THE DEVELOPMENT AND VALIDATION OF AN INSTRUMENT TO ASSESS INSTRUCTIONAL DESIGN COMPETENCY

by

Tammé E. McCowin

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Approved:

Kelley A. Conrad, Ph.D., Mentor

Richard Brunkan, Ph.D., Committee Member

Eugene M. Jablonski, Ph.D., Committee Member

Accepted and Signed: Kelley A. Conrad 4/29/2009
Kelley A. Conrad Date

Accepted and Signed: Richard J. Brunkan 4/29/2009
Richard Brunkan Date

Accepted and Signed: E. M. Jablonski 4/29/2009
Eugene M. Jablonski Date

5/8/2009
Jeremy Moreland, Ph.D. Date
Dean, School of Advanced Studies
University of Phoenix

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ABSTRACT

This dissertation study was undertaken to develop and validate a performance inventory that could aid practitioners, employers and educational organizations with assessing instructional design competency. The inventory serves as an objective measure of performance against industry competency standards. This research also had an alternate goal to produce an integrated performance assessment methodology to assist organizations and professionals with selection, placement, professional development and career planning. The data obtained in this dissertation study demonstrated the initial validity and reliability of the inventory. The results also showed there is still a need to strengthen the findings obtained through further research investigation. The full inventory contains seven scales. Each scale represents a core knowledge domain in the field and the items in each scale reflect industry competency standards.

DEDICATION

This dissertation study serves as an ongoing effort to develop and advance the instructional technology field. The study also provides a strong foundation for continuing the development and validation of the integrated performance assessment methodology; a measurement system designed to assist professionals and organizations with measuring performance against industry competency standards, which will enable and guide educational programming, selection, placement, career planning and professional development.

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CHAPTER 1: INTRODUCTION

In the instructional technology field, learning technology (LT) professionals are faced with the challenge of having to continually adapt in an ever-changing world market (Katz, 2005; Lui, Gibby, Quiros & Demp, 2002). Global competition, new methods and tools, fluctuations in the global world market, business acumen and strategy, positioning, and technological innovations are the norm in everyday business. A demand for LT professionals who can adapt to rigorous work environments while gaining new competencies in a rapidly changing industry has risen in recent years (Curtis, Hefley, & Miller, 2002; Lui et al., 2002; Lui, Jones & Hempstreet, 1998; NWCET, 2003; Richey et al., 2001; Seels & Richey, 1994). LT professionals "have a responsibility to keep their skills current" (Rothwell & Kazanas, 2004, p. 386). Updating and improving one's knowledge, skills, and abilities is an important and essential competency (Richey et al., 2001). Learning to adapt to extant and emerging business and technological trends is also an important technical leadership characteristic. Katz (2005) claimed that skill use, extension, and versatility are critical ingredients for sustaining professional success and technical professionals must continually extend their knowledge and capabilities to grow, innovate, and lead.

To increase a person's professional competencies across LT domains requires an effective assessment method to measure skill capabilities. Traditionally, competency and performance measurements focused on qualitative methods, such as interviews, performance appraisals, and individual skills assessments through self-rater surveys or 360-degree reviews (Kravetz, 2004; Wood & Payne, 1998). With the growing need for LT professionals to develop multiple competencies across complementary knowledge domains and disciplines, an accurate and objective method will make it possible to measure a person's professional competencies. Alone, qualitative methods do not provide a complete picture of a person's skill capabilities. Qualitative methods such as self-rater instruments and surveys combined with quantitative methods such as criterion - referenced tests and performance assessment measures can provide a more complete picture of a person's professional competency.

Use of quantitative methods as a basis for performance assessment has often led to confusion and ambiguity in related assessment terminology. For example, testing, measurement, assessment, and evaluation are all related terms often confused, misused, and misunderstood (Shrock & Coscarelli, 2000). According to Shrock and Coscarelli (2000), testing refers to the collection of quantitative information to determine the degree of knowledge, skill or ability (KSA) of an individual; measurement refers to the collection of quantitative data to identify the magnitude of a specific capability; assessment is the systematic collection of quantitative and qualitative data without making judgments about the information gathered; and evaluation is the process of making judgments about the worth, value or benefit of some product, program, process or person.

Testing is a measurement technique used to gather the right information as apart of assessment processes to make decisions or evaluations about a specific person, place or thing. Assessments and evaluations are used to make performance and educational decisions (Nitko, 2004). Both are effective methods for ensuring that instructional solutions are designed, developed and implemented to meet stated instructional objectives and educational goals. More importantly, effective assessment and evaluation methods are used in concert to measure and track student performance and determine the effectiveness of educational programs to ensure that organizations are meeting their stated organizational goals. The word evaluation is often used interchangeably with assessment (Marsh & Willis, 2004).

An evaluation determines whether something has merit or worth (Fitzpatrick, Sanders, & Worthen, 2004; Marsh & Willis, 2004; Shrock & Coscarelli, 2000). It is a perceived value judgment. The objects of an evaluation are people, processes, programs, projects, and products. In an educational setting, the process of conducting evaluations comes in two forms formative and summative. Formative evaluations are performed during the design, development or implementation of some unit, lesson, or course. Summative evaluations are performed at the end of a unit, lesson, or course to determine if instruction met the intended instructional objectives and educational goals (Tessmer, 1998; Marsh & Willis, 2004).

Assessments, on the other hand, consist of prerequisite tests, entry tests, pre/post tests, diagnostic tests, equivalency tests, and certification tests (Nitko, 2004, Shrock & Coscarelli, 2000). These are performed before, during or after a unit, lesson or course to determine extant KSA of individuals. Assessments can be conducted independently or as a part of a larger evaluation process. Effective assessments provide a bridge between evaluation methods and help to determine what individuals should know and be able to do while establishing the worth or value of learning environments that proclaim to foster growth and development according to stated instructional objectives and educational goals.

Therefore, an integrated measurement method that uses both qualitative and quantitative measurement techniques is a more comprehensive approach to assess a person's skill capabilities. An integrated performance assessment (IPA) method can assist professionals and organizations with selection, placement, career planning, and professional development (Nitko, 2004; Society for Industrial and Organizational Psychology, 2003).

Background

The instructional technology field has many specialized domains, which include design, development, management, utilization, and evaluation (Seels & Richey, 2001). The field is diverse, multidisciplinary, and has grown to include many new areas such as learning management systems, web design and development, programming, eLearning, and mobile learning. Influence, both inside and outside the field, has come from extant and emerging new media technologies and business practices (Richey et al., 2001). LT professionals may carry more than one role such as project manager, subject matter expert, designer (e.g. creative and technical writers, visual communicators and graphic designers), and developer (e.g. programmers, information architects, e-Learning specialists, and technologists). These roles represent unique skill specializations with each role focused on unique and discrete tasks, which leaves little or no time to build individual skills in other areas. Skill versatility is an emerging business trend for LT professionals as the demand increases for more professionals' who possess an oeuvre of competencies within and across complementary disciplines. According to Lui et al. (2002), LT professionals participate in many projects or programs where skill versatility and flexibility prove to be a valuable asset. Balancing multiple roles is the norm in everyday business. Organizations have attempted to overcome this prevailing demand for skill versatility in several important ways.

First, organizations promote the practice of integrated teaming by placing LT professionals in teams or workgroups. According to Holzschlag (2003):

> This separation appeals to managers for …[many] reasons: personality difficulties, rapid application development belief systems, and the need to delegate tasks efficiently. This model works but integrating the components at the end of the process can be time consuming and unwieldy. (p. 13)

Although many large organizations are working toward better integration of teams, little skill versatility among individual constituents within and across teams continues to be a latent problem. This could be because of latent apprehension of job security, increased workloads, strict design and development requirements, and rigorous project schedules. Whatever the cause, it is clear that integrated teaming is still problematic. Richey et al. (2001), suggested:

> Competent and experienced instructional designer[s] can demonstrate the skills associated with the systematic design process and [are] therefore capable of managing a design project from needs assessment through the design, development, implementation, and evaluation phases. In many organizations instructional designers continue to perform all five phases of a design project, but there is still an increasing trend towards specialization, especially in large organizations. (p. 108)

Second, many organizations rely on hiring external contractors to fulfill project needs when minimal headcount is available or employees do not possess the knowledge or skills to meet the demands of a project or larger business needs (Richey et al., 2001). If effective team integration is an issue for internal employees, it becomes even more problematic as outsiders enter the workplace. When faced with negative economic shifts or organization redesign efforts, internal employees may assume additional job roles outside their current area of expertise. This may be necessary to fulfill immediate business needs or adapt to sudden organizational or industry changes. For example, as contractors assume roles on specific instructional design tasks, internal instructional designers may have to assume a project management role to manage multiple projects (Richey et al., 2001).

Third, to add to the myriad of concerns facing organizations as they struggle to work out integration issues are incessant technological changes, which affects both organizations and LT professionals equally. For organizations, these changes bring advanced and innovative products and tools that can improve the effectiveness and efficiency of business performance. At the same time, LT professionals must learn to cope and adapt to technological change by acquiring the necessary knowledge and skills to maintain effective performance. According to Seels and Richey (2001), professional practice has dramatically changed since the microcomputer emerged and the possibilities for continued growth and development in the field multiplied in an exponential fashion especially for practitioners. Plagued by the growing demand for workers who possess a multiple and integrated skill set across multiple content areas and disciplines, the field is incessantly changing. Serritella (2003) claimed "now more than ever before, organizations will drive results through the alignment and integration of people[,] processes[,] and systems with business strategies" (ASTD Public Policy Council, 2003, p. 6).

Finally, as technological advancements and changes persist, LT professionals will continue to find themselves engulfed in fluctuating job roles, customer requirements, and business practices that require new competencies and skills (Larson & Lockee, 2004; Lui et al., 2002; Lui et al., 1998). In particular, new media technologies have proliferated across instructional technology domains. This growth continues to transform education and training practices. The field has expanded to encompass newer delivery methods other than print, television, radio, and film; this includes all types of multimedia methods, tools, mobile devices, and platforms. All these issues require a more integrated approach to managing and measuring an LT professional's competencies. As a result, integration efforts must expand beyond current business level strategies to focus on talent management strategies at the individual performer level.

Problem Statement

LT professionals – namely instructional designers (IDs) and instructional developers (IDv) must often fulfill roles in one or more instructional technology domains (Seels & Richey, 2001). The industry perpetuates this practice by requiring that these professionals assume multiple roles as a part of regular instructional systems design (ISD) practice. Carrying more than one role has become common practice in the field. "When a situation calls for it, the professional slips out of one role and 'puts on' another… because a vast body of underlying skills and knowledge supports…execution." (Bernthal et al., 2004, p. xxiii). At the same time, the instructional technology profession has become more complex and sophisticated, which can lead to skill specialization

(Richey et al., 2001). This notion of specialization is one of synergy and integration not segmentation and discord. LT professionals that see themselves as integrated professionals with multiple competencies, talents, and skills across instructional technology domains instead of specialized professionals in a single domain will possess a competitive advantage over those individuals who do not.

When LT professionals do not ensure that their competencies and skills are in alignment with fluctuating demands and challenges of the workplace, a serious and ineffective performance problem arises. This critical problem can be ameliorated by clearly establishing a valid and reliable performance assessment methodology to identify a professional's strengths and weaknesses on core industry defined competency standards. By developing and validating the ISD Performance Inventory, professionals, employers, and educational organizations will have an accurate and objective way to gauge individual performance.

Purpose

This research effort was a quantitative study to develop and validate an instrument to assess the professional competencies of LT professionals working for a large semiconductor company with geographical locations in North and South America, Middle East, Asia, and Europe. The ISD Performance Inventory is a self-reporting instrument used to measure ISD competencies. Caldwell and O'Reilly (1990) argued "techniques for investigating person-situation fit must take into account the fact that individuals and situations can vary on many different dimensions" (pp. 196-197). Gardner (1999) and Gardner and Walter (1993) claimed that individuals have a collection of aptitudes, which they presumed dispels the notion of a single problem-solving faculty, called an intelligence quotient. LT professionals must use all their intellectual capacities in many different projects for many different reasons. In fact, knowing how to apply one or more of these capacities – during any given project – at any given time – becomes a fundamental requirement for managing and balancing multiple projects while maintaining efficient and effective job performance. This is skill versatility. Skill versatility refers to the notion that a person can possess, control, and use one or more of his or her intellectual capacities whenever and however as he or she desires.

Connell, Sheridan, and Gardner (2003) posited that individuals could be measured, assessed, and ranked against their peers to determine their expertise in a given area when a known set of competency standards exists. Their observation suggested that the creation of a set of measurements to investigate an LT professional's ISD competencies, multiple intelligence (MI) constructs, skill integration, and skill imbalance to assess an individual's skill capabilities across all instructional technology domains is possible. A valid assessment methodology will also help to quantify the relationship between perceived, assessed, and demonstrated performance to determine a person's fit to a specific organization, job role, or career path.

Significance of the Study

Assessment of an LT professional's skill capabilities will help to identify a person's competency level on core industry defined standards. Proper assessment can also help individuals improve their self-efficacy and fluency (Binder, 2003; Locke & Latham, 1990; Zimmerman, 2006; Zimmerman, 2000), assist them in becoming competent technical leaders (Armitage, Brooks, Carlen, & Schultz, 2006; Katz, 2005), and provide education and business organizations with a more objective means for screening and selecting prospective job and student applicants (Reynolds, Livingston, & Willson, 2006; Shrock & Coscarelli, 2000; Society for Industrial and Organizational Psychology, 2003).

