Wisconsin) and a network of community colleges in California. They assisted in the design and review of plans and materials and provided examinees for the prototype and field-test phases of assessment development. Twelve skills were selected for initial development based on those identified by educators and employers (McLarty, 1992). It was anticipated that this list would be modified over time in response to changing employer needs.

ACT released the first WorkKeys assessments, *Applied Mathematics, Reading for Information, Listening*, and *Writing* in 1992. *Applied Technology, Locating Information*, and *Teamwork* were released the next year, followed shortly by *Observation*. The *Business Writing* assessment was released in 2002; *Workplace Observation* was released in 2009; and *Listening for Understanding* was released in 2011. In 2017, the *Applied Mathematics* assessment was renamed *Applied Math* and the *Reading for Information* assessment was renamed *Workplace Documents.* The *Graphic Literacy* assessment was introduced in 2017. New items are generated and new forms are released periodically. In response to changing employer demands, ongoing development of new skill areas has continued over the years.

Skill scale development

In assessment development, it is common for the assessment to be developed first and for the development of score scales to follow (Crocker & Algina, 1986; Nunally & Bernstein, 1994). This is necessary for any score scale that depends on examinee data for its construction (e.g., norm-referenced score scales) because in that case, the skill scale and score scale are necessarily identical. Each WorkKeys skill scale can be conceptualized as an independent definition of the construct to be measured, a definition that is not based on the psychometric characteristics of the assessment. The score scales reflect the characteristics of each assessment and can be evaluated with respect to how well the assessment scores represent the designated skills and skill levels. More than one assessment approach can conceivably use the same skill scale. In the development of the WorkKeys system, the need to link job analysis with the assessment of individuals argued for separating the skill scales from the score scales so that both assessment of jobs (job profiling) and the assessment of individuals could be described by the same set of skill scales. It was therefore necessary to develop the skill scales before developing the tests and their score scales.

Several skill scale criteria were identified by WorkKeys staff as critical for the operational system (McLarty, 1992). WorkKeys skill levels would have to (a) be readily interpretable as a description of what the examinee can do and of the skills required by the job; (b) be appropriate for large-scale use and for validation as part of a system for selecting qualified job applicants; and (c) provide information that could be useful to a person wishing to improve skills in order to meet job requirements, an educator or trainer wishing to assist people in improving their job-related skills, and an employer wishing to select well-qualified employees. A primary goal was that the skill scales should be able to communicate to test takers, teachers, trainers, employers, labor union leaders, and other audiences, the levels of a generalizable skill that a job requires and that a person possesses. Based on their content,

the WorkKeys skill scales would have to communicate clearly and concisely to people making decisions using the assessment results.

The WorkKeys skill scales are, therefore, intentional scales, created to ensure that the resulting score scales will be both meaningful and hierarchical. Cognitive and content-related aspects of a skill are analyzed to identify and combine their component strands in order to generate hierarchical scales that will be meaningful to individuals, educators, and employers. Aspects of content knowledge and cognitive skills that do not contribute to the hierarchical scale are excluded from it. The quality of the resulting skill scales is then judged by the degree to which they serve as a common metric to link the job analysis to the assessments and by their usefulness in identifying the skill levels required by jobs and possessed by individuals. Clustering approaches (identifying skills perceived as different but equally valuable) are intentionally excluded from the scale-building process, although such clusters could become the basis of separate skill scales.

Thus, the WorkKeys skill levels are designed to be standardized, but particular to each skill. That is, Level 6 in *Workplace Documents* is not the same as Level 6 in *Graphic Literacy*. Level 6 in *Workplace Documents* does, however, mean the same skill level whether it is used to describe a job or a person, just as Level 6 in *Graphic Literacy* means the same thing when it is an individual's assessment score that it means when it is part of a job profile. The common metric, then, forges a link between assessments results and job analysis, but does not refer to any relationship between the skill areas.

Currently, six WorkKeys assessments are available for operational use: *Applied Math, Applied Technology, Business Writing, Graphic Literacy, Workplace Documents,* and *Workplace Observation*. In defining the basic or foundational skill domain to be covered in each WorkKeys assessment, ACT applies the following criteria:

- The way a skill is assessed is generally congruent with the way the skill is used in the workplace.
- The lowest level assessed approximates the lowest level for which an employer would be interested in setting a standard.
- The highest level assessed approximates the level beyond which specialized training would be required.
- The score scales are designed to have practical value in documenting workplace skills.
- The assessments are sufficiently reliable for high-stakes decision making such as selecting candidates for jobs.
- The assessments can be validated against empirical criteria.
- The assessments are feasible with respect to cost, administration time, and complexity.

The development process for a WorkKeys assessment consists of five phases: skill definition, test specification development, prototyping, pretesting, and construction of operational forms.

Phase 1: Skill Definition. Working with an expert panel of employers and educators, ACT first defines the content domains and develops hierarchical WorkKeys skill descriptions. The panel is asked to develop a broad definition of a skill area and to identify the lowest and highest levels of the skill to be measured. The panel then identifies examples of tasks within this broadly defined skill domain and narrows that domain to those examples that are important for job performance across a wide range of jobs. Next, the tasks are organized into subtasks (sometimes called "strands"), which are aspects of the general skill domain or skill area to be measured. The subtasks assessed in *Workplace Documents*, for example, include "choosing main ideas or details," "understanding word meanings," "applying instructions," "and applying information and reasoning."

Each subtask is also divided into levels based on the variables thought to make it more or less difficult. In general, at the lower levels of difficulty, the employee has few variables to attend to. However, at the higher levels of difficulty, the employee must be able to process information to apply it to more complex situations. For example, at the lower levels of the subtask "applying instructions" in *Workplace Documents*, the employee need only apply instructions to clearly described situations. At the higher levels, however, employees must not only understand instructions in which the wording is more complex, meanings are more subtle, and multiple steps and conditionals are involved, but they must also apply these instructions to new situations.

Phase 2: Test Specification Development. Using the skill definitions developed in Phase 1 for multiple-choice tests, the ACT WorkKeys development team prepares test specifications, which detail the skills the assessment will measure and how the items will become more complex as the skill levels increase. Each level is defined in terms of its characteristics, and exemplar multiple-choice items (test questions) are created to illustrate it. Each item is comprised of a stimulus, a stem, and a set of response options. A stimulus may be a recorded voice, reading passage, video scenario, described situation, or one or more graphics, depending on the test. The stem is the part of the item for which an answer, or response option, must be selected. In most cases the complexity of the stimulus and the stem determines the skill level to which a particular test item is assigned.

The WorkKeys *Business Writing* assessment uses a constructed-response (essay) format. For this assessment, the WorkKeys test development staff works together with professionals from a wide variety of job backgrounds to identify and refine prompt ideas that require a written response and have meaning to a broad audience. Next, they develop and revise prompts that are realistic, do not require prior knowledge, are specific and substantive enough to hold the examinee's interest, and are representative of situations that could arise in a wide variety of jobs. Prompts that meet all of these criteria are edited into a form that is clear, direct, and concise.

New prompts for all WorkKeys tests are reviewed for realism, accuracy, and fairness by a number of people including other members of WorkKeys development staff, staff members from other ACT departments, and business and academic experts outside of ACT from diverse cultural and ethnic backgrounds.

Phase 3: Prototyping. In Phase 3, the ACT WorkKeys development team recruits content experts to write items for prototyping. These experts draft items designed to meet the test specifications and correspond to the respective skill levels. ACT staff then edits the items, producing a number sufficient to create one full-length test form for the skill area.

The prototype test form is administered to convenience samples, which typically are at least two groups of high school students and two groups of employees. Usually, one group of students and one group of employees will be from the same city. The second groups of students and employees will be found in another state with different demographic characteristics. For example, if the first groups are from a suburban setting, the second may be from an urban area. The number of examinees varies according to the test format, with more being used for multiple-choice tests than for constructed-response tests. Typically, at least 200 students and 60 employees are divided across the two administration sites for each multiple-choice prototype test form. In 2001, ACT conducted a prototype administration of the first forms of the *Business Writing* assessment to approximately 2,640 Midwestern high school and community college students.

During the prototype process, interviews or surveys of the examinees are used to gather their reactions to the test instrument. Educators and employers are also invited to review and comment on the test. This information helps ACT evaluate the functioning of the test specifications. Questions such as whether the prototype items were too hard, too easy, or tested skills outside the realm of the specifications must be answered before development can move to the pretesting stage. Based on all the information from the prototype testing, the test specifications are adjusted if necessary, and additional prototype studies may be conducted. When the prototype process is completed satisfactorily, a written guide for item writers is prepared.

Phase 4: Pretesting. For the pretesting phase of item development, ACT contracts with numerous freelance content experts who write a large number of items. WorkKeys item writers must be familiar with various work situations and have insight into the use of a particular skill in different employment settings to ensure content and contextual accuracy. ACT staff edits the submitted items to meet content, cognitive, and format standards. A test item containing inaccurate content may be distracting even if the specific content does not affect the examinee's ability to respond correctly to the skill portion of the item. For this reason, inaccurate facts, improbable circumstances, or unlikely consequences of a series of procedures or actions are excluded from the content of the items. An examinee who knows about a particular workplace should not recognize any of the assessment content, circumstances, procedures, or keyed (correct) responses as unlikely, inappropriate, or otherwise inaccurate.

Given the wide range of employability skills assessed, verifying content accuracy for WorkKeys is challenging. To help WorkKeys staff detect any possible problems, the item writers write a justification for the keyed response and for each incorrect response for each test item. ACT editors check both the items and the justifications, and make modifications, if needed.

After the items have been edited, they are submitted to external consultants for content and fairness reviews. Qualified experts in the specific skill area being assessed, usually persons utilizing the skills regularly on the job, check for content and contextual accuracy. Members of minority groups review the items to make sure they will not be unfair or offensive to any racial, ethnic, and gender groups. ACT provides the reviewers with written guidelines (ACT, 1995) and receives written evaluations from them. ACT staff responds to every concern the reviewers raise, and make needed adjustments to the test items before pretesting. The items are then administered in pretest forms constructed to be as similar as possible to the final test. Examinees for the pretest are drawn from schools and businesses in sufficient numbers to provide stable data on which to base final decisions.

Statistical studies of the pretest data help ACT staff identify problem items. These items are then reevaluated by staff and, if necessary, by outside experts. The tests are subjected to both classical and item response theory-based (IRT-based) statistical analyses to evaluate the psychometric properties of each item and the test forms. In addition, when sample sizes permit, statistical differential item functioning (DIF) analyses of the multiple-choice assessment items are carried out to determine whether items function differently for various groups of individuals matched on ability. Items that show DIF are eliminated from the item pool. Based on data collected during pretesting and periodically after operational administration, no items in the multiple-choice WorkKeys tests show DIF. As statistical procedures for detecting DIF in constructed-response items are not yet in common use, analytical reading of the prompts by expert reviewers serves as the basis for detecting possible bias.

Phase 5: Construction of Operational Forms. Pretest item statistics are considered carefully when the forms for operational testing are constructed. Test forms for each assessment are developed from the pool of items that meet all the content, statistical, and fairness criteria for items and for test forms. The items are presented in approximate order of their complexity. That is, the least complex items are at the beginning of the test and the most complex items are at the end. ACT staff construct at least one base form and one alternate test form for each assessment, making sure that the two forms are similar in terms of their psychometric characteristics, the test characteristics as a whole, and the within-level characteristics with respect to content and complexity.

Integral to the test development procedures described above is an effort to minimize the likelihood of adverse impact resulting from use of the WorkKeys tests. The assessments are designed to be job-related and fair through careful screening prior to their being made available to employers. Specifically, the tests and test development must meet these criteria:

- The assessments are criterion-referenced, which means that scores are interpreted in relation to job requirements rather than population norms.
- The test specifications are well defined.
- Items tap a domain of workplace skill because people who have experience in the workplace write them.
- Items measure a particular workplace skill.
- Content and fairness experts review the items to determine possible differences in responses among racial and ethnic groups and genders.
- Statistical analyses at the item and test level are conducted to monitor the performance of various subgroups.

The WorkKeys system as a whole provides a well-designed procedure that businesses, schools, and job seekers can use to facilitate and improve career transitions—from applicant to employee, from school to work, and from job to job.

Job profiling

Collecting evidence to demonstrate content validity is also important in the business setting. According to the *Uniform Guidelines on Employee Selection Procedures* (1978), validation should demonstrate that the content of the selection instrument "is representative of important aspects of performance on the job for which the candidates are to be evaluated" (section 16D). Establishing a well-defined content domain for each test is part of the process of establishing the content validity of WorkKeys tests for selection purposes. In addition, the use of a given test for selection purposes should be validated for the applicable job. The WorkKeys job profiling component addresses this aspect of the process.

It is common to conduct a job analysis to see what tasks are required for a particular job and to then use the results to build a content valid test for that job (Cascio, 1982; Dunnette & Hough, 1990). This approach works best where a test will be built specifically for each job. This is not the case with the WorkKeys system, where the same test is designed to assess generalizable skills and skill levels associated with many different jobs. Thus, the primary uses of job analysis by WorkKeys are to (a) establish the content-relatedness between a specific job and the existing WorkKeys skill area and, if the job and skill are found to be content related, to (b) establish the WorkKeys skill level required by the job. This latter task in effect establishes a skill standard for that job.

As with other judgment-based standard-setting methods, job profiling (job analysis relative to WorkKeys skill scales) must address the key issues of who should make the judgments, on what basis, and by what method. Because those setting the standards must be familiar with the job, the decision was made that the subject matter experts (SMEs) would, wherever possible, be job incumbents. Although some companies choose to include supervisors and trainers as SMEs, ACT recommends that, when feasible, the standard-setting group be

comprised predominately of individuals who are doing or have recently done the job that is being profiled (ACT, 1995b; Anastasi, 1982).

The SMEs make their judgments based on their knowledge of the job under consideration and on knowledge of the WorkKeys skills and skill levels. The latter information is provided by WorkKeys Profilers during job analysis. Because of the depth of understanding that must be gained by the SMEs before they can accurately align the skills they perform in their jobs with the WorkKeys skill scales, the job profiling process is carried out in small group settings, much like focus groups. Each group of SMEs is guided by an authorized WorkKeys Profiler. The Profiler is selected based on relevant previous training and experience and is authorized by ACT after completing training in the job profiling process and in the WorkKeys skills and skill levels.

Job profiling is conducted in two phases: task analysis and skill analysis. In task analysis, the SMEs identify the tasks they complete on the job and then rate them for Importance. The scale used for these ratings is provided in Section 3. The average Importance rating for each task is used to sort the task statements and list them in order, with the most important tasks placed at the beginning of the list.

In skill analysis, the SMEs first link the WorkKeys skills (such as *Workplace Documents*) to the important tasks on the list (i.e., those with ratings of 3/important and higher), identifying each task that requires the particular skill and discuss why the task requires the skill. For the task to be considered in the next step to set the skill level (i.e., cut or passing score), the majority of the SMEs had to agree that the task requires the skill. Once the set of important tasks requiring that skill has been identified, the SMEs, using successive approximation, determine which level of the skills is required for that set of tasks. The SMEs begin with a description of a skill level that the Profiler believes is just below the level needed on the job. They determine whether their job requires skills that are above, below, or about the same as the level described. If they determine that the skills they must have are higher, they are shown the next higher level; if they determine the skills they must have are lower, they are shown the next lower level. If they determine that the skills they must have are about the same, they are shown both the next higher and the next lower levels. No decision is reached until the SMEs have considered a range of skill levels: the one they have identified as the required level and at least one level above it and one level below it (unless they have chosen the highest or lowest level available). SMEs sometimes find that the level required is below or above the levels measured by WorkKeys.

Establishing the link between assessments and the job

Careful attention has been given to developing both WorkKeys assessments and the job profiling procedure in a manner consistent with the standards for content validity established in the *Uniform Guidelines* (1978), *Standards* (2014), and *Principles* (2018). The essential element of content validation is a rational demonstration of linkage between test content and important job performance requirements. In WorkKeys, this linkage is normally accomplished in two steps: (1) test items are linked to skill and skill level definitions by the assessment development process, and (2) skill level definitions are linked to job requirements by the judgment of SMEs, who are generally job incumbents (and may sometimes be supervisors or others familiar with the job).

Items written and selected for WorkKeys assessments go through a series of screens in an attempt to ensure job-relatedness and fairness. For example, both minority review (a judgmental process) and DIF analysis (a statistical procedure) are used to determine possible differences in responses among racial groups and between men and women prior to construction of the released assessments. All aspects of the test development process are conducted to ensure that items pertain to the workplace and that they tap a domain of workplace skill.

In the case of the WorkKeys job profiling process, the validation procedure involves several steps to ensure that a link is established between the skill level definitions and the requirements of a particular job. Ideally, a representative pool of SMEs should be identified. It would include the variety of races, genders, regions, locations, and so on that is represented by employees in the job to be profiled. The pool of qualified SMEs then develops a list of tasks critical/important to the job. A thorough review of each skill level definition is made and then the SMEs are asked to come to a consensus on the levels of WorkKeys skills that are required for performing the job as a whole. This comprehensive and systematic analysis of jobs helps employers identify the important tasks as well as the skills and skill levels needed to perform those tasks.

During the job profiling procedure, incumbent workers who are knowledgeable about the job set the skill level requirement for entry into the job and for effective performance (the level that is expected to be acquired through training). At the end of the skill analysis, the SMEs complete the following statements, which appear at the bottom of the skill rating form:

Skill Level _____ is necessary for effective performance of this job.
Skill Level _____ is required for entry into this job. Employees should be expected to come into the job with this skill level; they are not expected to learn this skill level on the job.

The job profile established by employees who are knowledgeable about the job is based on entry level job requirements, not on personal capabilities or "wish list" expectations. The participation of supervisors in determining the skill requirements is recommended only when the supervisors have had experience in the job.

It is possible that SMEs may identify a higher skill level as the requirement to perform the job effectively (after initial entry). However, selection decisions should be based on the entry level requirements.

A. Evidence Demonstrating that the Selection Procedure is a Representative Sample of a Skill Used as Part of a Work Behavior and Necessary for that Behavior

Selection of skills

In developing the WorkKeys system, ACT consulted with employers, educators, and labor organizations to develop a list of foundational workplace skills that are used in a wide range of jobs, are teachable in a reasonable period of time, and facilitate job analysis (ACT, 1992). In 1992, initial WorkKeys foundational skills were selected on the basis of a review of the literature relating to employer-identified skill needs (Agency, 1989; ACT, 1987; Bailey, 1990; Carnavale, Gainer, & Meltzer, 1990; Center, 1990; Conover, 1991; Educational, 1975; Electronic, 1992; Greenan, 1983; Secretary's, 1990) and a survey of employers and educators who participated in the design of the WorkKeys system. The latter were from seven states (Illinois, Iowa, Michigan, Ohio, Oregon, Tennessee and Wisconsin) and a network of community colleges in California, all of which served as charter members of the WorkKeys development effort. These charter members assisted in the design and review of plans and materials and also provided examinees for the prototype and field-test phases of assessment. Twelve skills were selected for initial development based on those identified by educators and employers (McLarty, 1992). It was anticipated that this list would be modified over time in response to changing employer needs.

Skill scale development

In assessment development, it is common for the assessment to be developed first and development of score scales to follow (Crocker & Algina, 1986; Nunally & Bernstein, 1994). This is necessary for any score scale that depends on examinee data for its construction (e.g., norm-referenced score scales) because in that case the skill scale and score scale are necessarily identical. Each WorkKeys skill scale can be conceptualized as an independent definition of the construct to be measured, a definition that is not based on the psychometric characteristics or the assessment. The score scale reflects the characteristics of the assessment and can be evaluated with respect to how well the assessment scores represent the designated skills and skill levels. More than one assessment approach can conceivably use the same skill scale. In the development of the WorkKeys system, the need to link job analysis with the assessment of individuals argued for separation of the skill scale from the score scale so that both the assessment of jobs (job profiling) and the assessment of individuals could be described by the same skill scale. This circumstance required the development of skill scales before the development of the tests and their score scales.

Several skill scale criteria were identified by WorkKeys staff as critical for the operational system (McLarty, 1992). WorkKeys skill levels would have to (a) be readily

interpretable as a description of what the examinee can do and the skills required by the job; (b) be appropriate for large-scale use and for validation as part of a system for selecting qualified job applicants; and (c) provide information useful for an examinee wishing to improve skills in order to meet job requirements, an educator or trainer wishing to assist examinees in improving their job-related skills, and an employer wishing to select well-qualified employees. A primary goal was that the skill scale metric should communicate the level of a generalizable skill that the job requires, and that a person possesses, to the test taker, the teacher, the trainer, the employer, the labor union leader, and other audiences. Based on their content, the WorkKeys skill scales would have to communicate clearly and concisely to people making decisions using the assessment results.

The WorkKeys skill scales are, therefore, intentional scales, created to ensure that the resulting score scale will be both meaningful and hierarchical. Cognitive and content-related aspects of a skill are analyzed to identify and combine their component strands in order to generate hierarchical scales that will be meaningful to individuals, educators, and employers. Aspects of content knowledge and cognitive skills that do not contribute to the hierarchical scale are excluded from it. The quality of the resulting skill scales is then judged by the degree to which they serve as a common metric to link the job analysis to the assessments and by their usefulness in identifying the skill levels required by jobs and possessed by individuals. Clustering approaches (identifying skills perceived as different but equally valuable) are intentionally excluded from the scale-building process, although such clusters could become the basis of separate skill scales.

Thus, the WorkKeys skill levels are designed to be arbitrary but standardized, and particular to each skill. To explain, while a hat size of six is arbitrary but standardized, it is not expected to be comparable to a shoe size of six. A woman who wants to purchase a hat and shoes will need to measure both her head and her feet using scales that are appropriate for those parts, and no one would suggest that her feet are better than her head if she needs size six shoes and a size six hat. Similarly, just as a person who needs size six shoes does not automatically need a size six hat, a Level 6 in *Workplace Documents* is not the same as Level 6 in *Graphic Literacy*. However, Level 6 in *Workplace Documents* does mean the same skill level whether it is used to describe a job or a person, and Level 6 in *Graphic Literacy* means the same thing when it is an individual's assessment score that it means when it is part of a job profile. The common metric, then, forges a link between assessment results and job analysis, but does not indicate a relationship between skills.

Currently, six WorkKeys assessments are available for operational use: *Applied Math, Applied Technology, Business Writing, Graphic Literacy, Workplace Documents,* and *Workplace Observation*. In the process of developing the skill scales, the WorkKeys development team has refined the following procedure for establishing hierarchical skill scales. Each WorkKeys skill scale is developed initially by a panel of employers and educators. The panel first develops a broad definition (such as "workplace observation") of the skill area for which a scale is to be developed, identifies examples of tasks within

this broadly defined skill domain, and narrows that domain to those examples which are important for job performance across a wide range of jobs (by excluding things like "the observation of microscopic samples"). Next, they organize the remaining tasks into strands (such as "observation for the purpose of maintaining quality control"). Within each strand, they order the tasks into a series of difficulty levels, with the lowest being the simplest and the highest being the most complex.

The number of skill levels is determined iteratively on the basis of the number of separate levels that appear to best fit the task groupings. The panel then abstracts the variables it believes cause a task to be more or less difficult. For example, less difficult observation for quality control involves (a) directed attention to one or a very small number of features which are (b) easy to differentiate from the standard and for which (c) unlimited time is allowed to make the determination. More difficult observation has (a) no specific direction as to what to attend to, (b) a large variety of features to be inspected simultaneously, (c) distractions, (d) a short time in which the determination must be made, and (e) very fine distinctions between the item inspected and the standard. This conceptual analysis process is repeated for each strand identified.

Finally, to facilitate combining the strands into a single test, the panel suggests which levels of each strand are at approximately the same levels of difficulty as given levels of other strands (the strands do not necessarily have the same number of levels). The exemplar tasks, the identification of elements of difficulty, and the suggested common levels across strands form the basis for creating a description of the skill area and its levels. This description is then reviewed by panel members and others and refined until it is as conceptually clear as possible. It should be noted here that strand refers to tasks and content that pertain to a singular concept to be measured.

Once each skill scale is defined, it is necessary to construct a test to measure individuals' skills relative to it. The WorkKeys system tests were designed to meet the following criteria:

- The way in which the skill is assessed is generally congruent with the way the skill is used in the workplace.
- The lowest level assessed is at approximately the level for which an employer would be interested in setting a standard.
- The highest level assessed is at approximately the level beyond which specialized training would be required.
- The steps between the lowest and highest levels are large enough to be distinguished and small enough to have practical value in documenting workplace skills.
- The assessments are sufficiently reliable for high-stakes decision making.
- The assessments can be validated against empirical criteria.

- The assessments are feasible with respect to administration time and complexity, as well as cost.

Skill definitions and skill levels

The Final Task List(s) for the CSR job are shown at the end of this report. The aggregate importance ratings and skill requirements are also shown. A checkmark in a skill column means that, according to the SMEs, the task on that row requires that skill. The skill and skill level definitions are shown in Appendix B and the skill levels required for performing the tasks are given below. Tasks shown in gray italics are of low importance (i.e., they received average importance ratings below 3) and they did not influence the skill levels set for the profile.

B. Identification of the Work Behavior That Each Part of the Selection Procedure Is Intended to Measure

The WorkKeys job profiling procedure is designed to systematically develop accurate profiles through a task analysis that is used to select the tasks most important to a job and a skill analysis that is used to identify the skills and skill levels required at entry into the job and for effective performance on that job. A description of the procedure used is given below.

Conducting the task list review

Dr. Allen toured selected work areas of GCOMM facilities on October 16, 2017, with Jane Phillips, Customer Service Supervisor. The Profiler then met with the groups of Subject Matter Experts (SMEs) to tailor the Initial Task List to make sure that the resulting Final Task Lists accurately and completely described the job. Each group worked to develop one list. The Profiler met with the first group (Group A) of 6 SMEs on October 18, 2017, and met with the second group (Group B) of 7 different SMEs on October 19, 2017. The SMEs in each group worked to add, delete, consolidate, and change the descriptions of tasks, as needed, to make sure they accurately depicted their job as it is performed at their company. Then they independently rated each task in terms of its Importance. The average Importance rating for each task was used to sort the task statements and list them in order, with the most important (or critical) tasks placed at the beginning of the list. Tasks that received an average rating of 2 (i.e., low importance) or lower were grayed out, italicized, and moved to the bottom of the list. The SMEs then reviewed the list to see the final order of the tasks. The Final Task Lists, with the tasks listed in order of Importance, can be found at the end of this report.

Collecting the Importance ratings

After carefully examining this list of tasks, the SMEs rated each task according to its Importance. Importance refers to the significance of the task to overall job performance. The average Importance rating for each task was used to sort the task statements and list them in order, with the most important tasks placed at the beginning of the list. Tasks

that received an average rating of 2 or lower were grayed out, italicized, and moved to the bottom of the list.

Identifying on-the-job behaviors associated with each skill as it is used on the job

Once the SMEs understood the definition of a WorkKeys skill and had determined its relevance to the job, they independently identified the important tasks on the Final Task List that required the skill and they identified how the tasks specifically use that skill. For example, the Workplace Documents skill may be identified by SMEs as necessary for reading such documents as Standard Operating Procedures or company policies. After discussing the relationship between the skill and the tasks, only those tasks which the majority of SMEs agreed require the skill were included in the subsequent discussion, and only those tasks were used to determine the level of skill required for the job.

Determining the WorkKeys skill levels of the job

The Profiler presented detailed descriptions of the WorkKeys skill levels to the SMEs and showed them examples of problems or situations employees deal with at each level. For each WorkKeys skill, the SMEs decided which skill level is necessary at job entry and for effective performance of the job.

Prioritizing the WorkKeys skills

The WorkKeys skills are prioritized in terms of their importance to the CSR job. This is based on a systematic examination of the number of important (or critical) tasks identified by the SMEs as requiring each skill and the Importance rating of those tasks. The result is an ordering of the WorkKeys skills that are most important to the performance of the job.

C. Comparison of the Manner, Setting, and Level of Complexity of the Selection Procedure with Those of the Work Situation

Section 3 of this report documents the need for specified WorkKeys skills by identifying the important tasks that require those skills. This section (Section 5) summarizes the SMEs' discussions of the skill levels and documents their reasons for finding that the specified levels are required for both job entry and effective performance of the job. The skill levels required for job entry and for effective performance are presented in Tables 1 and 2 in the Executive Summary.

Applied Math

WorkKeys Applied Math is the skill people use when they use mathematical reasoning and problem-solving techniques to solve work-related problems. Employees may use calculators and conversion tables to help with the problems, but they still need to use math skills to think them through.

In evaluating the level of Applied Math skill necessary for the tasks of the job, the SMEs considered the types of mathematical operations (including single-step or multiple-step mathematical operations and conversions either within or between systems of measurement); how the information in the problem is presented (i.e., the information is presented in the order in which it is needed or it must be reordered); and whether all the information employees need for solving problems is provided or if they must derive some necessary information. The SMEs evaluated their work situation in comparison to WorkKeys Applied Math skill levels 3 through 5.