Career Planning and Professional Development

Objective feedback is the cornerstone of successful performance improvement. Knowing one's strengths and weaknesses is essential to setting goals, engaging in personal and professional development, and career planning (Brutus, London, & Martineau, 1999). A valid IPA method provides an objective means for gauging and monitoring the skill capabilities of LT professionals. A unique skill capabilities profile provides professionals with a way to monitor and self-regulate their performance. A skills profile provides external evaluation to professionals, students or employees to facilitate effective performance and talent management appraisals (Richey et al., 2001). This would enable continual adaptation to technological changes as professionals are empowered to set personal and professional goals toward the continuous attainment of new and emerging skills. According to Locke and Latham (1990), goal setting is a fundamental determinant of self-regulation and performance improvement. Zimmerman (2000) also stated that goal setting provides a way to employ self-evaluative measures during learning and development.

Leadership Development

With a constant push for newer, interactive, and robust learning technologies, an increased need for LT professionals to step outside the boundaries of traditional ISD practice and embrace the technical side of their emerging and evolving profession is essential for professional development. LT professionals who seek opportunities to align their competencies and skills with emerging technologies and alternative job roles will be more prepared to meet both technical and business challenges within their organizations. Developing and enhancing one's skill capabilities is a key competency of being a technical leader. Armitage et al., (2006) stated that leadership development should focus on professional competency, maturation, experience, and context. They suggested stages of growth and development, progresses from an initial state to a more advanced state (Armitage et al., 2006). Bloom's taxonomy and the Dreyfus skill acquisition model served as the model for expert performance in this dissertation study. Bloom's taxonomy consisted of six phases: knowledge, comprehension, application, analysis, synthesis, and evaluation. The Dreyfus model consisted of five stages: novice, advanced beginner, competent, proficient, and expert. A novice individual relies heavily on rote memorization, facts, rules, memory, and guidance in a specific content domain and their abilities improve with experience over time to a more fluid performance level (expert level), which is less dependent on facts, rules, memory, and guidance (Bloom, 1956 ; Dreyfus & Dreyfus, 1986).

Moreover, professional growth and development encompasses technical and non-technical competencies such as business acumen, leadership, and knowledge; as well as good use of industry fluctuations, organizational culture, technological trends, and context. According to Bereiter and Scardamalia (1993, p. 23), "an expert career can follow a variety of paths, and some of these are paths that go beyond simply getting better and better at one's occupation." Technical and non-technical competencies are essential to instructional technology practice. LT professionals who possess and demonstrate a set of combined competencies will represent a unique group of practitioners in the field because they will be more capable to handle a diverse range of technical and non-technical business problems across many subject areas, content domains, and disciplines.

Selection and Guidance Counseling

An effective classification, placement, and selection methodology is essential to help identify the right person to hire for a job, to admit to college, or to provide guidance in career planning.

> Classification refers to cases in which the categories are essentially unordered, placement refers to the case in which the categories represent ordered levels of education without rejection, and selection refers to the case in which students [or job applicants] are accepted or rejected. (Nitko, 2004, p. 12)

Career development and counseling builds on these three classification principles and requires an effective and objective measurement method to assist employers and educators with making effective decisions about job and student applicants (Society for Industrial and Organizational Psychology, 2003). Reynolds et al., (2006) claimed "well made tests that are appropriately administered and interpreted are among the most equitable methods of evaluating people" (p. 12). This includes all forms of performance assessments such as résumés, surveys, assignments, projects, portfolios, and written tests.

Nature of the Study

This dissertation was the first of four studies in the IPA research plan (see Figure 1). These four studies include: the ISD Performance Inventory study, Multiple Intelligences ISD (MIISD) Construct Map study, Integrated Skills Assessment (ISA) study, and IPA study. Each study represents a critical component needed to investigate the nature of expertise using empirical methods.

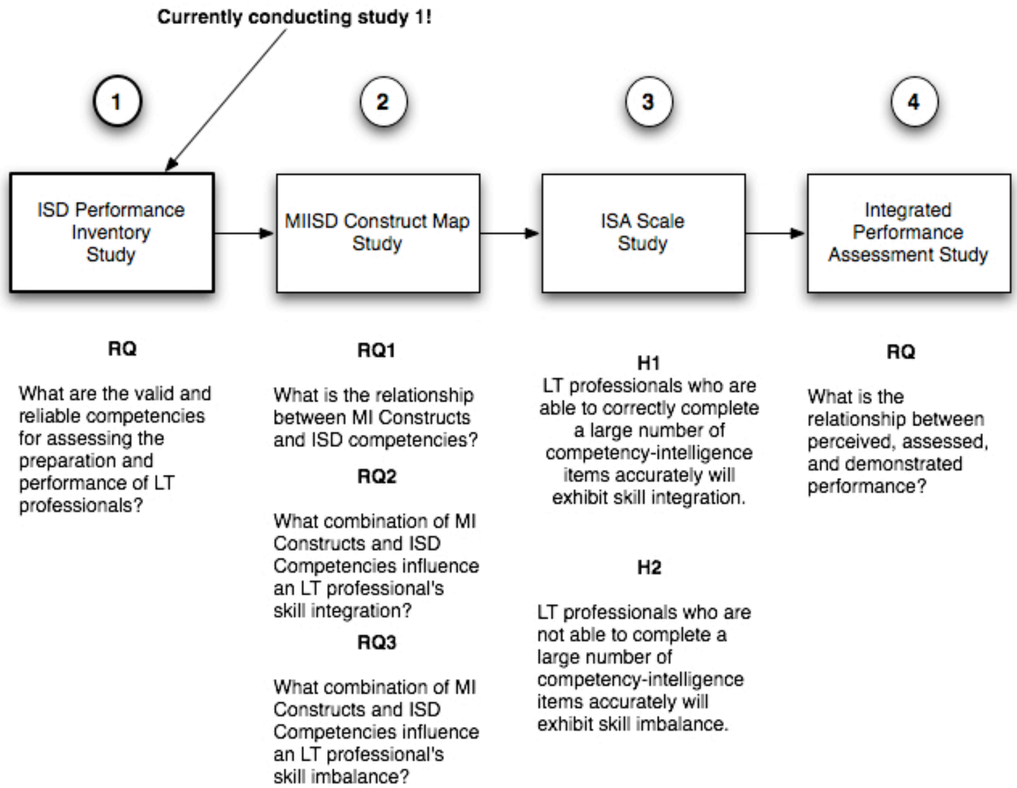


Figure 1. Integrated performance assessment research plan outlines four research studies to form a comprehensive performance assessment method.

ISD Performance Inventory Study

Study one, the focus of this dissertation, was necessary to further develop and validate the IPA methodology. The first study sought to answer the research question: What are the valid and reliable competencies for assessing the preparation and performance of LT professionals? A valid and reliable method for scoring LT professionals on ISD competencies will provide a foundation for continuing the IPA research plan and serve as an empirical basis for studies two, three, and four. There have been no quantitative studies conducted to establish criterion and predictive validity and reliability of ISD competencies as a basis for measuring professional competency in instructional technology and related fields. However, there have been several qualitative studies conducted to identify and describe the differences between novice and expert instructional design practice (see Atchison, 1996; Perez & Emery, 1995; Rowland, 1992; Wedman & Tessmer, 1993; Winer & Vazquez-Abad, 1995). There have also been several studies conducted to define and establish instructional design competency standards (see Atchison, 1996; NWCET, 2003; Richey et al., 2001; Song, 1998). These latter studies focused heavily on establishing the content validity of ISD competencies but failed to look at criterion and predictive validity and reliability of ISD competency standards as a basis for assessing individual performance.

In 1996, Atchison conducted a qualitative study to identify the competencies of expert IDs. Atchison's study helped to further classify, expand, and better define the 1986 International Board of Standards for Training, Performance, and Instruction (IBSTPI) standards (Atchison, 1996). The results from Atchison's study clearly explicated the differences between novice and expert practice.

In 1998, Song made an attempt to validate both the 1986 IBSTPI standards and Atchison's expert competencies. Song's study sought to determine if LT professionals in the field could further classify the complexities of the competencies (Richey et al., 2001; Song, 1998). Song used a descriptive research method and developed a survey instrument using both the 1986 IBSTPI standards and Atchison's expert competencies. Song was able to further classify the competencies at the novice, intermediate, and expert levels.

In 2000, IBSTPI used the findings from the Atchison and Song studies to develop a newer and broader set of ISD competencies – the 2000 IBSTPI standards. These newer competency standards reflected current practices in the field. IBSTPI conducted a study to validate the new competencies and performance statements for use in the profession (Richey et al., 2001). The validation study used two survey instruments: one to measure designer perception of competency criticality and the other to determine expertise levels required on-the-job to demonstrate each skill (Richey et al., 2001). IBSTPI created two skill classifications for the standards: essential and advanced.

In 1996, while Atchison was quantifying the ISD exemplary competencies, the National Workforce Center for Emerging Technologies (NWCET) identified eight information technology career clusters and skill standards (NWCET, 2003). In the summer of 1998, around the same time that Song was conducting her study, NWCET conducted nationwide research to validate the information technology skill standards. NWCET identified and updated information technology skill standards with new and emerging workforce job roles, technical knowledge, and related foundational skills (NWCET, 2003). There were 18 competency clusters identified for the instructional design role and several other job roles required of LT professionals. These competencies were included as job classifications for information technology professionals.

The ISD Performance Inventory study transcends past studies conducted to establish the content validity of ISD competency standards in two important ways. First, previous studies were conducted to identify, classify, and define existing standards. The Atchison study was a qualitative study that further expanded on known ISD competency standards to include expertise levels. The study focused heavily on clearly explicating a dividing line between novice and expert practice. Similarly, the Song study sought to further establish differences in expertise at three different skill levels: novice, intermediate, and expert. Second, the 2000 IBSTPI study established a new set of ISD competencies, which validated the content of each competency and performance statement and ultimately classified each competency as either essential or advanced. Neither of these studies established the criterion and predictive validity or reliability of the ISD competency standards.

The ISD Performance Inventory study transcends past studies to 1) establish a framework for scoring LT professionals across all instructional technology domains and related disciplines on known competency standards, 2) better classify and explicate ISD competencies to reflect stages of growth and development using the Dreyfus model, and 3) expand the validity and reliability of ISD competency standards through quantitative analysis. IBSTPI and NWCET sought to validate similar but discrete competency standards for LT professionals. IBSTPI developed and validated a set of 23 competencies across four separate knowledge domains (Richey et al., 2001). NWCET developed and validated a set of 18 competencies across three career clusters (NWCET, 2003). This present study sought to establish a valid measurement instrument based on the combined set of IBSTPI and NWCET standards. The domains, competencies, and performance statements identified and refined in previous studies (see Atchison, 1996; NWCET, 2003; Richey et al., 2001; Song, 1998) served as a content validity matrix while creating the initial item pool of the ISD Performance Inventory. A combined classification matrix made of Bloom's taxonomy and the Dreyfus model served as classification tools for each scale item in the inventory.

Finally, development of the final ISD Performance Inventory depended on establishing the validity and reliability of the instrument through quantitative analysis. To accomplish the goals of the study a four-step scale development and validation process was identified as the best empirical method for developing and validating measurement scales (DeVellis, 2003; Netemeyer, Bearden & Sharma, 2003; Viswanathan, 2005).

MIISD Construct Map Study

Study two will be to cross-validate ISD competencies and MI constructs. Cross-validation will help to identify competency-intelligence relationships between these two mutually exclusive aspects of human expertise. The identified competency-intelligence clusters will describe how these constructs influence skill integration and skill imbalance. This dissertation study will focus on answering several questions: What is the relationship between MI constructs and ISD competencies? What combination of MI constructs and ISD competencies influence an LT professional's skill integration? What combination of MI constructs and ISD competencies influence an LT professional's skill imbalance? To answer these questions it will be necessary to establish the relationship between intelligence and competency. Intelligence and competency scores will be obtained using two separate measurements. The Multiple Intelligence Developmental Assessment Scales (MIDAS) and the ISD Performance Inventory will serve as measurement instruments. The MIDAS is a 106-item self-reporting instrument completed by an individual (Shearer, 1996). The MIDAS measures a person's intellectual capabilities on all MI constructs (Shearer, 1996). Similarly, the purpose of the ISD Performance Inventory is to measure a person's skill capabilities on ISD competencies. Analysis of the data from both measures will help to determine the correct classifications and descriptions of competency-intelligence clusters. Once the number of competency-intelligence clusters has been established, the information may be used to describe a person's skill imbalance or skill integration.

ISA Scale Study

Study three will be to develop and validate the ISA scale. The ISA scale is a criterion-referenced measurement based on the competency standards and competency-intelligence clusters defined in studies 1 and 2. The purpose of ISA scale study will be to test two hypotheses.

H1: LT professionals who are able to complete a large number of competency-intelligence items accurately will exhibit skill integration.

H2: LT professionals who are not able to complete a large number of competency-intelligence items accurately will exhibit skill imbalance.

To overcome the subjective limitations of self-reporting measures and 360-degree reviews answers to these hypotheses is essential for true objective measurement. A more objective performance assessment method is attainable through criterion-referenced testing. A criterion-referenced test measures what a person knows or can do compared to what he or she must be able to know or do to perform a job or task successfully (Reynolds et al., 2006; Swezey, 1981). Criterion-referenced tests measure a person's skill capabilities against known performance standards. In this case, the known performance standards include the 2000 IBSTPI and 2003 NWCET standards.

There has only been one attempt to develop a measure that could discriminate between LT professionals. In 1990, Stepp conducted research to validate a testing instrument to discriminate between masters and non-masters of instructional design using the IBSTPI standards. Stepp's final instrument was norm-referenced and consisted of 50 test items for the original item bank in paper and pencil format. Further research is required to reinvigorate and expand upon the efforts made by Stepp. An extended research study should 1) focus on replicating Stepp's study, 2) focus on a criterion-referenced approach to look at the entire set of IBSTPI and NWCET standards, and 3) broaden the scope of subject groups used for the study. The ISA study offers an alternative method and first attempt to extend this past research beyond its current limitations.

IPA Study

Study four seeks to answer the research question: What is the relationship between perceived, assessed, and demonstrated performance? The IPA study will consist of three parts and employs a concurrent triangulation strategy (mixed methodology) using the case method. "Concurrent procedures, …[in mixed-methods studies,] collect both forms of data at the same time during the study and then integrates the information in the interpretation of the overall results" (Creswell, 2003, p. 16). In this case, a combined quantitative and qualitative approach mitigates the limitations of a single approach while canceling out the biases of either approach (Creswell, 2003). Part one of this dissertation study will ask participants to rate themselves on the ISD Performance Inventory. Part two will ask participants to complete the ISA scale. Part three will ask participants to complete an ISD project to measure their skill capabilities through observations and interviews. The data from these three measures could be used to generate a profile of an LT professional's skill capabilities, and may be used to develop a skill capabilities profile.

Theoretical Framework

The entire IPA research plan focuses on four theoretical areas: multiple intelligence theory, systems theory, psychometric theory, and espoused theory (theory-in-use). Multiple intelligence theory describes the connection between intelligence and competency. A neurological connection exists between competence and intelligence and identification of competency-intelligence clusters will provide a basis for measuring both constructs (Connell et al., 2003). According to Fodor (1983):

> The mental causation of behavior typically involves the simultaneous [use]…of distinct psychological mechanisms, [and] the best research strategy [seems]...to be divide and conquer: first study the intrinsic characteristics of each of the presumed faculties, then study the ways in which [those faculties] interact. (p. 1)

Systems theory provides a theoretical explanation of the interactions between competence, intelligence, and environmental factors. This notion is an outgrowth of Cartesian theory, which explicated that cognition, is directly linked to human behavior and consists of modular and integrative faculties (Connell et al., 2003; Fodor, 2000; Fodor, 1983).

Psychometric theory describes the relationship between variables to determine which combination of competency-intelligence clusters describes and influences skill integration and skill imbalance. According to Connell et al. (2003, p.136), “it is possible to parse the space of human cognitive capacities in many ways.” The IPA research plan offers one possible method for parsing intelligence and competence to describe the skill capabilities of LT professionals. Skill integration and skill imbalance is central to the entire IPA research plan. As an LT professional uses one or more of his or her intellectual faculties (MI constructs), this builds behavioral skill capacities in multiple content domains or disciplines (ISD competencies), which can lead to either skill imbalance or skill integration. Skill imbalance is the natural tendency to overuse or concentrate on one or more closely related competency-intelligence clusters, which causes skill-lopsidedness and inflexibility because certain competency-intelligence clusters are over or under used. This behavior leads to skill imbalance because usually individuals will have a tendency to exercise or improve their skills in those areas that they enjoy or have a natural affinity towards. Skill integration, on the contrary, is the ability to combine and use a mixture or blend of MI constructs and ISD competencies. This behavior results in versatility and flexibility. However, skill integration is difficult to accomplish because it requires making a conscious effort to use all one's cognitive dimensions, which may be dormant and requires development, or under used because of lack of practice.

Espoused theory helps to explain perceived, assessed, and demonstrated performance. What someone thinks he or she is capable of doing, how others know that he or she is capable, and how that capability may be demonstrated are not always in alignment. Schön (1983) suggested, "every competent practitioner can recognize phenomena – families of symptoms associated with a particular…[issue, problem, or situation] – for which he [or she] cannot give a reasonably accurate or complete description" (p. 49). Moreover, every professional can also recognize that he or she has some level of competency or ability poised ready to solve common and uncommon problems. Knowledge is an essential component of expertise. Traditionally, knowledge has been viewed as what knowledge includes (declarative) and how it may be used (procedural), but rarely looked at how knowledge is acquired or how it works (Bereiter & Scardamalia, 1993).

Each theory is fundamental to the IPA research plan. First, the ISD Performance Inventory study uses espoused theory and psychometric theory for data collection and analysis. Second, the MIISD construct map study and ISA scale study uses multiple intelligence theory, systems theory, and psychometric theory for data collection and analysis. Finally, the IPA scale study uses all four theories. The goal is to produce an integrated performance assessment methodology to assist organizations and professionals with selection, placement, career planning, and professional development.

As noted earlier, previous studies of ISD competencies have not examined or explored ways in which LT professionals could be measured on ISD competency standards (see Atchison, 1990; NWCET, 2003; Richey et al., 2001; Song, 1998). Moreover, germinal studies undertaken to describe instructional design practice before studies to define and validate ISD competencies were primarily qualitative (see Perez & Emery, 1995; Rowland, 1992; Wedman & Tessmer, 1993; Winer & Vazquez-Abad, 1995;). Ultimately, the IPA research plan overcomes the limitations of these previous qualitative studies because the long-term goal of this plan is to establish an objective, valid, and reliable systematic measurement methodology to assist LT professionals and organizations with assessing skill capabilities using quantitative and qualitative methods. The ISD Performance Inventory study, the first study in the overall IPA plan was the focus of this dissertation, and has the short-term goal to establish a valid and reliable measurement instrument to assess the skill capabilities of LT professionals.

Definition of Terms

There were many terms used throughout this paper, which require further definition and explanation. The terms and definitions cited are intended to clarify meaning around the various theoretical underpinnings that support this work. Beginning in alphabetical order the following terms and definitions include:

Assessed performance is a person's measured ability based on a valid and reliable criterion-referenced measurement instrument. This term represents a key variable in the IPA scale study. Assessed performance is one of three variables used to compare performance measures.

Competency is the knowledge, skills, abilities, and attitudes that enable a person to effectively perform the functions of a given occupation to the standards expected in employment (Richey, et al., 2001).

Competency-intelligence clusters are combined MI constructs and ISD competencies. This term is a theoretical term used to describe the connection between competency and intelligence. Competency and intelligence stand as mutually exclusive aspects of human expertise. However, the fusion of the two results in observable human behavior. Competency is a derivative of intelligence (Connell et al., 2003; Fodor, 1983).

Demonstrated performance is a person's observed performance on some real-world product, project, or problem. This term represents a key variable in the IPA scale study. Demonstrated performance is one of three variables used to compare performance measures.

Factors are linear combinations of variables (Kline, 1994). Factor loadings are correlations of variables with a factor; the weighted combination of variables, which best explains the variance (Kline, 1994). This term helps to understand the relationship between domains, competency, performance, and items. In other words, factors are responsible for the variance or covariance (factor loadings) between variables (DeVellis, 2003; Kline, 1994; Netemeyer et al., 2003;).

Instructional designer (IDs) is a title, position, or job role that focuses on the creative components of instruction, such as analysis, design, development, implementation, evaluation, planning, and management.

Instructional developer (IDv) is the title, position, or job role that focuses on the technical components of instruction, such as analysis, design, development, implementation, evaluation, planning, management, programming, information architecture, and technology.

Integrated skills assessment (ISA) scale is a criterion-referenced measurement instrument used to measure skill capabilities based on competency standards taken from IBSTPI and NWCET standards.

Integrated performance assessment (IPA) model is a Cartesian based assessment model that combines theory and practice to assist LT professionals with measuring, monitoring, and maintaining a flexible and versatile skill set. The IPA research plan consists of MI constructs, ISD competencies, systems thinking, and cognitive abilities.

Intelligence is a biopsychological potential to process information activated in a cultural setting to solve problems or create products that are of value in a culture (Gardner, 1999, 1983).

Integrated professional is an equivalent alternate title to represent the LT role and can be used interchangeably.

ISD competencies are the broad skill domains, competencies, and performance statements taken from the IBSTPI and NWCET standards. These competencies were used to develop the ISD Performance Inventory.

ISD Performance Inventory is an assessment instrument use to measure performance on known ISD competencies at the novice, advanced beginner, competent, proficient, and expert level.

Learning technology (LT) professional is the title, position, or job role held by a professional who focuses on the combined use of IDs and IDv competencies across the instructional technology field. The LT professional role focuses equally on creative and technical components of instructional design to attain effective and efficient performance outcomes regardless of instructional solution.

MI constructs are the eight identified intelligences, which include logical-mathematical, musical, linguistic, visual-spatial, body-kinesthetic, interpersonal, intrapersonal, and naturalistic capacities (Gardner, 1983).

MIISD construct map is a factored taxonomy of ISD competencies and MI constructs. The planned MIISD construct map study will gather and analyze data from the MIDAS and ISD Performance Inventory to determine the correct classifications and descriptions of competency-intelligence clusters. By establishing the competency-intelligence clusters, the information will help to describe a person's skill imbalance or skill integration.

Perceived performance is a person's self-assessment of his or her skill capabilities. This term represents a key variable in the IPA scale study. Perceived performance is one of three variables used to compare performance measures.

Performance statement is a detailed explanation of behaviors comprising a competency statement (Mager, 1997; Richey et al., 2001).

Skill capabilities are an individual's unrealized competencies or established abilities that have not yet been developed or used to exhibit expertise in a given subject area, knowledge domain, or discipline (Connell, et al., 2003).

Skill integration is the ability to combine and use one or more MI constructs and ISD competencies (competency-intelligence clusters) in concert. This term represents a key variable in the MIISD Construct Map study and ISA study. Skill integration is one of two variables used to describe a person's skill capabilities.

Skill imbalance is the tendency to over or under use one or more MI constructs and ISD competencies. This term represents a key variable in the MIISD construct map study and ISA scale study. Skill imbalance is one of two variables used to describe a person's skill capabilities.

Assumptions

This dissertation study adopted several assumptions from the IBSTPI standards and NWCET standards. The assumptions taken from the IBSTPI standards "directed the development process [of the standards] and can also influence one's interpretation of the competencies. [The standards] are based not only upon a particular view of the state of…design practice, but also upon disciplinary values" (Richey et al., 2001, p. 36). The assumptions taken from the NWCET standards are grounded in the premise that a highly skilled workforce is the single most important and essential commodity an organization can have to fuel continuous competitive advantage (NWCET, 2003). The last three assumptions addressed the specificity of this present study.

Assumption 1: LT professionals “are those persons who demonstrate design competencies on the job regardless of their job title, role, or training” (Richey et al., 2001, p. 36). Many different job titles and roles to describe the instructional design professional have emerged in recent years. To name a few, some common titles have included: trainer, curriculum or course developer, technical writer, training specialist, multimedia developer, project manager, or eLearning developer (Lui et al., 2002, Richey et al., 2001). There are many entry points into the field from many different routes with varying degrees of expertise, specificity in job roles, and responsibilities.

Assumption 2: “ISD competencies pertain to persons working in a wide range of job settings” (Richey et al., 2001, p. 37). Because of continuous technological innovations and changing industry trends IDs specialization has broadened to include other domains of specialty. The instructional technology field has always been influenced by other industries and disciplines like information technology and media arts (Lui et al., 2002; Lui et al., 1998; NWCET, 2003; Richey et al., 2001; Seels & Richey, 2001;).

Assumption 3: “ISD is a process most commonly guided by systematic design models and principles in analysis, design, development, implementation, and management” (Richey et al., 2001, p. 38). Diversity in the use of various descriptive and prescriptive design models is common practice for LT professionals (Reiser, 2001a, 2001b; Richey et al., 2001). Practitioners have modified existing models or developed new ones to suit their needs when working on a project.

Assumption 4: ISD competencies span novice, intermediate, and expert skill levels (Richey et al., 2001). Previous studies to develop and validate ISD competency standards sought to distinguish between novice and expert practice (see Atchison, 1990;

NWCET 2003, Richey et al., 2001; Song, 1998). Currently, the field has a rudimentary competency set that may be used by any LT professional regardless of skill level.

Assumption 5: "Few…[LT professionals], regardless of their expertise level, are able to…demonstrate all ISD competencies [successfully]" (Richey et al., 2001, p. 40). The comprehensiveness of the NWCET and IBSTPI standards and the nature of evolving instructional technology field "make it unlikely that [LT professionals], even those with substantial work experience will be able to demonstrate each and every competency and performance statement" (Richey et al., 2001, p. 40). However, this does not preclude the notion that effective assessment tools may be used to give LT professionals and the organizations that employ them the ability to assess skill capabilities. The knowledge gained from such assessments will help guide decisions, related to selection, placement, career planning, and professional development.

Assumption 6: ISD competencies are generic and amenable to customization and should define the manner in which professionals practice (Richey et al., 2001). The IBSTPI and NWCET standards are written at a general level for professionals and organizations to use as they see fit. These standards may be augmented to accommodate new competencies and skills as the industry continues to change. Organizations may modify the competency standards to incorporate language unique and specific to its standard business practices. Moreover, the competencies themselves may be updated as new knowledge and practices emerge in the field.