The SMEs in both groups determined that Level 4 Applied Math skills are needed for entry into, and for effective performance of, the CSR job. New CSRs need this level because they must perform the same mathematical operations when they begin the job as they do when they are experienced in the job, and no training in mathematics is provided.

At Applied Math Level 4, tasks may present information out of order and may include extra, unnecessary information. One or two operations may be needed to solve the problem. A chart, diagram, or graph may be included. When employees use Level 4 Applied Math skills they can solve problems that require one or two operations. They may add, subtract, or multiply using positive or negative numbers, and they may divide positive numbers. They can figure out an average or mean of a set of numbers using whole numbers and decimals. They can figure out simple ratios, simple proportions, or rates. At Level 4 employees can add commonly known fractions, decimals, or percentages and add or subtract fractions that share a common denominator. They can multiply a mixed number by a whole number or decimal and they can put the information in the right order before they perform calculations.

According to the SMEs, Level 4 Applied Math skills are needed for the CSR job because the calculations that they perform can require them to figure out averages, use one or two operations of mathematics, and put information in the right order before performing calculations.

- To illustrate, when they help a customer understand their bill they have to figure the cost of each individual call, add the prices of calls to get a total, determine the taxes for the total and then get a grand total price. For each call they multiply the number of minutes (e.g., 20) by the rate (e.g., .06/minute) to determine the price of each call (20 x .06 = $1.20), after noting the time of the call to make sure that they use the correct rate. So the CSR first has to figure out how to set up the problem by identifying the correct rate to use and then completing the calculations.

CSRs use multiple operations and/or steps of mathematics to suggest (i.e., sell) additional services to customers during a routine call with a customer or when asked to generate a customized price estimate for a customer.

- For example, the CSR can enter the Pricing Screen to enter the total amount that the customer would like to spend each month and then the system presents the

pricing plans that would accommodate that estimate, along with an estimated number of calls (e.g., for $49.95/month the Friends Forever plan allows approximately 30 30-minute nights/weekends calls), but if the customer wants to know how many calls can be made during the day with just 4 calls made during nights/weekends, the CSR re-figures the estimate by hand, multiplying the day rate per minute (e.g., 20 cents) by 30 minutes by 7 calls (.20 x 30 x 7 = $42) and then figuring the nights/weekends rate (e.g., 5 cents) by 30 minutes by 4 calls (.05 x 30 x 4 = $6) to get a revised total ($48).

- Similar calculations are used when the CSR is asked to develop an estimate for a customized plan (such as the basic Friends Forever plan plus a texting option).

Level 4 Applied Math skills are also used when training new CSRs.

- Trainers have to be able to check the accuracy of the trainee's math such as in a test of the scenario described above.
- This level of skill is also used when CSRs generate an average when the customer requests a price comparison of the average monthly costs for GCOMM's service as it compares to a competitor's rates.
- And when troubleshooting the software for new pricing plans, each CSR is required to spend a minimum of one hour testing the software including the mathematical functions built into the software, by creating test customer scenarios, and computing the required mathematics by hand and comparing with the mathematics generated by the software tool (such as to use addition or subtraction to correct a bill or to use multiple operations to generate pricing for service plans).

Graphic Literacy

The WorkKeys Graphic Literacy skill is the skill people use when they work with workplace graphics such as tables, graphs, charts, digital dashboards, flow charts, timelines, forms, maps, and blueprints. Employees use this skill when they find, summarize, compare, and analyze information to make decisions using workplace graphics to solve work-related problems.

To determine the level of Graphic Literacy skill needed for the tasks employees complete in their job, the SMEs considered the difficulty of the graphics and how hard it is for employees to use the information to complete the tasks. The SMEs compared the tasks of the job to WorkKeys Graphic Literacy skill levels 3 through 6. The SMEs in both groups stated that Level 4 Graphic Literacy skills are necessary for job entry and for effective performance.

At Graphic Literacy Level 4, workplace graphics are common and of low to high moderate difficulty. Characteristics of low moderate graphics include a moderate amount of data; more than one level of data, but no nesting; several variables; one or two axes, if there are axes; and if two simple graphics are required to solve the problem, they should be considered a low moderate graphic. At Graphic Literacy Level 4, employees can use one or two low moderate graphics at a time to locate information in a graphic using

information found in another graphic; compare two or more pieces of information; identify a trend/pattern/relationship; make an inference or decision; and identify the graphic that accurately represents the data. High moderate graphics may be less common at Graphic Literacy Level 4 and have characteristics which include a moderate amount of data; more than one level of data and it may be nested; many variables such as types of wood, drill speeds, hole diameter, and type of bit; one or two axes (such as an x and/or y axis), if there are axes; and if a low moderate graphic and a simple graphic are required to solve the problem, they should be considered a high moderate graphic. At Level 4, employees can use one high moderate graphic to locate and find information and identify the next or missing step in a process.

According to the SMEs, CSRs need Level 4 Graphic Literacy skills to set-up new customer accounts and make changes to current customer accounts because they must enter several pieces of information (e.g., name, street address, transaction codes, service plans) into a computerized form while referring to tables for the information they need. The forms and tables are simple. The screens usually contain five to fifteen fields with drop-down lists and the CSR will need to reference a simple table to find the correct code to insert into the form. When two simple graphics are used together, they are considered a low moderate graphic. The CSRs are required to locate information in one graphic using information found in another graphic.

If a current customer is calling because they want to switch to a competitor's plan, the CSR can look at graphics that show their usage for different services and use that information to determine if a different GCOMM plan might meet the customer's needs better than their current plan (i.e., switch to another GCOMM plan rather than discontinuing their service). Level 4 Graphic Literacy skills are required because the usage graphics are simple line graphs or bar charts with two axes. The CSR needs to review the information in these graphics and decide which GCOMM plan to recommend to the customer. The CSRs perform similar tasks with potential customers, when they assist them to select a plan.

The CSRs use a *troubleshooting diagram* to guide the content of a customer call that is of high moderate difficulty because there can be many variables that require the CSR to follow different paths. However, the CSR is just finding the next or missing step so Level 4 is required overall. They also have diagrams for processing requests for refunds and issuing work orders. Although, they are of only low moderate difficulty and only require Level 3 skills.

All of the SMEs agreed that level 4 skills are required for entry. While three of the six SMEs in Group A and all of the SMEs in Group B (i.e., 9 of 12 total SMEs) agreed that Level 4 skills are also required for performing the job effectively because CSRs are required to perform all of the tasks in the 4-weeks of training and 5 weeks of mentoring that they are expected to perform at the conclusion of training (i.e., after 3 months in the job when effective performance is expected). Neither the classroom training nor the mentoring period are expected to grow the CSR's Graphic Literacy skills.

Consequently, individuals must bring the skills required to the job and that same level of skill is sufficient for effective performance.

The remaining three SMEs in Group A stated that to be effective, Level 5 Graphic Literacy skills are required. At Graphic Literacy Level 5, workplace graphics may be less common and of low moderate, high moderate, or difficult complexity. Characteristics of low moderate graphics include a moderate amount of data; more than one level of data, but no nesting; several variables; one or two axes, if there are axes; and if two simple graphics are required to solve the problem, they should be considered a low moderate graphic. At Level 5 Graphic Literacy, employees can use a low moderate graphic to compare two or more pieces of information; interpret a trend/pattern/relationship; make a reasonable inference or decision based on one graphic after finding information in another graphic; justify a decision or inference based on information; identify the most effective graphic for the task; and justify the most effective graphic for the task. High moderate graphics may be less common at Graphic Literacy Level 5 and have characteristics which include a moderate amount of data; more than one level of data and it may be nested; many variables; one or two axes if there are axes; and if a low moderate graphic and a simple graphic are required to solve the problem, they should be considered a high moderate graphic. At Level 5 Graphic Literacy, employees can use one high moderate graphic to locate information in a graphic using information found in another graphic; compare two or more pieces of information; identify a trend/pattern/relationship; make an inference or decision; and identify the graphic that accurately represents the data. Difficult graphics at Graphic Literacy Level 5 are likely to be less common or a composite of graphics. Data presented is dense; more than one level of data and nesting is likely; there are many variables such as types of wood, drill speeds, hole diameter, and type of bit; three or more axes, such as an x, y, and z axis, if there are axes; and if a high moderate graphic and a low moderate graphic are required to solve the problem, they should be considered a difficult graphic. At Level 5, employees can use one difficult graphic to locate and find information and identify the next or missing step in a process.

The three SMEs indicated that Level 5 skills are required because while effective employees may perform the same tasks as new employees, they use more complex materials. These SMEs stated that CSRs can receive an individual reward for retaining customers and for selling new services to customers in addition to the rewards given to sales teams. They maintained that customers can read marketing literature themselves so CSRs have to provide them with more convincing information in order to make a sale. These SMEs said that they gain this information by reading additional literature that is made available to all employees (such as sales reports, new product development reports, and product manuals). This literature contains tables, graphs, and diagrams that are of high moderate difficulty.

The majority of the SMEs in the two groups (i.e., 9 of 12) agreed that Level 4 Graphic Literacy skills are required to perform the job effectively. The three SMEs who stated that Level 5 skills are required gave examples of Graphic Literacy resources that match

the complexity of Level 5 that are used by CSRs who are attempting to increase their rewards for high sales. These SMEs did report that they had achieved the highest sales records for the previous year, but conceded that Level 5 skills are not necessary to effectively perform the tasks of the job.

GCOMM may consider providing voluntary training to CSRs who are interested in increasing their sales; however, Graphic Literacy Level 5 skills are not required for effective performance.

Workplace Documents

WorkKeys Workplace Documents is the skill employees use when they read and use written text in order to do a job. The written texts include messages, emails, letters, directions, signs, notices, bulletins, policies, websites, contracts, and regulations. It is often the case that these workplace communications are not necessarily well written or targeted to the appropriate audience. Workplace Documents materials do not include information that is presented graphically, such as in charts, forms, or blueprints.

To determine the level of Workplace Documents skill needed for the tasks employees complete on the job, the SMEs considered the difficulty of the reading materials and how hard it is for employees to find the information they need and make use of it. The SMEs evaluated their work situation as it compares to WorkKeys Workplace Documents skill levels 3 through 6. The SMEs in both groups agreed that Level 4 Workplace Documents skills are required for entry into the CSR job and for effective performance.

At Workplace Documents Level 4, reading materials include policies, procedures, and notices. Materials are straightforward with some long sentences and contain a number of details. These materials use common words, but do have some harder words, too. They describe procedures that include several steps. When following procedures, employees must think about changing conditions that affect what they should do. For example, they can follow directions that include if-then statements. When employees use Level 4 skills they can identify the main idea and details that may not be clearly stated, use the reading material to figure out the meaning of words that are not defined for them (not jargon or technical terms), apply information/instructions to a situation that is the same as the situation in the reading materials, and choose what to do when changing conditions call for a different action.

According to the SMEs, a CSR needs Workplace Documents Level 4 skills because the reading materials used during CSR training (e.g., training manual descriptions that explain procedures or script content) contain passages that have a number of procedural steps and associated details along with longer sentences explaining specific customer service problems and how to resolve them. For example, the CSR must verify the identity of the caller before making any changes to the account. The script includes the following content:

CSR*: May I have the spelling of your first and last name please? And your phone number is____?*

- If the account is found, verify at least 2 other pieces of information in the account, such as account number, address, or pin #.

- If the customer's name is not found in the database, ask for an alternate name or address that could be associated with the account.

The vocabulary includes common words and some harder words (e.g., *accommodate*, *resolve, status*). CSRs must be able to apply instructions (some of which involve several steps) to situations that are the same as those described in the materials. Reading materials that fit this definition include scripts of typical conversations with customers and marketing materials that incumbents use with customers to explain plan options (e.g., calling plans such as *Friends Forever*; text and voice plans) or equipment specifications (e.g., equipment sales or rental options). CSRs must determine what information from the reading materials applies to the current situation, such as to read the three suggested responses to a typical customer question and choose the statement that best fits the situation.

Other resources that require Level 4 Workplace Documents skills (i.e., the CSR Procedure Manual, help screens) contain straightforward "if-then" scenarios for the CSR to apply to an appropriate situation. Product brochures and company memos also match the Level 4 description because their text is straightforward, but contains a number of details. For example: *The new GCOMM Innovator is a 5G mobile computing device and is mobile hotspot capable*. Or *Approval to attend a non-GCOMM sponsored training event will be based on the relevance of the seminar/workshop to the staff member's job*.

When shown the definition and examples of Level 5 Workplace Documents, the SMEs in both groups agreed that skills at this level are not required to perform the CSR job. At Workplace Documents Level 5, reading materials include policies, procedures, announcements, legal, and multiple related documents that have many details. The information that employees need is generally stated directly, but it is hard to find because there are so many details and some may not be needed for the task being performed (extraneous information). The materials include technical terms, jargon, and acronyms, or words that have several meanings. The documents may have complex sentences and/or contain conditional situations. When employees use Level 5 skills they can figure out the appropriate meaning of a word based on how the word is used. They can identify the appropriate meaning of technical term, jargon, or an acronym that is defined in the document. They can apply technical terms and jargon to stated situations. Employees can apply information/instructions to a new situation that is similar to the one described in the material while considering changing conditions. At Level 5, employees can apply complex information/instructions that include conditionals to situations described in the materials. Employees may need to make some inferences to accomplish their goal.

While some of the materials used by CSRs (such as procedures) contain technical terms, all technical terms are clearly defined during the course of the 4-week training and there are resources available after the training (such as help screens and mentor assistance) so that terminology used in print materials is clearly understood. Other characteristics of the Level 5 definition are not presented in any reading materials, consequently, the SMEs agreed that Level 5 skills are not required for job performance.

Workplace Observation

The WorkKeys Workplace Observation skill is an employee's skill in visually observing a workplace event, noticing details, and remembering instructions, procedures, processes, and demonstrations in order to generalize to workplace situations that may be similar or very different from what was observed. Employees must pay careful attention to steps that are followed, safety procedures, and quality-control standards.

In determining the level of skill necessary for the tasks of the job, the SMEs considered the following five characteristics:

- the complexity of the procedures;
- how likely there are to be extra details presented;
- how likely there are to be distractions;
- how difficult is it to detect differences, discrepancies, or changes; and
- the action the employee must take.

The SMEs were shown Workplace Observation skill Levels 1 through 3. According to the SMEs, new CSRs need Level 2 Workplace Observation skills at job entry to successfully complete the four-week training. Level 2 Workplace Observation skills are sufficient for effective performance, as well, because the tasks of the job do not change and no training in observational skills is provided.

At Workplace Observation Level 2, employees interpret a straightforward procedure that involves a condition. With a condition, several possible things may happen, and a specific response is provided for each one. A Level 2 situation includes obvious and easily disregarded distractions, and there are a few extra details and differences. When employees use Level 2 Workplace Observation skills on the job, they can recognize cause and effect in a straightforward demonstration, process, pattern, or procedure; can filter out obvious distractions; and can identify the cause of a particular effect. Additionally, employees can recognize what to do next in a situation given a single condition. At Level 2, employees can also indicate action to be taken when there is an incorrect step identified.

According to the SMEs, Level 2 Workplace Observation skills are used in the CSR job in the following ways:

Complexity: Trainees observe and CSRs perform straightforward processes with if-then conditions (e.g., if the caller says they had a problem with their monthly bill, that means the CSR should retrieve the customer's background information and monthly statement screens; but if the caller says they want to add services, then a different combination of screen retrieval is appropriate). CSRs learn which combination of screens to retrieve based on observing and then participating in training exercises and mentoring routines that simulate customer call situations. Level 2 skills are also needed to perform the job after training is complete because the scenarios played out during the 9 weeks of training (i.e., classroom and mentoring phases) are comparable to the types of experiences that occur after training (i.e., after the first 3 months in the job).

Details – There are few extra details that are a part of the workplace situation being observed by CSRs; most details are an integral component of the situation. Extra details can include a blinking light on the console indicating that another caller is waiting.

Distractors – Distractors are possible, but they can be easily disregarded, such as the call timer which can be turned off by the CSR when handling a complex, lengthy call, so that the 'ticking of the timer' does not interfere with handling the call appropriately.

Differences – Differences are not difficult to discern and are generally pointed out, such as during the training when the differences between the purposes of the system computer screens are explained or the differences between the online scripts for a customer complaint and the script for a customer sale are explained.

Action – The action taken by the CSR based on observations is generally straightforward. During the training/mentoring process, CSRs observe multiple situations and the appropriate responses, and then apply that information to similar situations. CSRs learn the steps to handle customer calls so that they understand which step 'comes next' in the process. Even if a caller asks a question that is out of sequence (from the script), the CSR has the training to understand which step to apply next. The CSR doesn't need to draw conclusions based on what has been observed because the conclusion is already evident.

Both SME groups also determined that Level 2 skills are required for effective performance of the job. According to both groups, the complexity, details, distractions, differences in details they must notice, and actions they are required to take based on their observations do not differ from the time they begin the job to the time they become effective (i.e., by the conclusion of the first 3 months in the job). This is because the 4 weeks of classroom training and 5 subsequent weeks of mentored on-the-job training expose the CSR to all the tasks required of an effective CSR. Therefore, a higher skill level is not required for effective performance. Further, when shown the definition and

examples of Workplace Observation Level 3, the SMEs indicated that there are no tasks that require that level of skill.

At Workplace Observation Level 3, employees observe complex procedures that include several tasks that may occur at the same time, interact, and change from one situation to another. More than one condition may be present. Several important details are presented, but a few are not clearly prompted; and some distractions may make remembering details difficult. And, the employee may be asked to apply information observed to other similar situations. Steps may seem similar, but differ based on varying factors, and a few differences may be present that are not clear. When employees use Level 3 Workplace Observation skills on the job, they can identify a course of action to take given more than one condition; distinguish steps that seem similar but are different based on varying factors; and maintain attention to significant details with little prompting. Employees are able to recognize when steps can be combined and when they must be kept distinct; and can combine steps to achieve desired result. At Level 3, employees identify differences and/or details that are not clear; select, interpret, and integrate the steps, in the correct order, within a complex process; and apply information to a similar situation.

The SMEs indicated that in the rare instances that a call gets this complex, the conditions of the call are beyond the training of the CSR, so the appropriate step is to forward the caller to a Supervisor to resolve the issue(s). Consequently, Level 3 Workplace Observation skills are not required for the CSR job.

Prioritizing the WorkKeys skills

The skills were prioritized according to their importance to the job based on the number of important tasks identified by the SMEs as requiring the skills. Skills with the largest percentage of important tasks requiring the skill and with the highest importance ratings for these tasks are given the top ranking. GCOMM should consider using assessments for the following skill areas: Workplace Observation and Graphic Literacy. If GCOMM chooses to administer additional assessments, the following skill areas should be considered: Workplace Documents or Applied Math.

Section 6

Alternative Procedures Investigated

A. Testing and Performance

It is widely accepted among professionals in the area of personnel selection that cognitive ability can be used to predict performance. This conclusion is born out in the cumulative results of an extensive body of research on the validity of performance predictors (Gottfredson, 1986; Hogan and Hogan, 1990; Hunter and Hunter, 1984). This body of research reveals that paper-and-pencil tests constitute the most effective method of measuring cognitive abilities or knowledge for personnel selection. Although other selection procedures (such as interviews, reference checks, and experience ratings) can assess cognitive ability and knowledge, cognitive ability tests have more validity than these and other alternative methods of predicting applicant job performance. In their large scale meta-analysis of validity research results, Hunter and Hunter (1984) revealed that commonly used alternatives to ability tests, such as interviews, college GPA, and biodata had validities that ranged from .10 to .37. Today, most researchers and practitioners continue to agree with the Hunters' central contention:

> Meta-analysis of the cumulative research on various predictors of job performance shows that for entry level jobs [those for which current job performance is not available] there is no predictor with validity equal to that of ability, which has a mean validity of .53. For selection on the basis of current job performance the work sample test, with mean validity of .54 is slightly better. (Hunter and Hunter, 1984, p. 72)

The cumulative research suggests that for most jobs, there are currently no selection procedures for hiring new employees that approach the validity of ability tests.

B. WorkKeys Tests

The assessments in the WorkKeys system which map to profiled skills are cognitive ability tests. They each quantify individual knowledge or ability in specifically defined content areas. As with many other cognitive ability tests, the developers of the WorkKeys assessments addressed the potential for adverse impact by having the items that make up the tests reviewed by minorities and other experts for bias and offensiveness. The tests were also investigated using Differential Item Function Analysis for ethnic and gender differences in item responses, and revised accordingly.

Unlike other cognitive ability tests, the WorkKeys assessments further reduce the potential for adverse impact through the nature of their construction and use. The tests are criterion referenced. That is, they are constructed to yield specific information about a person's performance relative to an established criterion standard without reference to other test-takers or norms (Buck, 1975). WorkKeys job profiling establishes the passing score, and then the assessments are used to identify a pool of applicants who have reached the established criterion level. The tests are not used to rank applicants from

highest to lowest, so there is none of the adverse impact that typically results from such ranking procedures (Nathan, 1995).

C. Scope of Investigation

ACT's investigation of alternatives to the WorkKeys assessments comprised a search for testing or screening instruments of similar skills and an evaluation of their validity, adverse impact, and relationship to work. The skills of interest are *Applied Math, Applied Technology, Graphic Literacy, Workplace Documents, Workplace Observation,* and *Business Writing*. The search for other assessments of these skills began with a broad search for other procedures that have been validated for use in personnel selection. Three comprehensive references for assessments, *Tests in Print* (Murphy, Spies, & Plake, 2006), *Mental Measurements Yearbook* (Conoley & Impara , 1995), and *Tests* (Maddox, 1997), proved to be valuable sources of information and were used to identify alternative measures of the knowledge and abilities of interest. The descriptions and reviews published in these references indicate whether a given assessment was developed for use in personnel selection, and they provide some information on each instrument's construction, content, and validity. In some cases, additional information was obtained from technical reports provided by a test's publisher and from published research articles. Finally, the search for alternatives was rounded out with a review of the catalogs and Internet Web pages of test publishers known to provide assessments for personnel selection, and by searching the assessment research literature.

D. Method of Investigation

The EEOC (1985), in its interpretation and clarification supplement to the *Uniform Guidelines on Employee Selection* (1978), identified two criteria for evaluating alternative selection procedures: validity and adverse impact. In evaluating the alternatives identified in the search described above, validity, adverse impact, and relationship to work were used as evaluative criteria. Relationship to work is the extent to which an assessment's stimulus materials reflect materials or situations found on jobs, or the intended behavioral overlap between the assessment and jobs. This criterion was included to supplement explicit validity information. When considering the assessments included in this study, "adverse impact" refers to the extent to which attempts were made to enhance test fairness and eliminate discriminatory language and racial, cultural, or gender bias from the assessments. As such, it is an indicator of an assessment publisher's dedication to eliminating adverse impact and it is not always an actual measure of the existence of adverse impact.

E. Investigation Findings

In general, there were several alternatives to the WorkKeys *Applied Math* and *Workplace Documents* to consider. There were only two alternatives to WorkKeys for assessing applicants on their *Graphic Literacy* skills. The search revealed six alternatives for the *Applied Technology* assessment. There was only one assessment similar to the WorkKeys *Observation* and *Workplace Observation* assessments and three

alternatives for the *Business Writing* assessment. The search revealed no other civilian alternatives designed for these purposes, although there are several observation tests specific to police work available to law enforcement agencies. Despite the variety of sources used to compile this section of the report, information needed for the evaluation of the various alternatives was at times incomplete.

F. Investigation Conclusions

No evidence was found to suggest that any of the alternatives investigated exceed the WorkKeys assessments in validity or attention to reducing adverse impact. While a number of the alternatives appear work related in content, only the WorkKeys assessments have an explicit link or reference back to the requirements of a specific job. Like WorkKeys, a number of the alternative assessments attempt to address fairness and adverse impact through a careful consideration of test content, but only the WorkKeys assessments combine careful attention to content with a criterion-based method of test construction that in itself reduces the potential for adverse impact (Nathan, 1995). Based upon the results of this investigation, the combination of job specific content validity evidence and safeguards against adverse impact make the specific WorkKeys assessments recommended in the Executive Summary a viable selection alternative in this situation. The WorkKeys assessments recommended in the Executive Summary should be used in conjunction with their respective entry-level cut scores listed in both Table 1 of the Executive Summary and in the write-up of Section 5 of this report. Final decisions about the use of these assessments are entirely within the purview of the company including whether or not to obtain additional evidence about alternative procedures prior to making those decisions.

A. Methods Considered For Use as Part of the Selection Procedure

The WorkKeys assessments will be used as a part of the GCOMM selection procedure for hiring employees into the CSR job at the facility in Anywhere, Minnesota. Applicants will be required to meet the entry-level profile, as set by the subject matter experts (SMEs), for the skills being assessed. They will either meet or not meet (pass or fail) the requirements. They will not be ranked by their performance levels as established by the assessments.

Based on the relevance of the skills to the critical tasks of the job, GCOMM should consider building a WorkKeys assessment battery for applicants for the CSR job using assessments for the following skills: Workplace Observation and Graphic Literacy. If additional assessments are desired, these skill areas should be considered: Workplace Documents or Applied Math.

B. Rationale for Choosing the WorkKeys System

The WorkKeys system provides job-related, content-valid cutoff scores by determining the level of cognitive skills necessary for specific jobs. The job profiling component of the system requires a trained Profiler to work with one or more groups of SMEs to develop a thorough list of tasks performed on the job and to provide information about the level of skill necessary for performing the tasks or job upon job entry and/or for effective performance. During a job profile session, SMEs are able to make direct comparisons between the content of their job and the content of WorkKeys skill levels. The SMEs evaluate and discuss whether job incumbents need a certain skill level (as defined and described through the use of examples in the profiling session) to enter the job. The SMEs are asked to decide how a skill description and the accompanying examples compare to the skill needed on the job: is the skill needed higher, lower, or about the same as the description and examples? (These are paired comparison judgments.) The examples used for these judgments are consistent with the ordinal scaling of the empirically tested skill levels of the tests.

An important issue in selection testing is that of adverse impact. The EEOC considers adverse impact to be evidence of discrimination. However, showing that the selection device is job-related despite its adverse impact is the employer's response to a claim of adverse impact. Demonstration of a test's validity for use in selecting qualified employees is the typical measure of a test's job-relatedness. A common misconception is that tests are valid or invalid and that valid tests do not have adverse impact. However, as Nathan (1995) explains, the reality is that all competently developed cognitive ability tests are valid (see, for example, validity generalization results) and also

have adverse impact. The use of information obtained from valid tests must still be supported by evidence that the tests and the cutoff scores are appropriate to the situation. WorkKeys addresses the issue of adverse impact in several ways. ACT has developed the WorkKeys assessments to be job-related and fair by putting the items through a series of screens prior to their being included in tests that are used for selection decisions. These are:

- the assessments are criterion-referenced (they use job requirements as the reference);
- the test specifications are well defined;
- items are written by people who have job experience in the workplace, so the items tap a domain of workplace skill;
- items measure a particular workplace skill;
- content and fairness experts review the items to identify possible differences in responses by people in different racial groups and between men and women prior to construction of the released assessment; and
- statistical analyses at the item and test level are conducted to monitor the performance of various subgroups and of the items and tests, themselves. For example, differential item functioning (DIF) analysis, a statistical procedure for identifying bias for or against such things as race and gender is run for each item.

The job profiling process provides validation evidence by establishing a link between tasks performed on the job, the skills needed to perform the tasks, and the skills and skill levels measured with the WorkKeys assessments. The job profiling procedure requires the participation of SMEs who are knowledgeable about the job and who, together, constitute a representative sample of the incumbent employees. This group of SMEs must convene to describe, generally with consensus, the skill requirements for their job. Another group of SMEs also constituting a representative sample will confirm the task analysis results and the skill requirements in a replication session, as needed.

C. Purpose of Assessments

The WorkKeys assessments will be used as part of the selection procedure for the CSR job at GCOMM in the Anywhere, Minnesota facility and for training purposes.

D. Determination of the Normal Expectations of the Workforce for the Cutoff Scores

See Section 3A for a complete description of the SMEs, and Section 3G for a discussion of which skills are required. The entry skill levels for the most critical skills may be used as hiring cutoff scores on the relevant WorkKeys assessments as recommended in the Executive Summary.

Section 8

Contact Person

For further information regarding this validity study, contact:

Dr. Margaret Allen
Job Developer/ACT– authorized Profiler
Filerville Community College
801 University Avenue
Filerville, AR 55555
Phone: 555-555-5555
Email: margaret.allen@fcc.edu
Fax: 555-555-5555

Section 9

Accuracy and Completeness

In order to ensure completeness and accuracy of the collection and analysis of data and the reporting of the results, the following procedures were followed:

Margaret L. Allen, Ph.D., who conducted the profiling for the CSR job and prepared this report, is an ACT– authorized WorkKeys Profiler for Filerville Community College. She holds a doctorate in Human Resources Management, performs tasks for customers including new/existing job development, and conducts profiling activities for clients.