Assumption 7: ISD competencies are useful to designers and developers within small, medium, and large high tech companies worldwide (Richey et al., 2001). The competency standards are representative of global and cultural perspectives in everyday business and are applicable to all professionals working in many different countries and cultures.

Assumption 8: “Industry-identified skill standards will serve as a vehicle for companies to communicate their performance expectations for workers” (NWCET, 2003, p. 5). When a valid and reliable set of competency standards is in place, it provides a common framework for measuring performance. Information obtained from performance measures helps professionals and organizations make effective decisions about job and student applicants.

Assumption 9: “Voluntary skill standards will facilitate the reform of education to match curriculum development to workforce requirements” (NWCET, 2003, p. 5). Competency standards provide a global framework to assure development and implementation of effective educational programs through training and certification or academic preparation. It also enables knowledge transfer between organizations and careers.

Assumption 10: “Skill standards will close the qualification gap by linking industry expectations for knowledge, skills, and abilities to the education provided to students” (NWCET, 2003, p. 5). Use of the competency standards to develop a measurement instrument will provide educators and employers with a valid and reliable means of identifying the right people to hire for a job opening, admit to college, or provide guidance in career planning. The assessment instrument will also provide a means to link individual assessments to industry standards to inform personal and professional development.

Assumption 11: The IBSTPI and NWCET standards served as components of a combined competency framework that was deemed valid and reliable. These competency standards were used to develop and validate the ISD Performance Inventory to be used to assess the skill capabilities of LT professionals.

Assumption 12: Bloom's taxonomy served as a valid and reliable tool for rating and classifying scale items in the inventory. In a study conducted by Ven and Chuang (2005) they were able to classify information technology competencies into Bloom's taxonomy categories. The action verb lexicon that resulted from Ven and Chuang's study was included in the item review process to rate items in the inventory.

Assumption 13: The Dreyfus model served as a valid and reliable tool for rating the skill level of LT professionals. The skill stages of the Dreyfus model were aligned to Bloom's taxonomy levels and included in the item review procedure to rate items in the inventory.

Scope, Limitations, and Delimitations

The researcher confined this dissertation study to surveying LT professionals in a large semiconductor organization whom possessed the knowledge, skills, and abilities to perform one or more job roles employing ISD competencies as a condition of employment. The study focused on developing an instrument to assess professional competency on industry competency standards. A random sample of professionals helped to establish reliability and validity of the instrument through factor analysis. The selection criteria used to identify novice, advanced beginner, competent, proficient, and expert LT professionals could pose limitations. For example, during scale validation, subject matter experts were asked to identify and classify participants based on their knowledge of a participant's skill level. The Skill Level Classification Review Rubric was developed and tested to insure inter-rater reliability. It was expected that these procedures would help to establish a consistent method for making rating selections to mitigate misclassification of items and individuals selected.

The inability to obtain a representative sample may limit the study. Small sample sizes can threaten reliability, validity, and generalization of results. Therefore, to mitigate the possibility of small sample sizes members of three professional organizations and two online professional training forums were contacted and solicited to voluntarily participate. The three organizations were American Society of Training and Development (ASTD), International Society for Performance Improvement (ISPI), and Association of Education and Computing Technology (AECT). The two professional online forums were IT Forum and Training Developer Forum. When the minimum number of participants for each part of the validation study could not be attained, the sample was expanded to include professionals from outside the host organization. Another alternative was to employ marketing strategies using internal methods from each professional organization. When these options had been exhausted another alternative was to request participants who participated in the pilot study to participate in the validation study.

Moreover, it was expected that potential subjects could be unwilling to identify a third-party rater. A reluctance to identify a third-party rater could reduce the sample size as well as an unwillingness of participants to complete the study after starting it. In each case, adjustments to the research study would require necessary actions to account for incomplete data.

Summary

Skill versatility is the new business imperative for LT professionals. Now, more than ever before professionals have to switch between roles to meet new business demands and challenges. Organizations have attempted to overcome prevailing demands that require skill versatility by practicing integrated teaming, hiring contract workers, restructuring job roles, and juggling multiple projects across teams and workgroups. According to Rothwell and Kazanas (2004), LT professionals “have a responsibility to keep their skills current” (p. 386). Updating and improving one’s knowledge, skills, and abilities is an important and essential competency (Richey et al., 2001).

To ensure that LT professionals are able to keep their competencies and skills up-to-date and in alignment with fluctuating demands and challenges in the workplace, suggests there is a need to establish a valid and reliable performance assessment method. By developing and validating the ISD Performance Inventory, professionals, employers, and educational organizations will have an accurate and objective way to gauge individual performance against industry defined standards. Furthermore, development of the ISD Performance Inventory serves as a first step in the overall IPA research plan. The results from this dissertation study will lead to studies two, three, and four. The goal is to produce an integrated performance assessment method to assist organizations and professionals with selection, placement, career planning, and professional development. A unique skill capabilities profile outlining a professional’s strengths and weaknesses provides guidance in skill areas where he or she may need improvement. Professionals could then use their individual profiles as a way to self-regulate their performance as a part of career planning and professional development. Employers could use the profile to make more effective career planning decisions regarding existing employees and make better hiring decisions regarding new job candidates. Educational organizations could also use the profile to provide direction and guidance about training and academic program offerings.

A review of the literature in Chapter 2 describes the evolutionary progress that led to current trends shaping the field. Chapter 2 also describes the theoretical components of the IPA research plan, explains the connection between MI constructs and ISD competencies, and how the research plan offers an alternative approach to assessing individual skill capabilities.

CHAPTER 2: REVIEW OF THE LITERATURE

LT professionals are the architects of multiple types of instructional solutions and often develop and construct learning experiences designed to cultivate and transfer knowledge (Tracey & Richey, 2007; Tracey, 2001). The skills LT professionals need to maintain multiple roles also require them to possess competencies in more than one content domain. “Playing [multiple] roles is analogous to maintaining a collection of hats – when the situation calls for it, the professional slips out of one role and ‘puts on’ another” (Bernthal et al., 2004, p. xxiii). LT professionals must produce learning experiences and create environments that capitalize on the learning styles of learners while providing opportunities for learners to develop their multiple intelligences. Similarly, to be effective in maintaining multiple roles, LT professionals must also develop the same multiple intelligences that they seek to impart to the learner.

Evolving instructional technology practice builds on the combined effect of ISD and multiple intelligence (MI) theory. ISD is a systematic process for designing instructional solutions, and a focal knowledge domain for LT professionals. A systems approach is essential for human development (Gagné, Briggs, & Wager, 1992). Dick, Carey, and Carey (2005) suggested that instructional systems consist of several components, which include the learners, the instructor, the instructional materials, and the learning environment each interacting and working together to achieve a goal. Similarly, an LT professional’s skill capabilities must contain those knowledge, skills, abilities, and attitudes that encompass the entire ISD domain. These components develop through formal education, on-the-job training, and work experiences.

Gardner theorized that the brain has developmental characteristics referred to as multiple intellectual strengths. Gardner postulated that everyone has the potential to develop knowledge and skills in multiple areas including: linguistic, musical, logical and mathematical, spatial, body and kinesthetic, interpersonal, and intrapersonal (Gardner, 1983). These intellectual categories "are the constructor's tools, aiding [both] learners [and LT professionals] in their abilities to build [and use] knowledge" (Tracey, 2001, p. 1). These intelligences are independent and discrete, although these same faculties are integrative and used in concert within and across disciplinary boundaries (Gardner, 1999).

Documentation

An extensive literature search was conducted using literary databases: PsychInfo, ERIC, Proquest, Questia, EBSCOHost, Proquest Dissertations and Theses, Internet search engines, Performance Improvement Quarterly (PIQ) Journal, Performance Improvement Journal (PIJ), and Educational Technology Research and Development (ETR&D) Journal. Several search terms and categories were identified. Instructional design was selected as the knowledge domain of interest with a focus on competencies, measurements, expertise, expert practices, processes, methodologies, models, performance assessment, and scale development. Competency standard information was retrieved from publications issued by IBSTPI and NWCET. Research on expertise and expert practice was retrieved from published articles, other journal databases, and books. Figure 2 shows the distribution of references by literary source.

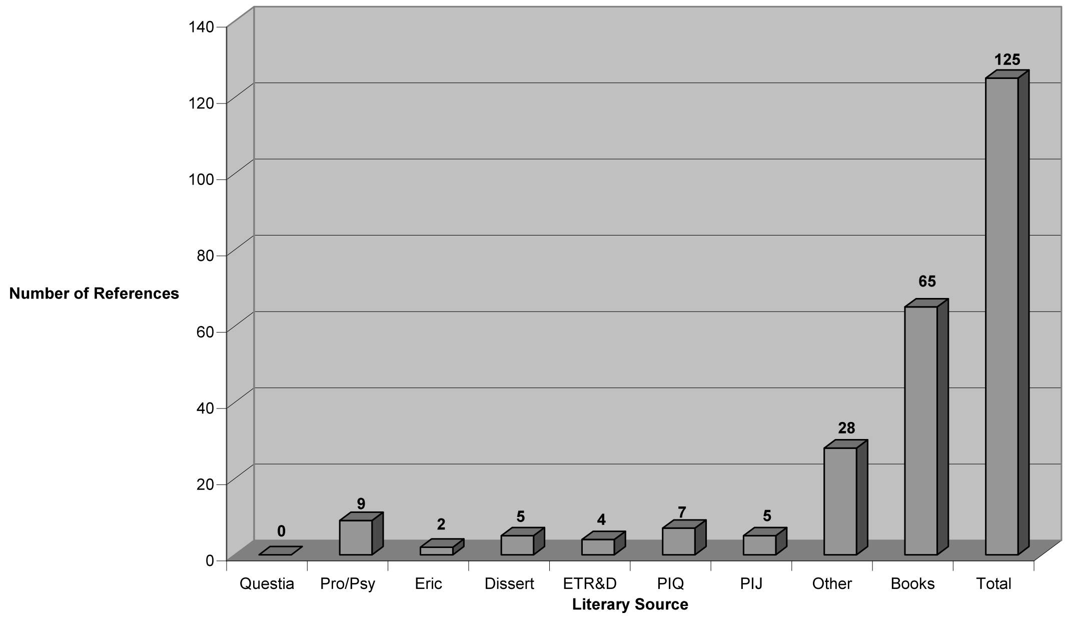


Figure 2. Number of references by literary source

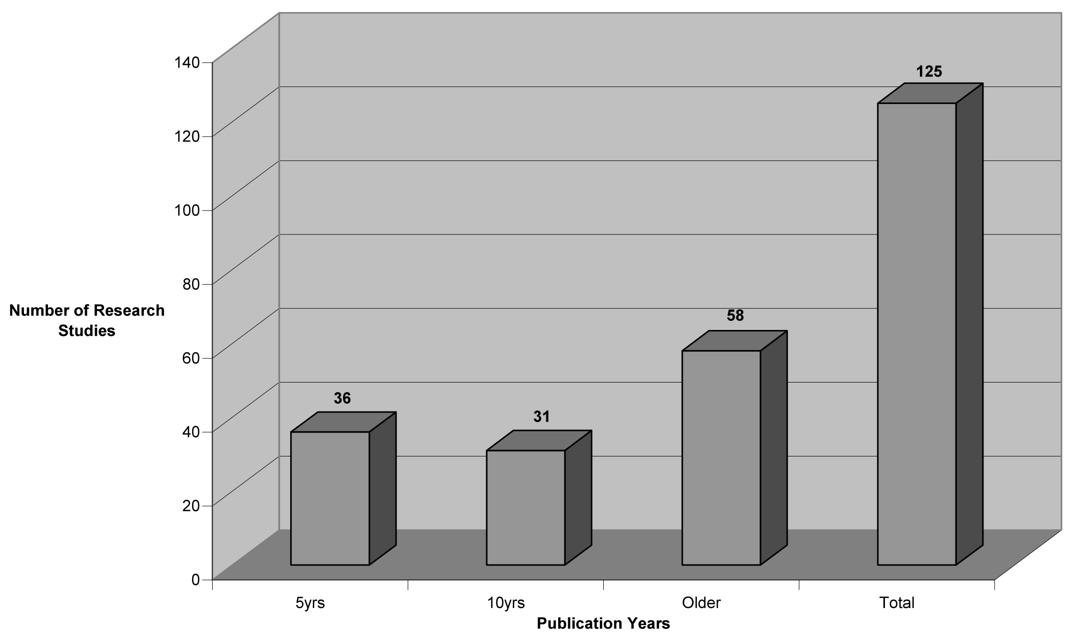


Figure 3. Number of research studies by publication years

Figure 3 shows the distribution of research studies by publication date. Of the 125 references identified for the entire study 29% were within the past five years, 25% were within the past ten years, and 46% were much older than ten years. A total of 29 studies were identified within the general search term categories related to instructional design competency and the acquisition of expertise in instructional design. Figure 4 illustrates the distribution of results obtained from the literature search by study type. These were deemed most critical and specific to the research question. Twelve qualitative studies related to ISD practice were conducted to identify and describe the differences between novice and expert instructional designers, practices employed during normal training and development activities, and skill classifications of competencies (see Atichson, 1996; Gayeski, 1991; Larson & Lockee, 2004; Lui et al., 2002; Lui & Hempstreet, 1998; Perez & Emery, 1995; Reiser, 2001a, 2001b; Rowland, 1992; Visscher-Voerman & Gustafson, 2004; Wedman & Tessmer, 1993; Winer & Vazquez-Abad, 1995). These were labeled instructional systems design (ISD) studies.