In developing the WorkKeys system, including the WorkKeys assessments and the job profiling system, ACT has been, and will continue to be, guided by the *Uniform Guidelines on Employee Selection Procedures* (1978), which have been adopted by the Equal Employment Opportunity Commission (EEOC) and various other federal agencies (Ref: 29 C.F.R. Part 1607), as well as the *Standards for Educational and Psychological Testing* (AERA, et al. 2014), and the *Principles for the Validation and use of Personnel Selection Procedures* (SIOP, 2018). The profile for the CSR job at GCOMM adheres to the requirements of the WorkKeys system.

Appendix A

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Appendix B

Skill Descriptions

Applied Math Skill

WorkKeys® Applied Math is the skill people use when they use mathematical reasoning and problem-solving techniques to solve work-related problems. Employees may use calculators and conversion tables to help with the problems, but they still need to use math skills to think them through.

There are five levels of difficulty. Level 3 is the least complex and Level 7 is the most complex. The levels build on each other, each incorporating the skills assessed at the previous levels. For example, at Level 5, employees need the skills from Levels 3, 4, and 5. Examples are included with each level description.

When deciding what level of the Applied Math skill employees need for the tasks they do at work, consider the following questions:

- How is the information presented? That is:
- Is it presented in the same order that it is needed?
- Is it necessary to change the order that the information is in before the math can be performed?

Is all the information needed for solving the problems provided? That is:

- Is all the information presented in the right form?
- Is it necessary to do some calculations to get some of the important information?
- Does the problem require a formula?
- Does the information need to be taken from a graphic?

What kind of mathematical operations do employees perform? That is:

- Can the math problem be completed in one step?
- Does the problem need to be done in several steps?
- Is it necessary to convert measurements from one form to another, either within or between systems of measurement?

Applied Math Level 3

Level 3 problems can easily be translated from a word problem to a math equation requiring a single type of math operation. All the needed information is presented in a logical order and there is no extra information given.

When employees use Level 3 Applied Math skills on the job, they can:

- Solve problems that require a single type of mathematical operation. They add or subtract either positive or negative numbers (such as 10 or -2). They multiply or divide using only positive numbers (such as 10).
- Convert a familiar fraction (such as ½ or ¼ to a decimal) and convert from a decimal to a common fraction; OR convert between decimals to percentages (such as 0.75 to 75%).
- Convert between familiar units of money and time (for example, one hour equals 60 minutes or ½ of a dollar equals $0.50)
- Add the prices of several products to reach a total, and they can make the correct change for a customer.

Applied Math Level 4

At Level 4, tasks may present information out of order and may include extra, unnecessary information. One or two operations may be needed to solve the problem. A chart, diagram, or graph may be included.

When employees use Level 4 Applied Math skills on the job, they can use the skills described at Level 3, and they can:

- Solve problems that require one or two operations. They may add, subtract, or multiply using positive or negative numbers (such as 10, -2), and they may divide positive numbers (such as 10).
- Figure out an average or mean of a set of numbers (such as $\frac{(10+11+12)}{3}$). For this they use whole numbers and decimals.
- Figure out simple ratios (such as $\frac{3}{4}$), simple proportions (such as $\frac{10}{100}$ cases), or rates (such as 10 mph).
- Add commonly known fractions, decimals, or percentages (such as ½, .75, or 25%).
- Add or subtract fractions that share a common denominator (such as $\frac{1}{8} + \frac{3}{8} + \frac{7}{8}$).
- Multiply a mixed number (such as $12\frac{1}{8}$) by a whole number or decimal.
- Put the information in the right order before they perform calculations.

For example, at this level, employees can figure out sales tax or a sales commission on a previously calculated total, and they can find out rates of use or business flow.

Applied Math Level 5

In Level 5 problems, the information may not be presented in logical order; the item may contain extraneous information; it may contain a chart, graph or diagram; and the mathematical set-up may be complicated. In solving, the test taker may need to perform multiple operations. For example, at this level employees may complete an order form by totaling an order and then computing tax.

When employees use Level 5 Applied Math skills on the job, they can use the skills described at Levels 3 and 4, and they can:

- Decide what information, calculations, or unit conversions to use to find the answer to a problem.
- As part of a multiple step problem, the employee may have to find one value and use it to find another value that answers the question.
- Add and subtract fractions with unlike denominators (such as ½ - ¼).
- Convert units within or between systems of measurement (e.g., time, measurement, and quantity) where the formula is provided such as converting from ounces to pounds or from centimeters to inches.
- Solve problems that require mathematical operations Calculate using mixed units, such as adding 3.50 hours and 4 hours 30 minutes or subtracting 3 feet and 10 inches from 6 feet and 4 inches.
- Identify the best deal by doing one- and two-step calculations and then comparing the results to determine the solution that meets the stated conditions.
- Calculate perimeters, circumference, and areas of basic shapes like rectangles and circles.
- Calculate a given percentage of a given number and then use that percentage to determine the solution (e.g., find the total cost of a product after calculating discount, markup or tax.
- Identify where a mistake occurred in a calculation (such as identifying the row in a spreadsheet where a problem occurred).

Applied Math Level 6

Level 6 tasks may require considerable translation from verbal form to mathematical expression. They generally require considerable setup and involve multiple-step calculations.

When employees use Level 6 Applied Math skills on the job, they can use the skills described at Levels 3, 4, and 5, and they can:

- Use fractions with unlike denominators and calculate reverse percentages.
- Convert units within or between systems of measurement (e.g., time, measurement, and quantity) where multiple-step conversions are required and the formulas are provided such as converting from kilometers to meters to feet.
- Identify why a mistake occurred in a solution.
- Find the best deal and use the result for another calculation.
- Find the area of basic shapes (rectangles and circles) when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations.
- Find the volume of rectangular solids.
- Calculate rates, productions rates, rate by time (such as, production rate is 59 cups produced per hour, how many will be produced in an 8 hour shift).
- Identify the correct equation for solving a problem

Applied Math Level 7

At Level 7, the task may be presented in an unusual format and the information presented may be incomplete or require the employee to make an assumption. Tasks often involve multiple steps of logic and calculation, and multiple operations.

When employees use Level 7 Applied Math skills on the job, they can use the skills described at Levels 3, 4, 5, and 6, and they can:

- Solve problems that include ratios, rates, or proportions with at least one of the quantities related to a fraction
- Identify the reason for a mistake.
- Convert between units of measurement that involve fractions, mixed numbers, decimals, or percentages.
- Find the area of multiple shapes or find the area of a composite shape.
- Calculate volumes of spheres, cylinders, or cones
- Calculate the volume when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
- Set up and manipulate ratios, rates or proportions where at least one of the quantities is a fraction.
- Determine the better economic value of several alternatives by using graphics or by finding a percentage difference or a unit cost.
- Apply basic statistical concepts for example calculate the weighted mean, interpret measures of central tendency, or interpret measure of spread and tolerance.

Applied Technology Skill

WorkKeys Applied Technology is the skill people use when they solve problems with machines and equipment found in the workplace. This skill includes four areas of technology: electricity, mechanics, fluid dynamics, and thermodynamics. Employees need to know the basic principles of each area, as described below.

Electricity involves the flow of electrons. Employees need to know how electrical current moves through a circuit or a system and how electricity affects a circuit or system. For example, they need to know how to control current and resistance.

Mechanics involves the way solid things move and how leverage, force, friction, and momentum affect that motion. Employees need to solve problems with simple machines, complex machines, and mechanical systems.

Fluid dynamics involves the way fluids (liquids and gases such as water and air) move through systems. Employees need to use this knowledge to solve problems with plumbing, hydraulics, or pneumatics (compressed gas).

Thermodynamics involves the movement of heat. Employees need to know which substances warm up quickly when heated and which ones warm up more slowly. For example, air heats faster than water. They also need to know how specific heat works. That is, they need to know how different materials hold heat for different amounts of time. They need to solve problems with refrigeration, heating, air conditioning, and phase changes.

Applied Technology Skill Continued

The Applied Technology skill focuses on reasoning, not math. Therefore, employees do not need to make calculations or use formulas to solve problems.

When employees use the Applied Technology skill, they may:

- Analyze a problem by identifying the problem and its parts.
- Decide which parts of a problem are important.
- Decide on the order to follow when dealing with the parts of the problem.
- Apply existing tools, materials, or methods to new situations.

There are four levels of difficulty. Level 3 is the least complex and Level 6 is the most complex. The levels build on each other, each incorporating the skills assessed at previous levels. For example, Level 5 includes the skills used at Levels 3, 4, and 5. Individual situations may involve only one area of technology, but each skill level requires employees to know the basic principles of all four areas at that skill level.

When considering the level of Applied Technology skill needed for the tasks employees complete on the job, you should think about the complexity of the system and the physical principles involved. You might consider the following questions:

How complex is the system? That is:

- Is the system one simple object or several objects working together?
- Are tools or test equipment involved?
- How much extra information is included?

How complicated is the troubleshooting task? That is:

- How many components of the system are involved?
- Are the underlying principles elementary or complex?
- Is more than one area of technology involved?

Applied Technology Level 3

Level 3 tasks are straightforward because the situations include the following characteristics:

- They involve one simple system (such as a sprinkler) that generally has two to five components.
- They show clear physical symptoms and usually have only one variable.
- They include all the needed information.
- They use only basic technical terms (such as loosen, temperature, and flow).

When employees use Level 3 Applied Technology skills on the job, they can:

- Identify how basic tools (such as hammers and wrenches) work.
- Identify how simple machine parts work (such as how turning a screw clockwise drives it into wood).
- Apply basic principles to solve problems involving a simple system (for example, friction creates heat).
- Solve basic problems (for example, using heat to loosen a metal nut stuck to a bolt or using a rubber washer to stop a leak at a hose connection).
- Identify the clear physical symptom (such as an oil leak, a stopped shaft, or warm coils) that points to the potential source of a problem.
- Identify the best solution after getting rid of clearly unsuitable options.

Applied Technology Level 4

Level 4 tasks are moderately complex because the situations include the following characteristics:

- They can involve two or more simple systems that work together (such as a timer and sprinkler) or one moderately complex system (such as plumbing for a sink). These systems have up to ten components.
- They can involve one or two variables.
- They present all the information that is needed but may contain extra information.
- They include less common technical terms that are defined (such as heat exchanger and circuit breaker).

When employees use Level 4 Applied Technology skills on the job, in addition to the skills at Level 3, they can:

- Understand the operation of moderately complex tools (such as gear pullers) and diagnostic equipment (such as continuity testers).
- Understand the operation of moderately complex machines and systems. These can include appliances, pulley-driven equipment, or piping systems that carry more than one fluid. For example, they can find the drive wheel shown on a diagram of a tape player.
- Apply less obvious basic principles to solve problems within physical systems (moving air cools a warm object).
- Solve moderate problems such as installing a valve to manage oil flow or using a block to improve the leverage of a pry bar.
- Eliminate physical symptoms that do not point to the source of a problem by choosing which information is important and ignoring information that is clearly extra.
- Identify the best solution after getting rid of other unsuitable options.

Applied Technology Level 5

Level 5 tasks can be moderately complex or of advanced difficulty because the situations include the following characteristics:

- They can involve two or more simple tools or systems that affect each other or a complex system (such as the plumbing in a house) that includes several components (such as drains, hot and cold water lines, and valves). These systems perform somewhat complex operations and generally have more than ten components.
- They can involve two or three variables.
- They may require the use of technical knowledge (for example, condensing coils should be warm and evaporating coils should be cool) and often include extra information.
- They use technical terms, which may be clearly defined or whose meaning may be implied in the context and illustrations.

When employees use Level 5 Applied Technology skills on the job, in addition to the skills at Levels 3 and 4, they can:

- Understand the operation of moderately complex tools (such as cutting torches and drill presses) and diagnostic equipment (such as ohmmeters, micrometers, or thermometers) and choose the best tool for the task.
- Understand the operation of complex machines and systems, such as gasoline engines, dishwashers, freezers, and building electrical systems.
- Apply two or more principles of technology (within one area or in two or more areas) as they interact in moderately complex systems (heat from friction causes components to expand).
- Solve moderate and advanced problems, such as how to change the speed of pulley-driven machines, protect electric circuits from overload, place fans in the best position, or find a problem in a hydraulic cylinder.
- Eliminate physical symptoms that do not lead to the source of a problem by choosing which information is important and ignoring extra information. To do this, it is necessary to use clues to find the source of a problem. For example, the smell of hot rubber near a conveyor might indicate a loose drive belt.
- Identify the best solution after getting rid of other suitable options.

Applied Technology Level 6

Level 6 tasks are advanced because the situations include the following characteristics:

- They involve complex tools or systems (such as the water system of a new subdivision) with more than ten components and they include large amounts of information.
- They present a variety of possible sources of problems that are subtle and difficult to diagnose.
- They may involve many variables at the same time.
- They require the use of technical, although not job-specific, knowledge (for example, how an electromagnetic relay operates) and contain considerable extra information.
- They use technical terms, which may be clearly defined or whose meaning may be implied in a complex context and illustrations.

When employees use Level 6 Applied Technology skills on the job, in addition to using the skill at Levels 3, 4, and 5, they can:

- Understand the operation of complex tools (such as an arc welder or compound miter saw) and diagnostic equipment (such as an oscilloscope) and choose the best tool for the task.
- Understand the operation of complex machines and their components (for example, hydraulic lifts, automobiles, and water treatment facilities).
- Apply two or more principles of technology (within one area or in two or more areas) as they interact in complex systems. For example, fluids, like refrigerant, are often subjected to phase changes in order to move greater amounts of heat.
- Solve advanced problems where a variety of mechanical, electrical, thermal, or fluid faults could be the reason for the problem.
- Eliminate physical symptoms that do not lead to the source of a problem by choosing which information is important and ignoring extra information. To do this, it is necessary to use less obvious clues to find the source of a problem. For example, discolored oil may mean a faulty gasket is allowing moisture into an engine.
- Test possible hypotheses to ensure the problem is diagnosed correctly and the best solution is found. This is necessary when systems have difficult problems that could be caused by a variety of mechanical, electrical, thermal, or flow faults.

Business Writing Skill

WorkKeys Business Writing is the skill people use when they write an original response to a work-related situation. Components of the Business Writing skill include sentence structure, mechanics, grammar, word usage, tone and word choice, organization and focus, and development of ideas.

The main requirement of workplace writing is clarity. Employers want their employees' written communications to be direct, grammatically correct, and easy to read. Careless errors may lead the reader to believe there are also errors in the facts, and the writer loses credibility and trustworthiness. WorkKeys Business Writing requires standard business English, defined as writing that is direct, courteous, grammatically correct, and not overly casual.

There are five skill levels. Level 1 is the least complex and Level 5 is the most complex. At each new level, employees demonstrate more competent writing skills than those used at the previous levels. For example, Level 3 builds upon the skills used at Levels 1 and 2. With the increased skills at each level, the writing that employees produce communicates more clearly and smoothly as they move to Level 5. At the same time, errors become less frequent and less serious.

When you evaluate a job to see what skill level employees need for completing their tasks, consider the following questions:

- To what extent do the ideas need to be developed? Should the writing include relevant supporting examples and details, or should there just be a focus on the main ideas themselves?
- How important is the writing style? Does the writing have to flow smoothly, or can it be choppy as long as the writer's thoughts are successfully communicated?
- Is it necessary to have a professional tone? Does the writing need to be formal, or is it all right to be casual?
- How important are the writing mechanics and grammar? Is it important for all the grammar, punctuation, and spelling to be correct, or are errors acceptable as long as the ideas get across?

BUSINESS WRITING SKILL Continued

When measuring the WorkKeys Business Writing skill, we focus on the writing a person can produce without help from a dictionary, a spelling or grammar checker, another person, or any other aids. As you decide which writing skills employees need on the job, you need to consider what kind of writing they must produce.

- The assigned skill level will be higher if the writing must be polished and well developed, but the writer does not have the chance to get help from a dictionary, a spelling or grammar checker, another person, or any other aids.
- The assigned skill level will be lower if the final product must be polished and well developed, but the writer has the chance to use writing aids.
- The assigned level will also be lower if the important thing is to convey the information, and what the writing looks like is not as important.

After this skill description, the skill levels are described individually. Sample responses are also provided, and each sample is followed by an explanation of why the response is at the specified level.

Business Writing Level 1

Employees with Level 1 skills can write responses in English. However, a large number of errors make the response very difficult to understand.

When employees use Level 1 Business Writing skills on the job, they produce writing:

- That consists of incomplete sentences the majority of the time.
- That includes a large number of major grammatical, mechanical, and word usage errors that interfere with communication.
- That has rude or overly casual language, tone, and style that may be inconsistent with standard business English.
- That has no organization.
- That attempts to communicate their ideas but provides little or no development or support.

Business Writing Level 2

Employees with Level 2 skills can write responses that are generally understandable. When employees use Level 2 Business Writing skills on the job, they can produce writing:

- That has some complete sentences, although some sentences may be simple or repetitive.
- With enough correct mechanics, word usage, and grammar to convey an idea, although many errors may somewhat interfere with comprehension.
- That has rude or overly casual language, tone, and style that may be inconsistent with standard business English.
- With some organization, but with an unclear focus. They use few or no transitions.
- With ideas that are generally understandable but that are not expanded.

Business Writing Level 3

Employees with Level 3 skills can write clear responses. The writing may include incorrect structure, some errors in grammar and punctuation, and adequate development, although the ideas may be limited.

When employees have Level 3 Business Writing skills on the job, they produce writing:

- With most of the sentences complete. Some variety and complexity are attempted.
- With few mechanical, grammatical, and word usage errors so that the response is adequately conveyed, but may be repetitive. Spelling is generally correct.
- With style and tone that are generally consistent with standard business English. The writing may have somewhat casual language, but does not contain rude language.
- That exhibits some organization but that may lose focus at some point. Transitions are simple.
- That has adequate development of ideas, but which may be limited in depth and thoroughness. Supporting examples tend to be general and details are relevant, but they may be repetitive.

Business Writing Level 4

At Level 4, employees write responses that are clear, with almost no errors. When employees have Level 4 Business Writing skills on the job, they produce writing:

- With all sentences complete and generally varied in length and complexity.
- With very few mechanical, grammatical, and/or word usage errors. These do not interfere with communication. Word usage is precise and varied.
- With style, tone, and language that are consistent with standard business English (the writing contains no rude or overly casual language).
- That is organized and maintains consistent focus. Transitions are effective, if not especially varied.
- That has most of the ideas developed well with relevant supporting examples and details.

Business Writing Level 5

At Level 5, employees write responses that are clear, precise, and generally free of errors. The writing communicates in a professional, courteous manner.

When employees have Level 5 Business Writing skills on the job, they produce writing:

- That uses complete sentences that are varied in length and complexity.
- With few or no errors in grammar and/or mechanics. Any errors present do not interfere with communication. They write with word usage that shows considerable precision and variety.
- With style, tone, and language that are consistent with standard business English (the writing contains no rude or overly casual language).
- That is smoothly organized and that maintains clear and consistent focus from beginning to end. Transitions are varied and effective, creating a seamless flow of ideas.
- That has well-developed ideas elaborated on with relevant supporting examples and specific details. The writing shows insight, perception, and depth.

Graphic Literacy Skill

The WorkKeys Graphic Literacy skill is the skill people use when they work with workplace graphics such as tables, graphs, charts, digital dashboards, flow charts, timelines, forms, maps, and blueprints. Employees use this skill when they find, summarize, compare, and analyze information to make decisions using workplace graphics to solve work-related problems.

There are five levels. Level 3 is the least complex and Level 7 is the most complex. At each new level, employees need more demanding skills in addition to the skills used at the previous levels. For example, Level 5 includes the skills used at Levels 3, 4, and 5. At the lower levels, employees may need to locate or find information in a simple graphic. At the higher levels, employees may use information in one or more difficult graphics to draw conclusions and make decisions. The complexity can also increase as the quantity and/or density of the information increases.

Skill levels depend on two things: the complexity of the graphic and the task that the employee is asked to perform. When you consider what skill level is needed for the tasks that employees complete on the job, think about the following things:

How complex is the workplace graphic?

- Is the graphic simple or difficult, common or uncommon?
- Is the content familiar or unfamiliar?
- How many graphics are there? Is there one graphic, two graphics multiple graphics, or a composite graphic (such as a bar chart with a line graph over it)?
- How many pieces of information are presented? Is there a lot of data presented or not very much?
- How many variables are there? Are there one or two variables such as weight and age or are there many variables such as height, weight, age, gender, and body mass index?
- If there are axes, how many are there (such as X, Y, and Z)?
- How many levels of data are there? Is the data nested such as major cities within states?

How complicated is the employee's task when using the graphics? That is:

- Is it only necessary locate, find, or compare information in a single graphic, or is it necessary to use the information in another graphic?
- Does the next step in a process or procedure need to be identified?
- Do trends, patterns, or relationships in a graphic need to be identified, compared, or interpreted?
- Is the information in the graphic used to make inferences or decisions? Does the inference or decision need to be justified?
- Is it necessary to identify the graphic that accurately represents the data or is the most effective? Does the choice need to be justified?

Graphic Literacy Level 3

At Level 3, workplace graphics are common and of simple or low moderate difficulty.

Characteristics of simple graphics include:

- A limited amount of data (i.e., less than twenty data points/fields)
- One level of data such as number of items in inventory
- One or two variables such as day of the week and number of items in inventory
- If there are axes, there will be one or two, such as an x and/or y axis

Characteristics of low moderate graphics include:

- A moderate amount of data
- More than one level of data, but no nesting
- Several variables
- If there are axes, there will be one or two
- If two simple graphics are required to solve the problem, they should be considered a low moderate graphic.

At Level 3, employees use one simple or low moderate graphic at a time to perform the following tasks:

- Locate and find information
- Identify the next or missing step in a process

Graphic Literacy Level 4

At Level 4, workplace graphics are common and of low to high moderate difficulty.

Characteristics of low moderate graphics include:

- A moderate amount of data
- More than one level of data, but no nesting
- Several variables
- If there are axes, there will be one or two
- If two simple graphics are required to solve the problem, they should be considered a low moderate graphic.

At Level 4, employees have demonstrated all of the skills defined at Level 3 and they can use one or two low moderate graphics at a time to perform the following tasks:

- Locate information in a graphic using information found in another graphic
- Compare two or more pieces of information
- Identify a trend/pattern/relationship
- Make an inference or decision
- Identify the graphic that accurately represents the data

High moderate graphics may be less common and have the following characteristics:

- A moderate amount of data
- More than one level of data and it may be nested
- Many variables such as types of wood, drill speeds, hole diameter, and type of bit
- If there are axes, there will be one or two such as an x and/or y axis.
- If a low moderate graphic and a simple graphic are required to solve the problem, they should be considered a high moderate graphic.

At Level 4, employees have demonstrated all of the skills defined at Level 3 and they can use one high moderate graphic to perform the following tasks:

- Locate and find information
- Identify the next or missing step in a process

Graphic Literacy Level 5

At Level 5, workplace graphics may be less common and of low moderate, high moderate, or difficult complexity.

Characteristics of low moderate graphics include:

- A moderate amount of data
- More than one level of data, but no nesting
- Several variables
- If there are axes, there will be one or two.
- If two simple graphics are required to solve the problem, they should be considered a low moderate graphic.

At level 5, employees have demonstrated all of the skills defined at Levels 3 and 4, and they can use a low moderate graphic to perform the following tasks:

- Compare two or more pieces of information
- Interpret a trend/pattern/relationship
- Make a reasonable inference or decision based on one graphic after finding information in another graphic
- Justify a decision or inference based on information
- Identify the most effective graphic for the task
- Justify the most effective graphic for the task

High moderate graphics may be less common and have the following characteristics:

- A moderate amount of data
- More than one level of data and it may be nested
- Many variables
- If there are axes, there will be one or two.
- If a low moderate graphic and a simple graphic are required to solve the problem, they should be considered a high moderate graphic.

Graphic Literacy Level 5 Continued

At Level 5, employees have demonstrated all of the skills defined at Level 3 and 4, and they can use one high moderate graphic to perform the following tasks:

- Locate information in a graphic using information found in another graphic
- Compare two or more pieces of information
- Identify a trend/pattern/relationship
- Make an inference or decision
- Identify the graphic that accurately represents the data

Difficult graphics are likely to be less common or a composite of graphics and have the following characteristics:

- Data presented is dense.
- More than one level of data and nesting is likely
- Many variables such as types of wood, drill speeds, hole diameter, and type of bit
- If there are axes, there will be three or more such as an x, y, and z axis.
- If a high moderate graphic and a low moderate graphic are required to solve the problem, they should be considered a difficult graphic.

At Level 5, employees have demonstrated all of the skills defined at Level 3 and 4, and they can use one difficult graphic to perform the following tasks:

- Locate and find information
- Identify the next or missing step in a process

Graphic Literacy Level 6

At Level 6, workplace graphics may be less common and of high moderate or difficult complexity.

High moderate graphics may be less common and have the following characteristics:

- A moderate amount of data
- More than one level of data and it may be nested
- Many variables
- If there are axes, there will be one or two
- If a low moderate graphic and a simple graphic are required to solve the problem, they should be considered a high moderate graphic.

At level 6, employees have demonstrated all of the skills defined at Levels 3, 4 and 5, and they can use a high moderate graphic to perform the following tasks:

- Compare two or more pieces of information
- Interpret a trend/pattern/relationship
- Make a reasonable inference or decision based on one graphic after finding information in another graphic
- Justify a decision or inference based on information
- Identify the most effective graphic for the task
- Justify the most effective graphic for the task

Difficult graphics are likely to be less common or a composite of graphics and have the following characteristics:

- Data presented is dense.
- More than one level of data and nesting is likely
- Many variables
- If there are axes, there will be three or more.
- If a low moderate graphic and a high moderate graphic are required to solve the problem, they should be considered a difficult graphic.

Graphic Literacy Level 6 Continued

At Level 6, employees have demonstrated all of the skills defined at Level 3, 4 and 5, and they can use one difficult graphic to perform the following tasks:

- Locate information in a graphic using information found in another graphic
- Compare two or more pieces of information
- Identify a trend/pattern/relationship
- Make an inference or decision
- Identify the graphic that accurately represents the data

Graphic Literacy Level 7

At Level 7, workplace graphics may be less common and of difficult complexity.

Difficult graphics are likely to be less common or a composite of graphics and have the following characteristics:

- Data presented is dense.
- More than one level of data and nesting is likely
- Many variables
- If there are axes, there will be three or more.
- If a low moderate graphic and a high moderate graphic are required to solve the problem, they should be considered a difficult graphic.

At level 7, employees have demonstrated all of the skills defined at Levels 3, 4, 5 and 6, and they can use a difficult graphic to perform the following tasks:

- Compare two or more trends/patterns/relationships
- Interpret a trend/pattern/relationship
- Make a reasonable inference or decision based on one graphic after finding information in another graphic
- Justify an inference or decision based on information
- Identify the most effective graphic for the task
- Justify the most effective graphic for the task

Workplace Documents Skill

Employees read and use workplace documents in order to do a job. The documents include, but are not limited to, messages, emails, letters, directions, signs, notices, bulletins, policies, websites, contracts, and regulations and are based on materials that reflect the actual reading demands of the workplace.

It is often the case that these workplace communications are not necessarily clearly written or targeted to the appropriate audience. These documents do not include information that is presented graphically, such as in charts, forms, or blueprints.

There are five levels of difficulty. Level 3 is the least complex and Level 7 is the most complex. The levels build on each other, each incorporating the skills assessed at the preceding levels. For example, at Level 5, employees need the skills from Levels 3, 4, and 5. The reading materials at Level 3 are short and direct. The material becomes longer, denser, and more difficult to use as readers move toward Level 7. The tasks also become more complex as readers move from Level 3 to Level 7. At Level 3, readers begin by finding very obvious details and following short instructions. At the more complex levels, tasks can also involve more application and interpretation.

When you consider what level of skill is needed for the tasks employees complete on the job, you might consider the following questions:

How difficult are the materials? For example:

- Are the sentences short, simple, and clear; or are they complex and possibly even confusing?
- Do the materials use only common words; or do they include difficult words, jargon, and words used in unfamiliar ways?
- How much extra information is included?

How complicated is the task? For example:

- Is it only necessary to use information that is stated clearly?
- Is it necessary to make inferences based on the reading materials before using the information?
- Do the employees need to apply the information to a situation exactly like the one described in the materials or to one that is quite different?

Workplace Documents Level 3

Level 3 reading materials include basic work related policies, procedures, and announcements with the following characteristics:

- They are short, with no extra information.
- Employees read the materials to find out what they should do.
- All the information within the document is stated clearly and directly.
- Short sentences and common, everyday, and workplace words (such as employee, timecard, office) are used.
- The document contains a small number of clearly stated details.

When employees use Level 3 skills on the job, they can:

- Find the main ideas and clearly stated details.
- Choose when to perform each step in a series of short steps.
- Apply information/instructions to a situation that is the same as the one they are reading about (such as knowing what button to push first after reading instructions on how to run a copy machine).