Four studies related to instructional design defined and established knowledge domains, taxonomies, and standards for professional competency (see Atchison, 1996; NWCET, 2003; Richey et .al, 2001; Song, 1998). These were labeled competency development (CD) studies. Two studies were conducted to determine the relationship between ISD models and multiple intelligences (Tracey & Richey, 2007; Tracey, 2001). These were labeled model development studies (MD). Two studies were found that focused on instrument development. One was conducted to develop a measurement instrument that could discriminate between masters and non-masters of instructional design (Stepp, 1995). Another study was conducted to develop and validate a multiple intelligences measurement instrument (Shearer, 1991). These were labeled tool development (TD) studies. Finally, eight additional studies were found that were deemed related domain areas. One focused on classifying information technology skill competencies using Bloom's taxonomy (Ven & Chuang, 2005). One focused on assessing the impact of learning capability on business performance (Prieto & Revilla, 2006). Nine focused on expertise and expert performance and other related topic areas. Of the studies found none were conducted to establish criterion and predictive validity and reliability of ISD competencies as a basis for assessing individual performance.

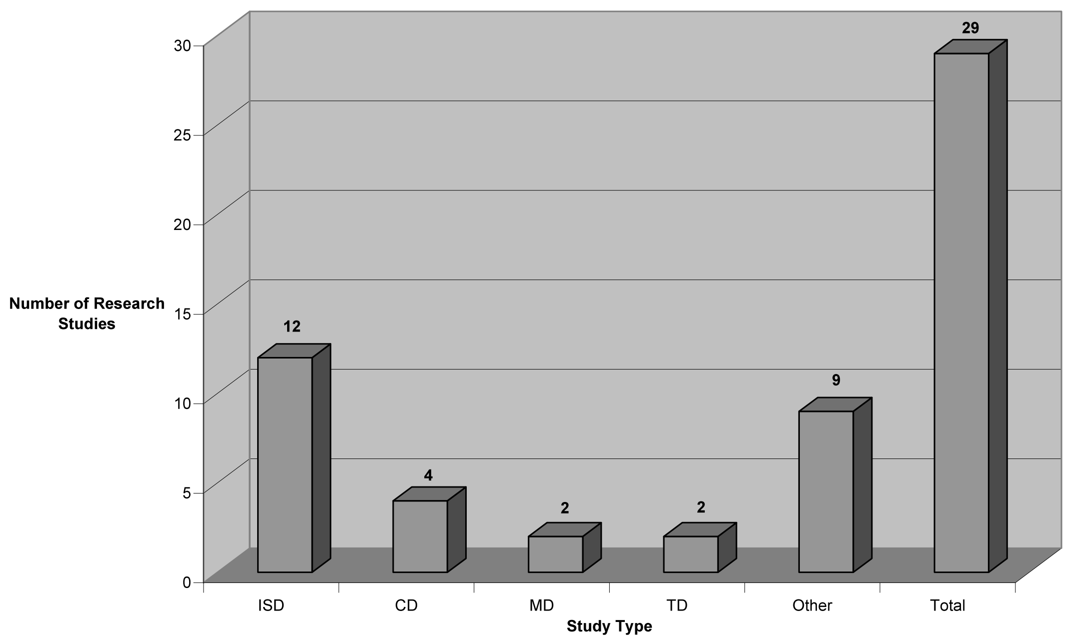


Figure 4. Number of research studies by study type

The limited research available on ISD practices, CD, MD, TD, and other related germinal works resulted in a reference percentage of less than 85% for literary source published within the previous five years. Five studies were found within the past five years that were related to this present study. In addition to the 29 studies found, it was necessary to include seminal works from cognitive psychology, psychometrics, systems theory, and espoused theory (theory-in-use) to prepare the literature review.

Relevance of Literature Review

ISD competencies and MI constructs are complimentary theoretical constructs and essential to building competency and skill in a multidisciplinary profession. Media technology has proliferated and transformed more as new technologies emerge, and the instructional technology profession has expanded to encompass a wide range of newer delivery methods, tools, and techniques (Richey et al., 2001; Seels & Richey, 1994). These new methods include all forms of digital media including CD and DVD ROMs, mobile devices, and web-based techniques. Media support mechanisms such as electronic documents, streaming media, client-side and server technologies, video-conferencing, multimedia, e-learning, and digital video and audio are a few of the technologies where LT professionals must acquire new competencies and skills to adapt today. The "new work environment has stimulated changes in design tools and techniques, and correspondingly in the expansion of [more complex] design expertise" (Richey et al., 2001, p. 29). To enable LT professionals so they can continue to be successful at producing effective and efficient work products while creating greater business value, at the accelerated pace of technology and an rapidly changing global economy, the creation of methods to assess the skill capabilities of these professionals in multiple content areas is essential.

This literature review will first discuss the historical perspectives that have changed and shaped the instructional technology field, as it exists today, placing the research study in context. Second, a discussion of the historical perspectives of intelligence, skill acquisition, and expertise; and how these theories may be applied to the IPA model (see Figure 5), provides insight into the nature of expertise required of LT professionals. Third, the underpinning theoretical components that comprise the IPA model and its connection to the IPA research plan provides additional insight into how this model can assist practitioners, employers, and learning organizations with individual skill assessments.

Evolution of ISD Theory and Practice

Theory and practice has been the cornerstone of instructional technology since the birth of the field. Seels and Richey (1994) and Reiser (2001a) proclaim that theory represents the underlining constructs, principles, and propositions that increase the body of knowledge in the field, whereas practice is the application of knowledge to solve learning problems. The field continues to fluctuate with rapid changes in theory, practice, and technology (Reiser, 2001a).

Early Twentieth Century Perspectives

Instructional technology became an established field early in the twentieth century. Before the 1920s, E. L. Thorndike’s notions of pre-specified instruction, useful learning goals, and educational measurement introduced empirical studies in education (Shrock, 1995). During the 1920s, the field matured to focus on educational objectives and individualized instruction. The Winnetka and Dalton plans successfully applied individualized instructional plans as effective learning strategies. Both plans sought to prescribe learning outcomes, self-paced learning objectives, and mastery learning techniques within school subjects (Shrock, 1995).

During the 1930s, early interest in instructional systems shifted to a behavioral approach because of the Great Depression and the ascendancy of the progressive movement. Tyler's work with the longitudinal *Eight-year study* established a solid foundation for behavioral objectives (Shrock, 1995).

With the onset of World War II, there was a proliferation of research, development, and innovation. Some researchers and practitioners in the field suggested instructional technology was formally developed during this decade (Reiser, 2001b; Seels & Richey, 1994). "Others…suggest that it was instructional media rather than instructional technology that [was] nurtured by the war effort" (Shrock, 1995, p. 14). The focus on training systems emerged again through the influence of instructional principles, research, and theory on learning, instruction, and human behavior (Reiser, 2001b). New instructional methods that employed audiovisual media emerged. The U.S. military used training films and video production methods to design, develop, and deliver training programs to troops (Reiser, 2001a).

By the 1950s, the programmed instructional movement was in full force. According to Reiser (2001b), this movement was the catalyst that sparked an ISD approach to training development practices. During this time, Skinner (1953) introduced operant conditioning through his studies on animal learning and behaviors. Skinner also described a methodology for improving human learning and instructional materials in an article entitled *The science of learning and the art of teaching.* The method described was a trial and error procedure for refining programmed instruction (Reiser, 2001b).

Task analysis was another new methodology introduced to the field by Miller and Flanagan. In task analysis, the goal is to identify job requirements, tasks, and actions required to perform a specific job role (Reiser, 2001b; Shrock, 1995). Behavioral objectives also resurfaced through contributions made by renowned theorists Mager and Bloom. Mager's focus was on teaching practitioners how to write good behavioral objectives, whereas Bloom's focus was on identification and classification of various types of behavioral objectives (Reiser, 2001b; Shrock, 1995).

Late Twentieth Century Perspectives

By the 1960s, the ISD movement had officially become the premiere instructional technology method of choice in the field. "What was distinctive at this time was the articulation of the components of instructional systems and the recognition of their system properties" (Shrock, 1995, p. 16). By definition, "a system is any entity that maintains its existence and functions as a whole through the interactions of its parts" (O'Connor & McDermott, 1997, p. 2). Nonetheless, this era of instructional technology development was profuse with contributions from many perspectives, and these are still in use today. *Norm-referenced* and *criterion-referenced* tests were in widespread use. Norm-reference tests measured a student's ability against other students, and criterion-referenced tests provided a student's score based on a set of defined behavioral standards (Reiser, 2001b; Shrock, 1995). Another contribution to the field, introduced by Gagné, was *conditions of learning* and the *nine events of instruction*. These learning theories are still extant in the field and are among the prominent theories used in the practice of ISD, teaching, and learning (Reiser, 2001b; Shrock, 1995). Scriven (1967) defined formative and summative evaluation. These evaluation methods are essential to producing effective instructional materials that meet intended learning outcomes (Reiser, 2001b; Shrock, 1995).

The theoretical and practical contributions of the 1960s led to a myriad of ISD models in the 1970s. ISD models have continued to emerge and change over the years and now consist of a wide variety, such as the generic ADDIE (analysis, design, development, implementation, and evaluation); Dick and Carey (2005); Seels and Glasgow (1997); Morrison, Ross, and Kemp (1994); and Gagné (1994) models. These models are descriptive and prescriptive methods used by both novice and expert practitioners in the field (Reiser, 2001a, 2001b).

In the 1980s, the field experienced growth and redirection with the advent of the microcomputer and human performance technology (HPT) (Reiser, 2001a, 2001b; Shrock, 1995). Business organizations adopted ISD methodologies to guide training and development initiatives and there was an increased use of computer-based instruction as the microcomputer emerged on the scene (Reiser, 2001a, 2001b; Richey et al., 2001; Shrock, 1995). At the same time, the HPT movement emerged with an emphasis on front-end analysis, job performance, and other types of performance interventions. (Reiser, 2001a; Rosenberg, 1990; Rossett, 1990).

During the last decade of the century, the profession experienced a shortage in ISD professionals, rapid turnover, and much inefficiency (Gayeski, 1991). The field experienced rapid growth and development in the widespread use of various ISD models, customization of those models to suit various design epistemologies and business needs, and an expansion in software tool development and use to automate the ISD process (Gayeski, 1991; Rowland, 1992; Wedman & Tessmer, 1993; Winer & Vazquez-Abad, 1995).

Gayeski (1991) noted that organizations had begun searching for more efficient methods to fill the ISD job role in business. These methods were as simple as retraining subject matter experts (SMEs) in ISD methodologies and tools to fill the ISD job role, to more sophisticated methods, which included automated instructional design tools. The latter method received considerable attention through collaborative research efforts funded through government and corporate research grants and numerous organizational partnerships (Gayeski, 1991).

The central aim behind most expert systems was to develop a *designer in a box*, *teacher in a box*, or *design tools in a box* that could act as an expert ISD professional to assist novice designers and other types of professionals with ISD type work tasks. "The underlying philosophy [was] that design is a science [or deterministic activity]…and a tool [could] make decisions better than inexperienced designers" (Gayeski, 1991).

It was believed tools of this sort could address specific ISD tasks perceived to be structured and logical. Yet, none of these tools could replace an expert designer nor automate ISD job tasks. Professionals designing expert systems had overlooked the creative, intuitive, contextual, and nonlinear design tasks, which are today, unexplored research areas (Dreyfus & Dreyfus, 1995; Gayeski, 1991; Winer & Vazquez-Abad, 1995;). At the same time professionals designing expert systems were creating ISD automation tools to empower LT professionals and newcomers entering the field, other perplexing issues plagued practitioners and researchers. For example, there was a growing concern that existing ISD models were too limiting and restrictive and needed customization to meet various business needs and project types. Therefore, practitioners in the field began adapting ISD models to suit their individual project needs. This spurred new research studies to better describe and explain how ISD practice was being applied. One notable qualitative study conducted by Rowland (1992) sought to investigate what LT professionals do.

There was a wealth of literature and theory extant in the field that described and prescribed how to design instructional solutions, but few researchers examined what LT professionals did in ISD practice. The outcomes of Rowland's research showed that novice and expert designers differed in the way they carried out instructional design steps and the types of solutions they devised. There was variability in how steps were applied within and between groups as well. For example, expert designers with equivalent competencies and skills varied in the types of methods used and solutions they devised for similar instructional projects.

Another study conducted by Wedman and Tessmer (1993) sought to identify the frequency with which LT professionals used or omitted instructional design steps in their projects. The study identified leading causes contributing to an LT professional's selection of certain design steps. Most frequently cited reasons included lack of time or money, someone had already decided, and certain steps were considered unnecessary. However, most "respondents felt that they had the expertise needed to accomplish the activity" (Wedman & Tessmer, 1993, p. 53). A lack of expertise was not a recognized cause for deviating from the basic steps.

In 1995, Winer and Vazquez-Abad replicated Wedman and Tessmer's 1993 study. The results of the Winer and Vazquez-Abad study showed that 47% of respondents entered the field through education technology programs, 29% through on-the-job-training, 16% through personal or professional contacts, 5% through training seminars and workshops and the remaining 3% through the International Society of Performance Improvement (ISPI). Even with multiple entry points into the field, the homogeneity of the results confirmed the validity of the ISD methodology used. These results "allow us to make some general statements about what instructional designers do, and why they do not perform certain steps" (Winer & Vazquez-Abad, 1995, p. 63).

A second and equally important benefit of Winer & Vazquez-Abad study indicated that selection of instructional strategies and media selection were the most important ISD components, and these would undoubtedly have an impact on future ISD methodologies. This also suggested that LT professionals would "have to expand their focus [and skill repertoire] to include systemic influences and cultural constraints in the creation of learner-centered learning environments" (Winer & Vasquez-Abad, 1995, p. 65). Furthermore, Winer and Vasquez-Abad (1995) suggested that these results make one wonder whether professionals would continue to use ISD models, and if those models would continue to be appropriate tools to use to create learning and performance solutions.

21st Century Perspective and Beyond

By the turn of the century, it was obvious that complexities in the field, challenges faced with current ISD models, and incessant changes in computer technology would have a significant impact (Winer & Vazquez-Abad, 1995). The field had become more diversified and complex, and new media design and development was a new reality for LT professionals (Lui et al., 2002). These new trends and technologies have impelled LT professionals to acquire a multiple set of skills to cope with the demands of the industry. As the knowledge for building robust and innovative products and delivering rapid solutions continue to increase, LT professionals will find themselves engulfed in multiple projects. They must assume roles in areas previously reserved for more specialized professionals. Oftentimes, LT professionals may find themselves carrying more than one role (Bernthal et al., 2004; Larson & Lockee, 2004; Lui et al., 2002). In fact, "the term [IDs and IDv] is less familiar outside the field. Instead, one hears job titles such as industrial designer, curriculum developer, [e-]learning specialist, instructional technologist, [subject matter expert, and] sometimes just project manager" (Lui et al., 2002, p. 2).

The IDs or IDv title is no longer appropriate for every professional in the field; this is most noticeable because of rapidly changing new media tools and delivery mediums. To be more consistent with emerging trends, it may be more appropriate to refer to these unique professionals as *new media integrators*, especially since job titles, roles, responsibilities, and the work products they produce are a result of applying an interspersed skill set.

Consequently, LT professionals must continuously expand their skill set and acquire new competencies to adapt to the demands of current and emerging new media technologies (Lui et al., 2002). For example, new media technology tools such as Acrobat Connect™, Dreamweaver™, Fireworks™, Flash™, Flex™, RoboHelp™, Director™, Captivate™, Authorware™, Coldfusion™, Photoshop™, Illustrator™, Premiere Pro™, and After Effects™ (Adobe products) have become increasingly complex and integrated tools. These tools require that LT professionals continuously upgrade their skills to keep up with new software versions. If they do not stay current, they risk falling behind in their knowledge and skills, and this may have a long-term and damaging effect on their career.

According to Lui et al. (2002), a good designer knows that formal education is only one way to acquire LT skills. Other methods include: staying current by taking additional college classes, attending conferences, informal training, workshops, collaborating and sharing within learning teams at work, studying competitor products, learning new products and tools, staying connected and involved with universities, and learning from clients. As a result, LT professionals must identify ways to further develop, maintain, and assess their skill capabilities as integrated professionals. Professionals who possess and demonstrate an integrated skill set will represent a unique group of practitioners in the field. These professionals will be able to: 1) Handle multiple tasks and job roles; 2) Recognize when to assume a more specialized role given the needs of a program, project, product, or service; 3) Identify and diagnose problems early during the analysis and design steps; 4) Work in integrated teams or workgroups, in a single or specific role, or carry all the roles for an entire project; 5) Manage multiple projects from beginning to end.

Historical Accounts of Intelligence, Skill, and Expertise

Intelligence and skill acquisition measurements are mutually exclusive methods polarized into quantitative and qualitative techniques. Traditional intelligence measurements use quantitative methods, whereas skill acquisition methods use qualitative ones (Herrnstein & Murray, 1994; Proctor & Dutta, 1995). At a macro-level, these two methods serve an important social and economic value in society. At a micro-level, they serve as ways to distinguish between individual abilities, talents, strengths, and weaknesses. Herrnstein and Murray (1994, p. 2) stated, “people vary in their intellectual abilities and the differences matter, to them personally and to society.” Inclusion of quantitative and qualitative techniques in the assessment methodology is important. This includes multiple types of measurement techniques such as 360-degree reviews, performance appraisals, surveys, tests, projects, and portfolios. Expertise, however, is the union of intelligence and skill. Both are needed to be able to gauge the level of expertise of an individual. "Expertise refers to the characteristics, skills, and knowledge that distinguish experts from novices and less experienced individuals" (Ericsson, 2006a, p.3). Effective assessment of expert performance must be obtained through quantitative and qualitative methods. Quantitative methods are more objective, cognitively focused, and can significantly aid in identifying superior competency in a given domain. Quantitative methods only measure half of an individual's capability.

On the other hand, qualitative methods are more subjective and rely on expert judgments or peer-nominations. Qualitative methods can aid in identifying superior performance in a given domain. Ericsson (2006a, p. 4) claimed that "people recognized by their peers as experts do not always display superior performance on domain related tasks. Sometimes they are no better than novices even on tasks that are central to [their] expertise." Therefore, qualitative measurements alone do not automatically imply that an individual will be able to excel beyond intermediate levels in a given professional domain. To obtain a complete profile of an individual requires looking at both quantitative and qualitative methods. What is more, with shifts in domain practices and technology it becomes even more important to gather profile data on an individual based on a given period in time.

Measures of Intelligence

Galton introduced intelligence studies in anthropometric laboratory experiments; however, Binet developed the first intelligence test (Gardner, 1999, 1993; Proctor & Dutta, 1995). Stern coined the phrase IQ, which is the ratio of one's mental age to one's chronological age, with the ratio multiplied by 100 (Gardner, 1999). The use of intelligence and ability tests was ubiquitous throughout the 20th century. Their primary use was to classify people. According to Proctor and Dutta (1995, p. 297), "ability tests have been used for highlighting subgroups of strengths and weaknesses of individuals and for matching the characteristics of an applicant with the demands of a job." More recently, a shift from a uniform view of schooling and assessment toward an ecumenical and individualized perspective has emerged (Gardner, 1993). Gardner's MI theory, trait theory of intelligence, and trait theory of expertise, has dispelled the notion of a single faculty of intelligence that determines a person's mental agility and dexterity. Recent research does not support this conclusion (Horn & Masunaga, 2006; Gardner, 1993). MI theory is emerging as an established practice in K-12, postsecondary education, and now business and industry.

Shearer (1991) developed a scale to measure a person's multiple intelligence in the Hillside assessment of perceived intelligence study. Shearer developed and validated the scale to assist in providing cognitive remediation strategies to increase a brain-injured patient's recovery potential (Shearer, 1991). The instrument serves as one component of a combined neuropsychological assessment to assist with behavior management, cognitive remediation, psychotherapy, family therapy, and vocational planning for both clinical and non-clinical populations (Shearer, 1991).

The outcomes of this research led Shearer to develop the MIDAS scale. The MIDAS is a 106-item report completed by an individual or a knowledgeable informant (Shearer, 1996). Although the scale attempts to incorporate an objective perspective from a third-party who knows the individual under assessment, subjectivity is still inherent to the assessment because of personal perceptions imposed by the assessor. Nonetheless, the scale provides a broader view of a person's intellectual capabilities, which transcends extant standardized intelligence tests (Shearer, 1996). In fact, the primary purpose of the MIDAS is to provide a description of a person's strengths and weaknesses that will focus educational efforts, facilitate action plan development, increase motivation, and assist with career planning (Shearer, 1996).

Measures of Skill Acquisition

Concurrent with research studies in psychometrics, researchers undertook similar studies to identify and classify skill acquisition. Early studies about skill development trace back to Ebbinghaus. His original studies focused on learning and memory and these studies set the stage for later studies on skill acquisition (Proctor & Dutta, 1995). Bryan and Hart (1897, 1899) developed the first studies to identify and describe skill acquisition, which included notions of a layer of plateaus, hierarchy of habits, and transfer of training. Woodworth (1899) is another critical contributor to the study of skill acquisition through his notions that people have a tendency to be perceptual and intellectual as well as active and reactive. Studies in the perceptual-motor domain led to contributions describing impulse and current control. Craik (1948) focused on mechanistic nature and behavior that mimics a machine. These studies evoked notions of general information processing through mental models, which has resurfaced in recent years (Proctor & Dutta, 1995). Skill acquisition presumably progresses through qualitative phases of performance. Four prominent models are used to describe these phases: Fitts' phases of skill acquisition, Anderson's framework for cognitive skill acquisition, Rasmussen's modes of performance, and Dreyfus' five stages of skill acquisition. Each model describes "similar distinctions between qualitatively different skill levels" (Proctor & Dutta, 1995, p. 15).

Fitts' phases of skill acquisition. Fitts' model consists of three phases: cognitive, associative, and autonomous. The cognitive phase represents the mental processes required to understand and perform a specific task. The associative phase is where links are established to specific actions and a person becomes less dependent on verbal remediation. Then error rate and performance times diminish as well. The autonomous stage is where performance is executed without interference from external commands or demands and tasks are performed automatically (Fitts, 1990; Fitts & Posner. 1967).

Anderson's framework for cognitive skill acquisition. Anderson's model extended Fitts' work. Anderson developed a framework for cognitive skill development. In this model, Anderson described skill acquisition as a link between declarative knowledge and procedural knowledge. Declarative knowledge is the knowledge that one possesses and includes facts, rules, and information. Procedural knowledge is one's ability to practice a specific task without reliance on declarative knowledge (Clark, 1999; Proctor & Dutta, 1995). After a person acquires both declarative and procedural knowledge, then the next step is what Anderson defines as tuning. Tuning "involves [refining]…procedures through processes of generalization, discrimination…and strengthening" (Proctor & Dutta, 1995, p. 16).

Rasmussen's modes of performance. Rasmussen's model, akin to Fitts' model, deals with task performance in complex situations and describes three modes as knowledge-based, rule-based, and skill-based. Knowledge-based behavior is a person's present performance mode, rule-based behavior is a person's ability to control and make conscious decisions, and skill-based behavior is a person's automatic response or performance on a specific task (Rasmussen, 1983). This model encourages flexible movement between each mode, rather than progressive stage movement as in Fitts' and Anderson's models (Proctor & Dutta, 1995).

The Dreyfus model of skill acquisition. The Dreyfus model consists of five stages of skill acquisition, which include novice, advanced beginner, competent, proficient, and expert. The primary focus of this model is to distinguish between two seemingly discrete ideas in skill acquisition, *knowing-that* and *knowing-how*. Knowing-that (or about something) relies on external rules and facts to guide behavior. Knowing-how is one's innate ability or potential, which allows behavior to manifest. A distinct difference exists between knowing-that and knowing-how when executing specific tasks. In fact, the knowing-that and knowing-how relationship is similar to the distinction made between intelligence and skill. One is cognitively innate and the other is behaviorally concrete. Knowing-that is cognitively innate and knowing-how is behaviorally concrete. Knowing-that relates to content and subject matter, which is the substance of human mental capacity and (Dreyfus & Drefyus, 1986; Cornell et al., 2003). It is synonymous to intelligence. Whereas knowing-how relates to the activities, actions, and methods a person may perform or execute for a specific task or job (Dreyfus & Drefyus, 1986; Cornell et al., 2003). It is synonymous to skill.

Once a person has reached an expert performance level, regression to a novice state is still possible. This occurs when a person relies on conscious reflection of rules and facts that govern a specific task or skill. For example, in one example offered by Dreyfus and Dreyfus (1986) an expert pilot who had promoted to instructor went on to serve as a flight evaluator. During a test simulation, the pilot had his skills challenged during a routine return flight with a student when one of the engines failed. At that exact moment because of lack of practice in flying, the pilot reverted to flying by memory rather than experience. In this emergency situation, the pilot reverted to novice performance as his skills were challenged due to limited practice for flying in unexpected conditions. This conscious recall of facts and rules under a dire emergency quickly caused the pilot to regress to flying as a beginner. This is one example of how practice is essential to maintain know-how. Know-how is lost through inactivity or no use (Dreyfus & Dreyfus, 1986).

Each model shares similar concepts and ideas. Each model suggested that expertise is 1) acquired through practice and not entirely innate; 2) goal-oriented, which means it may get evoked in response to some need or demand; 3) acquired once an individual has integrated into daily practice; and 4) enhanced as cognitive demands reduce. As a result, this would free up time for more complex and perplexing tasks (Proctor & Dutta, 1995). With the overwhelming similarity between each model, the Dreyfus model of skill acquisition offers the best approach to measuring expert practice, as demonstrated in Benner's book *Novice to expert*. She noted the Dreyfus model of skill acquisition was an effective way to measure the skill capabilities and differences between novice and expert nurses (Benner, 2001).