Workplace Documents Level 4

Level 4 workplace documents include policies, procedures, and notices with the following characteristics:

- They are straightforward with some long sentences and contain a number of details.
- These materials use common words, but do have some harder words, too.
- They describe procedures that include several steps.
- When following the procedures, employees must think about changing conditions that affect what they should do. For example, they can follow directions that include "if-then" statements.

When employees use Level 4 skills on the job, in addition to using Level 3 skills, they can:

- Identify the main idea and details that may not be clearly stated.
- Use the reading material to figure out the meaning of words that are not defined for them (not jargon or technical terms).
- Apply information/instructions to a situation that is the same as the situation in the reading materials.
- Choose what to do when changing conditions call for a different action.

Workplace Documents Level 5

At Level 5, workplace documents include policies, procedures, announcements, legal, and multiple related documents that have many details with the following characteristics:

- The information that employees need is generally stated directly, but it is hard to find because there are so many details and some may not be needed for the task being performed (extraneous information).
- The materials include technical terms, jargon, and acronyms, or words that have several meanings.
- The documents may have complex sentences and/or contain conditional situations.

When employees use Level 5 skills on the job, in addition to using the skills described at Levels 3 and 4, they can:

- Figure out the appropriate meaning of a word based on how the word is used.
- Identify the appropriate meaning of technical term, jargon, or an acronym that is defined in the document.
- Apply technical terms and jargon to stated situations.
- Apply information/instructions to a new situation that is similar to the one described in the material while considering changing conditions.
- Apply complex information/instructions that include conditionals to situations described in the materials.
- They may need to make some inferences to accomplish their goal.

Workplace Documents Level 6

At Level 6, workplace documents include policies, informational, instructional (procedures), legal, and multiple related documents with the following characteristics:

- They use mostly complicated sentences.
- Documents may be long and/or complex and/or contain conditional situations.
- There are implied and/or extraneous details with difficult words, jargon, and technical terms.
- Most of the information is not clearly stated.
- Meanings may need to be determined from context.

When employees use Level 6 skills on the job, in addition to using the skills at Levels 3, 4, and 5, they can:

- Infer implied details.
- Infer the meaning of an acronym, jargon, or technical term from context.
- Apply information/instructions to a situation not directly described or to a completely new situation.
- Apply principles inferred in a passage to a situation not directly described or to a completely new situation.
- Identify the rationale behind a procedure, policy, or communication.

Workplace Documents Level 7

At Level 7, workplace documents include policies, informational, instructional (procedures), legal, and multiple related documents with the following characteristics:

- The documents contain a lot of details, and the concepts are complicated.
- May cover uncommon topics (concepts) and/or contain conditional situations.
- There are implied and extraneous details.
- Advanced, unfamiliar, and/or uncommon words, technical terms, and jargon; meanings must be determined from context.
- Not clearly stated, pieces of information may be spread throughout the document and may be extraneous.

When employees use Level 7 skills on the job, in addition to using the skills at Levels 3, 4, 5, and 6, they can:

- Infer the meaning of an acronym, jargon or technical term from context.
- Apply principles inferred from the materials to a situation not directly described or to a completely new situation.
- Identify the rationale behind an entire document or a section of a document.
- Infer implied details.

Workplace Observation Skill

WorkKeys® Workplace Observation is the skill that employees use to visually observe a workplace event, notice details, and remember instructions, procedures, processes, and demonstrations in order to generalize to workplace situations that may be similar or very different from what was observed. Employees must pay careful attention to steps that are followed, to safety procedures, and to quality-control standards.

There are five levels. Level 1 is the least complex and Level 5 is the most complex. The levels build on each other, each incorporating the skills assessed at the previous levels. For example, Level 5 includes the skills used at Levels 1, 2, 3, 4, and 5. The skill level is determined by the complexity of the situation being observed and the task(s) that employees are asked to do based on their observations. At Level 1, employees must be able to recall information from a short, straightforward sequence with few details, no distractions, and obvious differences from the standard. For example, they may need to identify the next step in a series of steps. At Level 5, employees must be able to generalize information from a complex situation to new situations in order to make accurate predictions or anticipate changing variables. Distractions and differences are difficult to recognize.

Video examples of situations that belong at each skill level are provided. When you consider what skill level is needed for the tasks that employees complete on the job, think about the following things:

How complex is the procedure being observed and remembered?

- Is it logical or illogical, familiar or new, commonplace or unique, straightforward or complicated?
- How much information is involved, and are the procedure's parts independent or interactive?
- How much distracting information is there?
- Are extra details likely?
- How difficult is it to detect differences, discrepancies, or changes?

How difficult is the task that employees are asked to do?

- How much generalizing is the employee required to do? Are they identifying the next step in a straightforward process or are they determining how a change will affect an outcome?
- How subtle are the details or differences in the procedure to be noticed by employees? Are these differences significant?
- Are employees required to apply instructions, demonstrations, procedures, or processes to other situations?
- Do employees need to take changing conditions into account to choose the best course of action?

Workplace Observation Level 1

At Level 1, employees follow a short, straightforward, and simple procedure with each step clearly shown. The task is performed in a routine and predictable manner. There are no distractions and differences are obvious. There are a few details, but no unnecessary details.

When employees use Level 1 Workplace Observation skills on the job, they can:

- Repeat a short, straightforward demonstration, process, pattern, or procedure
- Recognize an incorrect step (wrong order or not in process)
- Identify the next step in a series of steps
- Put steps in correct order
- Identify a missed or incorrect step
- Match placement or identify misplacement of components (e.g., follow instructions for putting phone cord in proper location when packing a box)

Workplace Observation Level 2

At Level 2, employees interpret a straightforward procedure, but there is a condition (if – then or cause-effect). Several possible things may happen and a specific response is provided for each one. There are obvious and easily disregarded distractions. There are a few extra details and differences.

When employees use Level 2 Workplace Observation skills on the job, they can:

- Recognize cause and effect in a straightforward demonstration, process, pattern, or procedure
- Filter out obvious distractions
- Identify the cause of a particular effect (e.g., alarm sounds when pressurized air is released)
- Recognize what to do next in a situation given a single condition
- Indicate action to be taken when there is an incorrect step identified

Workplace Observation Level 3

At Level 3, employees watch complex procedures that include several tasks that may occur at the same time, interact, and change from one situation to another. More than one condition (if-then or cause-effect) may be present. Several important details are presented, but a few are not clearly prompted. Some distractions may make remembering details difficult. The employee may be asked to apply information observed to other similar situations. Steps may seem similar, but differ based on varying factors. A few differences may be present that are not clear.

When employees use Level 3 Workplace Observation skills on the job, they can:

- Identify course of action to take given more than one condition
- Distinguish steps that seem similar but are different based on varying factors
- Maintain attention to significant details with little prompting
- Recognize when steps can be combined and when they must be kept distinct
- Combine steps to achieve desired result
- Identify differences and/or details that are not clear
- Select, interpret, and integrate the steps, in the correct order, within a complex process
- Apply information to a similar situation

Workplace Observation Level 4

At Level 4, employees must analyze and determine the basic principles before a process can be generalized to a new situation. Several conditions are present that may influence the course of action. Strong distractions compete for attention. Some steps may not be demonstrated (i.e., inferred). Some of the differences are difficult to notice.

When employees use Level 4 skills on the job, they can:

- Make inferences from situational cues in a demonstrated process or procedure
- Derive steps that are missing from a partial or non-explicit pattern, process or procedure
- Apply complicated instructions to new situations
- Decide which conditions apply to a new situation
- Determine the general principle underlying the condition, process, or procedure
- Determine what comes next (e.g., tiling a floor and figuring out the next placement in the pattern)
- Break down a given process and apply results to unfamiliar processes to complete a task or diagnose a problem
- Use situational cues to determine steps to be taken

Workplace Observation Level 5

At Level 5, employees evaluate a new situation with multiple conditions and then choose the best course of action. General principles may be difficult to determine and may need to be applied differently in order to achieve a desired outcome. The situation requires innovation and the level of abstraction may be high. Distractions are present that appear to be relevant but are not. Differences are difficult to recognize and/or evaluate.

When employees use Level 5 skills on the job, they can:

- Determine the best course of action by applying principles to a new situation and/or when the information is not complete.
- Make accurate predictions based on what has been observed (e.g., what is the likely result).
- Consider the implications of a process or procedure and how they will affect outcomes.
- Prioritize appropriately (identify aspects of process that should be given priority under certain circumstances, identify parts of the process that can be omitted in different circumstances)
- Identify ways to improve the process
- Evaluate whether something is or is not a distraction

Appendix C

WorkKeys Terminology

Assessment — A test used to evaluate individuals' performance in a skill area. Scores on the WorkKeys assessments can be compared to the WorkKeys skill levels identified in a profile. The difference between the profiled level and a score indicates the need for training.

Content Validity Report — A summary generated by the Profiler that includes the Final Task List, detailed descriptions of the session discussions of each skill, and recommendations for using the results.

Content Validity Report Addendum — When a previous profile has been conducted and a client wishes to use a WorkKeys skill assessment that was not included in the profile, the WorkKeys skill will be profiled and a Content Validity Report Addendum will be written to document the results.

Effective Level — Effective performance is the point at which an employee performs competently without continuous supervision. Effective performance Level levels are provided for use as training goals.

Entry-Level — Following the Uniform Guidelines on Employee Selection Procedures (1978), WorkKeys defines entry as an employee's first day performing the job. The entry-level skill requirements are recommended for use as cutoff scores on the related WorkKeys assessments.

Final Task List — A list specifying the critical/important tasks for a job in statements that have been reviewed and edited by SMEs and then placed in order using SME Importance rating averages.

Importance — The importance of the task to the job. Importance is represented by the mean Importance rating for each task.

Initial Task List — Prior to the profiling session, the Profiler develops an Initial Task List using information compiled from databases (e.g., O*NET), job-related documentation (e.g., job descriptions, resources from similar job profiles, training materials), and information gathered from the tour of the facility.

Job Profile	The result of conducting one or more job profiling sessions which shows the most critical/important tasks for a job and the WorkKeys skills and skill levels required to perform a job.
Job Profiling	A procedure to determine the most critical tasks for a job and to determine the WorkKeys skills and skill levels required to perform these tasks. Variations on this model include **curriculum profiling** – which analyzes WorkKeys-related curriculum requirements through a review of the curriculum objectives and a skill analysis that identifies the WorkKeys skills and skill levels required for entry into, and exit from, a program, and **occupational profiling** – which identifies the WorkKeys skill levels required for an occupation across jobs, companies, or industries; or an employer.
Profiler	An individual who has completed ACT's WorkKeys Profiling training program successfully. An ACT authorized Profiler has been trained to facilitate the job profiling process while using the SkillPro® software and write a report of the profile results
Profiling Session	A focus group meeting facilitated by an ACT authorized Profiler. The Profiler meets with SMEs to perform a task analysis and skill analysis.
Reconciliation	When SME groups do not agree on skill requirements (generally for job entry) the Profiler meets with representative SMEs from each group to resolve the differences in a reconciliation session.
Replication	Replication sessions are additional profiling sessions with different groups of SMEs. Replication sessions are used to make sure that the results are consistent from one group to another, when there are a large number of incumbents on the job.
Skill Analysis	A skill analysis occurs after a task analysis is completed and consists of two parts: • The SME group identifies the critical/important on-the-job behaviors (i.e., tasks from the Final Task List) that are associated with the WorkKeys skills under consideration. • The SME group compares detailed descriptions of the WorkKeys skill levels to the critical/important tasks that require the specified skill. The Profiler seeks to bring the group to a consensus regarding the skill levels required at job entry and for effective performance.

Skill Gap	When the profiled skill level is higher than the assessment score, the difference is referred to as a "skill gap."
SME	Subject matter experts are employees currently performing the job or people knowledgeable about the job being profiled (e.g., supervisors or people who have been recently promoted from the job).
Task Analysis	A task analysis consists of three parts: • The Profiler meets with the SME group to tailor the Initial Task List (i.e., add, edit, and delete tasks), making sure that the Final Task List accurately and completely describes the job. • The SMEs independently rate each task for Importance. • The Profiler calculates the importance of each task using the SME Importance ratings and sorts the task statements by placing the most important tasks at the beginning of the list. The SMEs review and confirm the order of the tasks. The product of the task analysis is the Final Task List.
WorkKeys Skills	Applied Math, Applied Technology, Business Writing, Graphic Literacy, Workplace Documents, Workplace Observation.

Appendix D

Group A Final Task List

The Final Task List is shown in the table below. The mean importance ratings and skill requirements are also shown. An "X" in a skill column means that, according to the SMEs in the profile session, the task on that row requires that skill. Tasks are presented in order, from those most critical to job performance to those least critical. The tasks in gray italics received mean ratings of Importance below 2 (i.e., low importance) and were not included in the skill analysis. The Importance Sum (i.e., sum of importance ratings for the skill) and Skill Percent (i.e., percentage of important tasks requiring the skill) for each skill are shown at the end of the table. The total Importance Sum possible is 132.