Measures of Expertise and Expert Performance

The theory of expertise and expert performance has evolved over time to include both intelligence and skill acquisition theories. These theories have emerged, overlapped, and converged between the many theorists, philosophers and educators who had an interest in understanding the nature of expertise from very different perspectives and for many different reasons. Feltovich, Prietula, and Ericsson (2006) suggested that expertise and expert performance theories have been influenced by broader theories within the field of computer science, psychology, and education. This impetus was fueled by the goal to supplant a general theory of expertise and expert performance that recognizes the similarities in theoretical principles mediating the phenomena and the methods for studying them across domains and disciplines (Ericsson, 2006a). Bereiter and Scardamalia (1993, p. 2) suggested, "societies are experiencing a need to pursue expertise itself as a goal and [to explore]… more systematic ways of doing so." These notions also suggested a need to produce more knowledgeable and capable individuals by helping them to develop their expertise and expert performance through application of intellectual faculties, competency development, experiential learning, ongoing practice, and evolving experience.

Influence from computer science. The development of the microcomputer led to research explorations into the nature of intelligent computational performance of computer devices (Dreyfus & Dreyfus, 1986; Feltovich et al., 2006). This spawned new research and development of cognitive models. One important model that emerged was the information-processing model. In this model, it was believed that computers and software programs could mimic human cognition such as problem solving. Another model that emerged and shared many of the principles of information processing was artificial intelligence (AI). In the early years, AI focused on simple elementary games like checkers (Buchanan, Davis, & Feigenbaum, 2006; Feltovich et al., 2006). However, as the field matured the need to address more complex, richer, and knowledge driven problems and issues emerged. The limitations of simple computational methods spawned interests to create more complex programs and the field of expert systems emerged (Buchanan et al., 2006; Feltovich et al., 2006). Research into the realm of computer science sparked interest with research psychologists and the theories and principles from the cognitive science field migrated into the field of psychology (Feltovich et al., 2006).

Influence from psychology. The field of psychology was influenced primarily by the tenets of behaviorism for most of the first half of the twentieth century. This approach to studying human cognition and development focused on recognizing mental constructs through observations. Theorists like B.F. Skinner and others explored techniques in operant conditioning and stimulus-response techniques to describe human behavior. However, this approach had considerable difficulty in describing complex human mental operations like language and reasoning (Feltovich et al., 2006). The outgrowths of information processing models lend promise to a field that was beginning to struggle with ways to overcome the inadequacies of its core theoretical underpinnings.

Influence from education. A convergence of theoretical principles ensued across the field of cognitive science and psychology. The convergence across these two fields naturally migrated into the field of education and educational psychology (Feltovich et al. 2006; Amirault & Branson, 2006). As such, an indirect link between the field of expertise and expert performance and instructional technology was established. Today, this link can be recognized in the different forms and uses of information and educational technologies. "Given the broad divide in the theoretical mechanisms used by cognitive and behavioral researchers, it is interesting that researchers [have converged] on methods of collecting observable process indicators and have mutual interests in large, reproducible differences in performance." (Feltovich et al., 2006, p. 44).

Taxonomy of Skill Capabilities

Skill integration and skill imbalance builds on MI theory and ISD theory and practice. This foundation consists of ISD competencies, MI Constructs, systems thinking, and cognitive ability. These are the components of the IPA model (see Figure 5), which combines theory and practice to assist LT professionals with measuring, monitoring, and maintaining a flexible and versatile set of professional skills. This section describes each component of the IPA model and how to use the model to assist in building multiple skills.

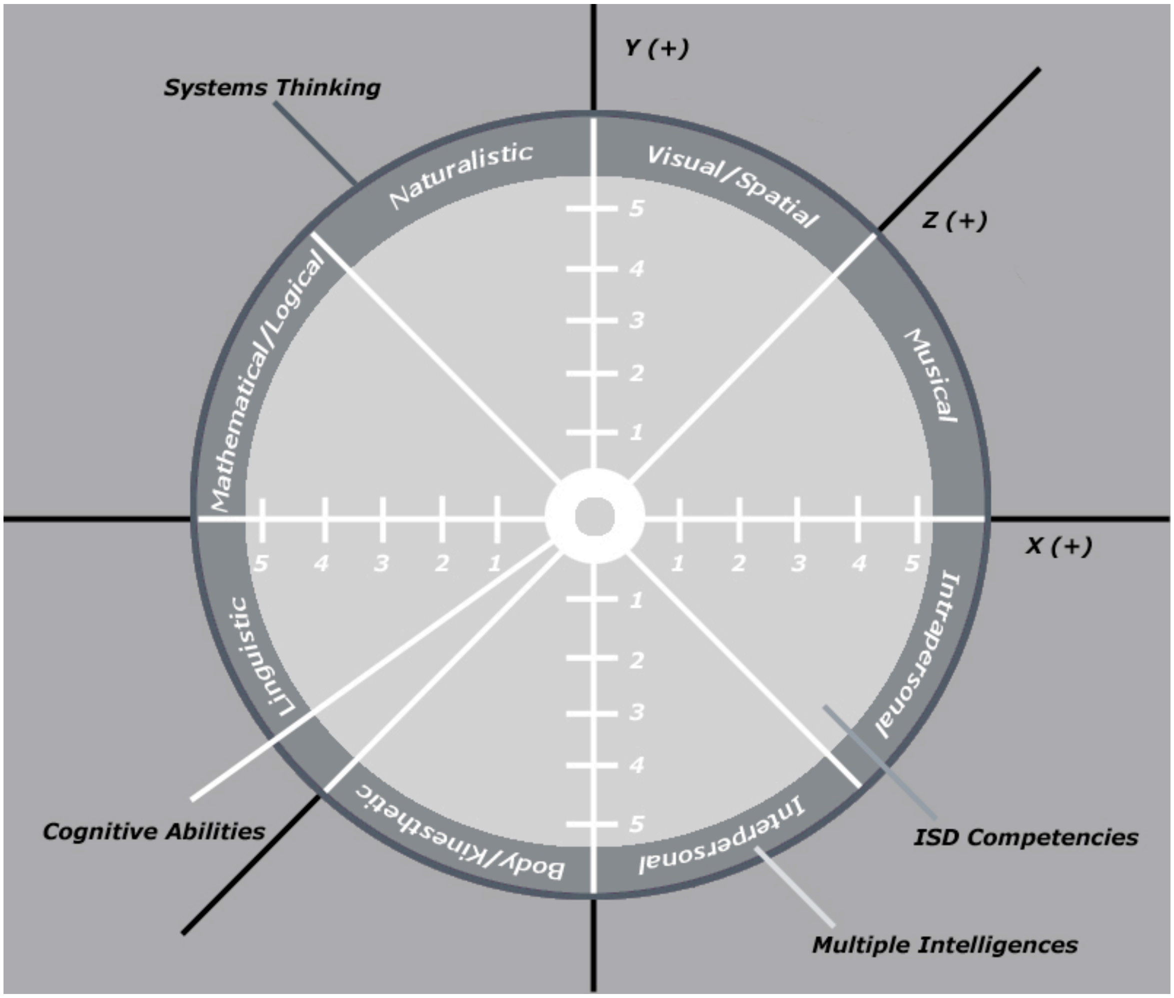


Figure 5. Integrated Performance Assessment Model with theoretical components

ISD Competencies

ISD competencies are the *enabling components* of the model and explain the competencies required in each ISD domain (see Figure 5). Past studies of ISD practice raised awareness of the need to better define the competencies and skills needed of LT professionals as the field continues to change to meet the demands of a changing world economy. Therefore, professionals cannot rely solely on procedural models to guide the design and development of instructional solutions. LT professionals must rely on internal and external traits or dimensions to assist them during ISD practice, such as multiple competencies, cognition, intuition, internal motivation, cultural perspectives, situational issues, and technology (Gayeski, 1991; Lui et al., 2002; Winer & Vasquez-Abad, 1995;).

Inconsistency “between actual practice and the theoretical models which define practice in the literature…[led to a qualitative study] to identify the competencies of expert IDs by examining the knowledge, skills, and abilities they use to analyze instructional problems” (Atchison, 1996). Atchison identified nine exemplary roles and matching competencies, which included the reflector, the ethicist, the humanist, the collaborator, the advocate, the evaluator, the manager, the marketer, and the entrepreneur (Atchison, 1996). More recently, a new exemplar has emerged – the technologist – and LT professionals have a new role to add to their skill repertoire (Lui et al., 2002; NWCET, 2003; Richey et al., 2001).

Before Atchison’s study, IBSTPI published a first edition of *Instructional design competencies: The standards* in 1986. The standards “were intended to describe a ‘journeyman’ IDs: someone who may or may not have formal academic training in the field, but probably did have considerable training and exposure to the literature of the field through whatever route” (Richey et al., 2001, p. xx). The original standards were ideal for entry-level performance as IDs (Atchison, 1996). The results from Atchison’s study clearly explicated the differences between novice and expert practice. The 1986 IBSTPI Standards are *essential* traits for every IDs and IDv practitioner entering or currently working in the field, whereas Atchison’s expert competencies are *advanced* traits represented by expert practitioners (Atchison, 1996; Richey et al., 2001).

Another foundational study conducted by Song in 1998 focused on validating both the 1986 IBSTPI standards and Atchison’s expert competencies from a practitioner perspective. Song's goal was to determine if LT professionals in the field could determine the complexity (novice, intermediate, and expert) of this expanded list of competencies (Richey et al., 2001; Song, 1998). Song used a descriptive research method and developed a survey instrument using both the 1986 IBSTPI standards and Atchison's expert competencies.

The Atchison and Song studies were notable research efforts instrumental in helping to develop and validate the current 2000 IBSTPI standards. The Atchison study employed a qualitative method. Atchison conducted structured interviews with 15 expert practitioners working in four different work settings – higher education and vocational trade, business and industry, healthcare, and government (Atchison, 1990; Richey et al., 2001). Atchison reviewed, synthesized, and quantified common themes using ethnographic data analysis procedures. The Song study took a slightly different approach by employing the survey method. Song used the 1986 IBSTPI standards and Atchison's expert competencies to develop the survey instrument. She mailed 80 surveys for the entire study. Thirty-three participants completed and responded to the survey. Eight of the surveys returned incomplete. This yielded a response rate of 41.25 percent for completed surveys (Richey et al., 2001; Song, 1998). Song's study established competencies at the entry, intermediate, and expert levels.

IBSTPI used the findings from the Atchison and Song studies to develop a newer and broader set of ISD competencies – the 2000 IBSTPI standards. These newer competency standards reflect current practice in the field. IBSTPI conducted a study to validate the new competencies and performance statements for use in the profession (Richey et al., 2001). This validation study used two survey instruments: one to measure designer perception of competency criticality, and the other to determine the levels of expertise required on-the-job to demonstrate each skill (Richey et al., 2001).

The IBSTPI board used its internal contacts to create a cross-section of practitioners from several geographical locations worldwide including the United States, Australia, Canada, and Europe. While the sample was not random, there was a significant amount of diversity between respondents (Richey et al., 2001). The IBSTPI study obtained a high response rate from practitioners in the field. The data showed a typical competency rating was 4.0 through 4.49 on a 5-point Likert scale, and the typical performance statement rating was 3.5 through 4.49. Richey et al. (2001) categorized eight of the 23 competencies as advanced. The remaining 16 competencies they categorized as essential. The final 2000 IBSTPI standards contained four knowledge domains and included professional foundations; planning and evaluation; design and development; and implementation and management (Richey et al., 2001).

In 1996, while Atchison was quantifying the ISD exemplars, two organizations NWCET and the Regional Advanced Technology Education Consortium sought to identify eight information technology career clusters and skill standard (NWCET, 2003). In the summer of 1998, around the same time that Song was conducting her study, the NWCET and the American Electronics Association joined efforts on a nationwide research project to validate the information technology skill standards. The goal of this project was to identify and update the skill standards with new and emerging workforce job roles, technical knowledge, and related foundational skills (NWCET, 2003). The career clusters identified delineated key job roles and sample job titles typical for each cluster. Three of the clusters cited the instructional design role and several other job roles required of LT professionals in job classifications for information technology professionals. The three career clusters identified include: digital media, technical writing, and web development and administration. The millennium edition, published in 1999, contained the results of the validation effort (NWCET, 2003). There were18 competencies identified for LT professionals.

The research method outlined in chapter 3 will extend previous research and validation efforts to further investigate the validity and reliability of the combined set of IBSTPI and NWCET standards. The IBSTPI and NWCET standards were used as a content validity matrix to develop a pool of items for the ISD Performance Inventory and to test the validity and reliability of scale items. The goal was to establish a valid and reliable measurement instrument to assess the skill capabilities of LT professionals.

MI Constructs

MI theory is the *linking component* of the IPA model (see Figure 5). It provides the link between individual human faculties and mental activity that naturally occurs through normal brain operations to produce certain behaviors required to demonstrate competence. Gardner (1983) explicated a new theory of intelligence, in his germinal book *Frames of mind*, which defined seven kinds of intelligences. Gardner's theory grew out of years of neuropsychological research with the Aphasia Research Center at Boston University. Gardner worked with stroke victims and individuals with neurological damage to some portion of their brain. Through that research, Gardner realized that "people have a wide range of capacities [, and] a person's strength in one area of performance simply does not predict any comparable strengths in other areas" (Gardner, 1999, p. 31). He also found that damage to any portion of the brain through an accident of nature such as a stroke could eliminate the use of any one intellectual construct, which made it possible to study and observe other constructs individually.