Tasks	Importance	Applied Math	Graphic Literacy	Workplace Documents	Workplace Observation
Assists customers in the selection and purchase of specialized telephone services, such as long distance plans by using plan descriptions and text from relevant scripts to review and suggest options and to answer questions.	5	☒	☒	☒	☒
Calls prospective new customers to explain new services and products by using the appropriate script, marketing materials, and pricing charts based on the client's current plan and usage information as shown in the computer record.	5	☐	☒	☒	☒
Checks for accuracy of customer name and mailing address each time a customer calls or writes by asking them for this information and comparing it to the information already in the database.	5	☐	☒	☐	☒

Tasks	Importance	Applied Math	Graphic Literacy	Workplace Documents	Workplace Observation
Handles customer complaints concerning billing by identifying the nature of the problem, correcting minor billing errors, and forwarding other requests.	5	☒	☒	☒	☒
Prevents customers from discontinuing their service if their reason is due to poor service or a competitor's better deal by offering special Retention Plans, beginning with the least expensive options.	5	☐	☒	☒	☒
Processes customer requests for refunds that are due to a move or change of special services in the middle of a billing cycle by locating the customer's record in the database to enter the appropriate debit or credit code in their billing screen.	5	☐	☒	☐	☒
Sells telephone services to preferred business accounts by offering special plans and upgrades outlined in the plan descriptions and scripts.	5	☒	☒	☒	☒
Arranges for payment of delinquent accounts by calling customers, getting them to agree on a payment plan, setting dates and amounts of payments, documenting in the database, and sending a form letter with the agreed upon terms.	4	☒	☒	☒	☒
Assists customers in placing long-distance phone calls by asking them the nature of the problem and either accessing their account and dialing the call for them, or connecting them to the appropriate service carrier company.	4	☐	☒	☐	☒
Determines if customer problems are due to hardware (e.g., boxes, cables, or telephone) by finding the problem on the Troubleshooting Chart and reading the action to take to the customer and issuing a work order if indicated by the test.	4	☐	☒	☒	☒

Tasks	Importance	Applied Math	Graphic Literacy	Workplace Documents	Workplace Observation
Opens accounts for customers by adding a new record in the computer database and completing the required fields such as name, street address, billing address and service plan option(s).	4	☐	☒	☐	☒
Prepares for a sales call by finding the correct Prospect Screen that shows the services currently subscribed to by the customer, and using this information to determine the additional services to recommend and the script to follow.	4	☐	☒	☒	☒
Prepares for a sales call to a non-GCOMM customer by reviewing the printout showing the prospect's current phone company, number of people in household, and annual income to determine the appropriate script to follow.	4	☐	☒	☒	☒
Processes orders (e.g., installation, discontinuance, or change) by inserting the appropriate transaction code in the client's computer record along with any special instructions (e.g., requested service date/time, dangerous dog in yard).	4	☐	☒	☐	☒
Quotes prices for customized plans to non-GCOMM customers by entering all charges included in the quote and charges for current plan onto the electronic Price Quote worksheet and then using the information to explain why GCOMM's plan is best.	4	☒	☒	☐	☒
Recommends additional services to customers by reviewing the customer's record in the database for existing service plan and current services and then offering services such as additional phone lines, internet service, or caller ID.	4	☒	☒	☐	☒
Reports irregularities in the database by contacting the shift supervisor and telling them and/or showing them the problem (e.g., a recent sale or service was not documented appropriately or when a work order was not issued properly).	4	☐	☒	☐	☒

Tasks	Importance	Applied Math	Graphic Literacy	Workplace Documents	Workplace Observation
Activates phone to receive calls by clicking #44 on phone and logging into computer system.	3	☐	☒	☐	☒
Completes Information Requested order form by entering prospect or customer name and contact information, indicating which company products and services brochures should be mailed, and submitting electronically.	3	☐	☒	☐	☒
Completes special installation or repair requests for unusual problems by locating the screen for special requests, entering customer information and special request, and submitting electronically.	3	☐	☒	☒	☒
Contacts customers to obtain more information about their accounts by using the up-to-date form letter and completing the Follow-up Contact form after five unsuccessful attempts to reach the customer by phone.	3	☐	☒	☐	☒
Deactivates phone by clicking on #43 on phone and logging out of computer system.	3	☐	☒	☐	☒
Determines if team is meeting sales goals by reading the Sales Goals Projection Report distributed to each team.	3	☐	☒	☒	☒
Documents customer report of interrupted service by checking the Reported Outages screen to see if their area is listed, apologizing for the service disruption, telling them when it is expected to return to normal, and thanking them for the call.	3	☐	☒	☐	☒
Enters additional account information upon customer request by locating the correct screen in the computer database and entering the information as the customer provides it (e.g., name of family members added to account).	3	☐	☒	☐	☒

Tasks	Importance	Applied Math	Graphic Literacy	Workplace Documents	Workplace Observation
Investigates errors found in customer accounts by gathering information from the customer or their record, comparing it for consistency, using the correct transactions screen to correct the account, and noting a description of the action taken.	3	☐	☒	☐	☒
Investigates potential fraud or misuse of calling cards by checking accounts that have been flagged by the computer for unusual use (such as calls exceeding $100 in a one-day period) and attempting to contact the customer by phone and U.S. Mail.	3	☐	☒	☐	☒
Issues calling cards by verifying the caller's identity, obtaining and entering the required information (e.g., name, number of cards), and using the appropriate transaction code to submit the request.	3	☐	☒	☐	☒
Notifies customers that installation is completed by printing the completed service list and sending the customers a form email or postcard.	3	☐	☒	☐	☒
Notifies other departments of customer's problem by sending an email request for service outlining the problem to the appropriate department if the reported problem came in after hours or they didn't pick up a transferred call.	3	☐	☒	☐	☒
Participates in monthly team meetings by attending and participating in discussions about sales goals and ways to increase sales, using information provided by marketing.	3	☐	☒	☐	☒
Participates in training workshops by attending, participating in activities, and reviewing all materials.	3	☐	☒	☐	☒
Provides customer with the price for additional services that are not included in their plan by using pricing charts, Price Quote worksheet, and a calculator to calculate the price.	3	☒	☒	☐	☒

Tasks	Importance	Applied Math	Graphic Literacy	Workplace Documents	Workplace Observation
Suggests improvements in work methods and procedures by role playing behaviors during training sessions, such as suggestive selling, and verbally conveying them to the supervisor for consideration.	3	☐	☒	☐	☒
Trains newcomers by allowing them to shadow calls (i.e., observe experienced CSR & their monitor), and then switching roles to have trainees answer calls and navigate through the customer account software while being supervised.	3	☐	☒	☒	☒
Updates prospect information during a phone solicitation call by entering or updating prospect information (e.g., names, addresses, purchases, and reactions or additional notes) into the sales database.	3	☐	☒	☐	☒
Pages employees on the floor by operating the in-house paging system to get their attention and indicating which line the call is on.	*2*				☒
Performs recommended exercises to prevent carpal tunnel by doing the finger-wrist exercises twice each shift and on breaks.	*2*				☒
Transfers customers to the billing department when billing adjustments exceed $100 or if the customer is more than two months delinquent in their payments by either conveying verbally or in an email about the situation and previous actions taken.	*2*				☒
Prepares a verbal report on daily sales activities by summarizing the types of products or services sold and reasons why customers bought or declined an offer.	*1*				☒
Recommends telephone models for purchase/rent to customers by using the marketing materials and identifying the customer's needs.	*1*				☒

Tasks	Importance	Applied Math	Graphic Literacy	Workplace Documents	Workplace Observation
Records toll charges made by writing down the name of the person called, phone number, reason for the call, and the employee's identification number in the Call Charge Log.	*1*				☒
Updates "No Call" list by entering the names and telephone numbers of prospects contacted who request to be added to the list, and adding the "no call" code to the record for the prospect in the sales database.	*1*				☒
Importance Sum		30	132	50	132
Skill Percent		19.4	100.0	33.3	100.0

Appendix E

Group B Final Task List

The Final Task List is shown in the table below. The mean importance ratings and skill requirements are also shown. An "X" in a skill column means that, according to the SMEs in the profile session, the task on that row requires that skill. Tasks are presented in order, from those most critical to job performance to those least critical. The tasks in gray italics received mean ratings of Importance below 2 (i.e., of low importance) and were not included in the skill analysis. The Importance Sum (i.e., sum of importance ratings for the skill) and Skill Percent (i.e., percentage of important tasks requiring the skill) for each skill are shown at the end of the table. The total Importance Sum possible is 156.

Tasks	Importance	Applied Math	Graphic Literacy	Workplace Documents	Workplace Observation
Assists customers in the selection and purchase of specialized telephone services, such as long distance plans by using plan descriptions and text from relevant scripts to review and suggest options and to answer questions.	5	☒	☒	☒	☒
Calls prospective new customers to explain new services and products by using the appropriate script, marketing materials, and pricing charts based on the client's current plan and usage information as shown in the computer record.	5	☒	☒	☒	☒
Handles customer complaints concerning billing by identifying the nature of the problem, correcting minor billing errors, and forwarding other requests.	5	☐	☒	☐	☒

Tasks	Importance	Applied Math	Graphic Literacy	Workplace Documents	Workplace Observation
Investigates errors found in customer accounts by gathering information from the customer or their record, comparing it for consistency, using the correct transactions screen to correct the account, and noting a description of the action taken.	5	☒	☒	☒	☒
Opens accounts for customers by adding a new record in the computer database and completing the required fields such as name, street address, billing address and service plan option(s).	5	☐	☒	☐	☒
Prepares for a sales call by finding the correct Prospect Screen that shows the services currently subscribed to by the customer, and using this information to determine the additional services to recommend and the script to follow.	5	☒	☒	☒	☒
Prepares for a sales call to a non-GCOMM customer by reviewing the printout showing the prospect's current phone company, number of people in household, and annual income to determine the appropriate script to follow.	5	☐	☒	☒	☒
Prevents customers from discontinuing their service if their reason is due to poor service or a competitor's better deal by offering special Retention Plans, beginning with the least expensive options.	5	☐	☒	☒	☒
Processes orders (e.g., installation, discontinuance, or change) by inserting the appropriate transaction code in the client's computer record along with any special instructions (e.g., requested service date/time, dangerous dog in yard).	5	☐	☒	☐	☒
Provides customer with the price for additional services that are not included in their plan by using pricing charts, Price Quote worksheet, and a calculator to calculate the price.	5	☒	☒	☐	☒

Tasks	Importance	Applied Math	Graphic Literacy	Workplace Documents	Workplace Observation
Quotes prices for customized plans to non-GCOMM customers by entering all charges included in the quote and charges for current plan onto the electronic Price Quote worksheet and then using the information to explain why GCOMM's plan is best.	5	☒	☒	☐	☒
Sells telephone services to preferred business accounts by offering special plans and upgrades outlined in the plan descriptions and scripts.	5	☐	☒	☒	☒
Trains newcomers by allowing them to shadow calls (i.e., observe experienced CSR & their monitor), and then switching roles to have trainees answer calls and navigate through the customer account software while being supervised.	5	☐	☒	☐	☒
Arranges for payment of delinquent accounts by calling customers, getting them to agree on a payment plan, setting dates and amounts of payments, documenting in the database, and sending a form letter with the agreed upon terms.	4	☒	☒	☐	☒
Assists customers in placing long-distance phone calls by asking them the nature of the problem and either accessing their account and dialing the call for them, or connecting them to the appropriate service carrier company.	4	☐	☒	☐	☒
Checks for accuracy of customer name and mailing address each time a customer calls or writes by asking them for this information and comparing it to the information already in the database.	4	☐	☒	☐	☒
Completes Information Requested order form by entering prospect or customer name and contact information, indicating which company products and services brochures should be mailed, and submitting electronically.	4	☐	☒	☐	☒

Tasks	Importance	Applied Math	Graphic Literacy	Workplace Documents	Workplace Observation
Completes special installation or repair requests for unusual problems by locating the screen for special requests, entering customer information and special request, and submitting electronically.	4	☐	☒	☐	☒
Contacts customers to obtain more information about their accounts by using the up-to-date form letter and completing the Follow-up Contact form after five unsuccessful attempts to reach the customer by phone.	4	☐	☒	☐	☒
Determines if customer problems are due to hardware (e.g., boxes, cables, or telephone) by finding the problem on the Troubleshooting Chart and reading the action to take to the customer and issuing a work order if indicated by the test.	4	☐	☒	☒	☒
Determines if team is meeting sales goals by reading the Sales Goals Projection Report distributed to each team.	4	☐	☒	☐	☒
Documents customer report of interrupted service by checking the Reported Outages screen to see if their area is listed, apologizing for the service disruption, telling them when it is expected to return to normal, and thanking them for the call.	4	☐	☒	☐	☒
Enters additional account information upon customer request by locating the correct screen in the computer database and entering the information as the customer provides it (e.g., name of family members added to account).	4	☐	☒	☐	☒
Investigates potential fraud or misuse of calling cards by checking accounts that have been flagged by the computer for unusual use (such as calls exceeding $100 in a one-day period) and attempting to contact the customer by phone and U.S. Mail.	4	☒	☒	☐	☒

Tasks	Importance	Applied Math	Graphic Literacy	Workplace Documents	Workplace Observation
Notifies other departments of customer's problem by sending an email request for service outlining the problem to the appropriate department if the reported problem came in after hours or they didn't pick up a transferred call.	4	☐	☒	☐	☒
Participates in monthly team meetings by attending and participating in discussions about sales goals and ways to increase sales, using information provided by marketing.	4	☐	☒	☒	☒
Participates in training workshops by attending, participating in activities, and reviewing all materials.	4	☐	☒	☒	☒
Processes customer requests for refunds that are due to a move or change of special services in the middle of a billing cycle by locating the customer's record in the database to enter the appropriate debit or credit code in their billing screen.	4	☐	☒	☐	☒
Recommends additional services to customers by reviewing the customer's record in the database for existing service plan and current services and then offering services such as additional phone lines, internet service, or caller ID.	4	☐	☒	☐	☒
Reports irregularities in the database by contacting the shift supervisor and telling them and/or showing them the problem (e.g., a recent sale or service was not documented appropriately or when a work order was not issued properly).	4	☐	☒	☐	☒
Updates "No Call" list by entering the names and telephone numbers of prospects contacted who request to be added to the list, and adding the "no call" code to the record for the prospect in the sales database.	4	☐	☒	☐	☒

Tasks	Importance	Applied Math	Graphic Literacy	Workplace Documents	Workplace Observation
Updates prospect information during a phone solicitation call by entering or updating prospect information (e.g., names, addresses, purchases, and reactions or additional notes) into the sales database.	4	☐	☒	☐	☒
Issues calling cards by verifying the caller's identity, obtaining and entering the required information (e.g., name, number of cards), and using the appropriate transaction code to submit the request.	3	☐	☒	☐	☒
Notifies customers that installation is completed by printing the completed service list and sending the customers a form email or postcard.	3	☐	☒	☐	☒
Recommends telephone models for purchase/rent to customers by using the marketing materials and identifying the customer's needs.	3	☐	☒	☐	☒
Records toll charges made by writing down the name of the person called, phone number, reason for the call, and the employee's identification number in the Call Charge Log.	3	☐	☒	☐	☒
Transfers customers to the billing department when billing adjustments exceed $100 or if the customer is more than two months delinquent in their payments by either conveying verbally or in an email about the situation and previous actions taken.	3	☒	☒	☐	☒
Pages employees on the floor by operating the in-house paging system to get their attention and indicating which line the call is on.	*1*				☒
Performs recommended exercises to prevent carpal tunnel by doing the finger-wrist exercises twice each shift and on breaks.	*1*				☒

Tasks	Importance	Applied Math	Graphic Literacy	Workplace Documents	Workplace Observation
Prepares a verbal report on daily sales activities by summarizing the types of products or services sold and reasons why customers bought or declined an offer.	*1*				☒
Suggests improvements in work methods and procedures by role playing behaviors during training sessions, such as suggestive selling, and verbally conveying them to the supervisor for consideration.	*1*				☒
Importance Sum		41	156	47	156
Skill Percent		24.3	100.0	27.0	100.0