Each human faculty is separate and discrete with only loose and non-predictable relations with one another, and can be viewed from a modular perspective rather than a single, all-purpose machine (Gardner, 1999). Gardner and Walters (1993) claimed that almost every cultural role requires more multiple intelligences because when judging human capabilities individuals should be seen as having a collection of aptitudes rather than a singular problem-solving faculty that can be measured through assessment instruments. This implies that a person develops a unique cognitive profile, which represents diversity in human ability because of the level and number of strengthened and frequently exercised intelligences.

Gardner and Walters (1993) further suggested, "an individual [may or] may not be particularly gifted in any intelligence; and yet, because of a particular combination or blend of skills, he or she may be able to fill some niche uniquely well" (p. 27). Determining a person's intellectual strength requires "[assessing a] particular combination of skills that may earmark an individual for a certain vocational or avocational niche" (Gardner & Walters, 1993, p. 27). These intellectual constructs are the essence of a person's true skill capabilities. They are as follows:

Logical-mathematical intelligence. The use of this intelligence includes the capacity to order objects, develop classifications and taxonomies, and analyze and solve mathematical problems (Gardner, 1983). Some examples are ordering objects, breaking down ideas and complex abstractions into parts, putting pieces together to make a whole, or completing math problems in numerical or word form. An LT professional exhibits this intelligence when he or she is planning and designing learning and performance solutions. Creating modules, units, lesson plans, organizing information, chunking content, sequencing instructional elements, and making the right media selections are critical tasks performed by an LT professional.

Linguistic intelligence. The use of this intelligence includes the ability to think, write, and speak in written and spoken form, learn new languages, and the capacity to apply language to accomplish goals (Gardner, 1983). Some examples are sonnets, poems, literary works, and public speaking. This intelligence can occur when LT professionals design learning strategies, write learning objectives, or create instructional content to support multiple types of media formats for instructional delivery or when planning and conducting evaluations and communicating with others.

Musical intelligence. The use of this intelligence includes the ability to compose, perform, and express oneself through musical patterns or form (Gardner, 1983). This includes writing or reading sheet music, playing a music instrument, or singing a melody or song. An LT professional exhibits this intelligence when composing, playing, recording, editing, and synchronizing music or selecting sound effects for multimedia or web-based instruction.

Visual-spatial intelligence. The use of this intelligence accesses artistic ability and capitalizes on one's ability to recognize and find special patterns and areas (Gardner, 1983). Some examples include the ability to navigate terrains, read maps, recognize special distance, and create pictures and objects through artistic expression. An LT professional exhibits this intelligence when designing web interfaces and other components such as graphics, color schemes, or applying visual design principles;

designing digital media components and instructional strategies for use in a project; or when reviewing and evaluating instruction.

Body-kinesthetic intelligence. The use of this intelligence exploits one's ability to use physical extremities, such as hands, legs, and feet to maneuver to solve problems or fashion products (Gardner, 1983). Some examples include running, jumping, climbing, or using tools to fabricate products. An LT professional exhibits this intelligence when using software applications, tools, and methodologies to design and produce learning and performance solutions.

Interpersonal intelligence. The use of this intelligence connotes a person's ability to interact with others, perceive, recognize, and understand the intentions and desires of others (Gardner, 1983). Some examples include collaboration and intuition. An LT professional exhibits this intelligence when he or she interacts and communicates with peers, customers, subject matter experts, and key stakeholders.

Intrapersonal intelligence. The use of this intelligence involves one's ability to understand, reflect, and recognize one's own desires and feelings (Gardner, 1983). Some examples include self-awareness, metacognition, and introspection. An LT professional exhibits this intelligence when planning, monitoring, and regulating their own performance through professional development to further their career or enhance their competencies and skills. An LT professional may also exhibit this intelligence through reflective or ruminating strategies to gauge their own behaviors.

Since developing the original seven intelligence constructs, Gardner has identified an eighth intelligence. The eighth construct – naturalistic intelligence – represents one's ability to perceive, recognize, and understand natural phenomena, and species in the natural world (Gardner, 1983). Some examples include recognition of one's environment, and the various species that exist. This includes plants, animals, and even the potential dangers within an environment. An LT professional may exhibit this intelligence when working in various work environments. For example, having the ability to recognize multiple types of work environments and cultures, interpret the effects of new technologies and emerging trends on the profession, and distinguish between organizational culture and business practices is key to performing well in any educational or business environment.

Sternberg – a neuropsychologist equally interested in human intelligence - developed the *triarchic theory of intelligence*. Sternberg's theory suggested that people also possess three general intelligences identified as analytical, creative, and practical. Analytical intelligence is the ability to think and reason logically, creative intelligence "allows…[a person] to cope with novelty[;] and practical intelligence…enables them to apply what they know to everyday situations" (Viadero, 1995, ¶ 5). Practical intelligence is a person's mental ability to control the application and use of various intelligences. Sternberg's triarchic theory is another perspective from which to view MI theory. Both theories converge on notions of analytical reasoning and creative ability. The strong parallelism between Sternberg's triarchic theory of intelligence and Gardner's MI theory suggests that both are complementary to holistic development and support skill imbalance and skill integration depending on how a person uses his or her innate potential.

Systems Thinking

Systems' thinking is the *integrative component* of the IPA model (See Figure 5). Systems thinking describe and explain the connection between individual components and emergent properties. These individual components include MI constructs, ISD competencies, and levels of cognitive ability. Emergent properties, according to O'Conner and McDermott (1997, p. 6), "emerge from the system when it is working." Emergent properties can be any number of different learning solutions created to meet learning needs within a myriad of situational contexts. This could be within a training environment, school, or on-the-job. LT professionals use systems thinking to create various types of learning and performance solutions.

Moreover, systems' thinking entails maintaining a continuous connection between a person's intelligences and competencies within and across domains. The interaction of these components maintains or produces new performance outcomes. This activity represents normal cognitive brain functioning. A continuous process of adaptation, transformation, autonomy, and regulating inputs and outputs is a natural a function of mechanical thinking. Hawkins (2004) stated it this way:

> Most descriptions of brains are based on flowcharts that reflect an oversimplified view of hierarchies. That is, input…flows into the primary sensory areas and gets processed as it moves up the hierarchy, then gets passed through the association areas, then gets passed down to the motor areas…. When …[a person] reads aloud, visual information does indeed enter at V1, flows up to association areas, makes its way over to the frontal motor cortex, and winds up making the muscles in …[his or her] mouth and throat form the sounds of speech. However, that isn't

> all there is to it. It's just not that simple. In the oversimplified view I am cautioning against, the process is…treated as though information flows in a single direction, like widgets being built on a factory assembly line. But information in the cortex always flows in the opposite direction as well, and many more projections feeding back down the hierarchy than up…. Although the up hierarchy is real, …[people] have to be careful not to think that the information flow is all one-way. (pp. 46-47)

In ISD, systems thinking consist of systematic processes and procedures, as explicated by traditional ISD models as well as systemic cognitive strategies employed by professionals to demonstrate skill integration or skill imbalance when creating learning or performance solutions. According to Banathy (1987), "systems inquiry enables us to explore and characterize not only the selected system [, in this case an LT professional,] but the environments in which the system is embedded as well as components or subsystems" (p. 88).

As noted earlier in this chapter, a significant number of prescriptive and descriptive models used to practice ISD. These models "enable…[professionals] to map the instructional system into the larger system and thus make it an organic part" (Banathy, 1987, p. 89). The same is also true of the LT professional, when he or she uses MI constructs and ISD competencies (competency-intelligence clusters) to produce simple and complex learning and performance solutions. To study skill integration and skill imbalance requires an essential look at the whole and the parts as well as the connections between them. All systems follow the same rules of organization, regardless of its parts and functions, and system behaviors depend on the interaction between parts rather than the parts themselves (O'Connor & McDermott, 1997). O'Connor and McDermott further stated it this way:

> A system maintains itself through the interaction of its parts, and so it is the relationships and the mutual influence between the parts that is important, rather than the number or size of the parts. These relationships can be simple or complex. There are two very different ways that anything can be complicated. When [people]… think something is complex, [they]… usually think of it having many different parts. This is complexity of detail.... The other type of complexity is dynamic complexity. This [occurs]… when the elements can relate to each other in many different ways, because each part has many different possible states, so a few parts can be combined in a myriad of different ways. It is misleading to judge complexity solely on the number of independent and separate pieces, rather than the countless number of ways of putting the pieces together. It is not necessarily true that the smaller the number of parts, the simpler to understand and deal with. It all depends on the degree of dynamic complexity. (p. 13)

Placing this in context, competency-intelligence clusters will have an impact on an LT professional's skill capabilities and systems thinking enable these professionals to achieve skill integration or skill imbalance. From a systems perspective, the parts are competency-intelligence clusters that a professional must possess to be efficient and effective at work. According to Richey et al. (2001) few professionals can meet all the demands in a given project or assume every ISD role. Switching between multiple skills can present challenges for many professionals because 1) they have not mastered the ability to use all their intellectual capacities (MI Constructs), 2) they may possess insufficient cognitive ability in applying key principles (ISD Competencies) within each instructional technology domain, or 3) both conditions are true.

The degree to which a professional demonstrates skill integration may be connected to his or her ability to employ one or more competency-intelligence clusters as required by the job task regardless of subject matter, domain, or discipline. This further implies that as a person uses multiple combinations of his or her competency-intelligence clusters this increases his or her ability to handle the demands of an agile and diverse work environment. Similarly, the degree to which a professional demonstrates skill imbalance may be connected to his or her ability to employ one or more competency-intelligence clusters as required by the job task. However, skill imbalance refers to a person's ability to employ a selected number of competency-intelligence clusters when needed when his or her skill capabilities are specific to an individual subject, domain, or discipline. The assumption is that expertise develops through two practice modes: skill imbalance or skill integration. As an LT professional uses all his or her intellectual faculties (MI constructs), this builds behavioral skill capacities in multiple content domains or areas (ISD competencies), which will lead to either skill imbalance or skill integration depending on whether he or she possesses adequate skill capabilities. "Humans have both modular faculties like color vision and spoken language as well as integrative faculties that allow them to coordinate various modular faculties into more flexible and general representations and skills" (Connell et al., 2003, p. 135).

For example, skill imbalance is the natural tendency to overuse or concentrate only on IDs skills or IDv rather than both, which causes skill lop-sidedness and inflexibility because certain competency-intelligence clusters are over or under used. This behavior leads to skill imbalance because usually individuals will have a tendency to exercise or improve their skills in those areas that they enjoy or have a natural affinity towards. Connell et al. (2003) noted “modular faculties develop automatically, have similar gross neurological organization across most normal individuals, and can be selectively disrupted in predictable ways” (p. 135). On the contrary, skill integration is the ability to combine and use a mixture or blend of IDs and IDv skills. This behavior results in versatility and flexibility. However, this agility is more difficult to accomplish because it requires making a conscious effort to use all one’s skill capabilities that may be dormant and requires development or may be under used because of lack of practice. Connell et al. (2003) called this integrative faculty. Integrative faculty is the ability to integrate across modular faculties, not easily developed, variable between individuals, and difficult to disrupt predictably (Connell et al., 2003). Skill integration makes it difficult to sort out the underlying causes of the observed differences between individuals in a culture or profession (Connell et al., 2003).

Cognitive Abilities

Cognitive ability is the *feedback mechanism* of the IPA model (see Figure 5). Cognitive levels are indicators to help determine a person’s expertise. The information obtained through feedback provides a means for regulating optimal performance within a system. The reciprocity of looping back and forth as new information gets retrieved, assessed, and assimilated. O’Connor and McDermott (1997) presumed:

> [Most people]… experience feedback as the consequences of [their] actions coming back to influenc[e]…what…[they] do next. ‘Feed-back’ is often used to

> mean any response, but the essential point is that it is a return of the effects of an action, influencing the next step, i.e. a two-way link. Feedback is a loop, so thinking in terms of feedback is *thinking in circles*. (p. 27)

This is systemic feedback and it requires identifying the degree of complexity required to execute various cognitive faculties needed to employ individual competencies. This includes both complexity of detail and dynamic complexity. To accomplish this, an examination of Bloom's germinal work is essential.

In 1956, Bloom and several colleagues assembled a committee of college and university examiners to develop a taxonomy that classified educational objectives. "It was the view of this committee that educational objectives stated in behavioral form have their counterparts in the behavior of individuals. Such behaviors can be observed and described, and these descriptive statements can be classified" (Bloom, 1956, p. 5). Originally, Bloom developed the taxonomy in three parts – the cognitive, effective, and psychomotor domains. The all three domains are central to the work required to develop tests and assessment instruments. The cognitive domain has been the primary domain used in the field. It includes those objectives that deal with cognitive processes and developing skill capabilities (Bloom, 1956). Bloom validated the final version of the taxonomy in the field with preprinted versions of the final handbook. Changes and suggestions from other experts and practitioners were incorporated in the official published version of the handbook.

Moreover, the ideal outcome for this taxonomy was to describe and classify intended behavior, although there may be a significant difference between actual and intended behavior as specified by the objective. Therefore, the committee devised the taxonomy to account for the possibility that students may not develop a given skill to the desired level stated in the objective or possibly never (Bloom, 1956). The taxonomy consists of six major classes, which include knowledge, comprehension, application, analysis, synthesis, and evaluation. It also represents an ordered and hierarchal arrangement from simple to complex. This ordering supports the premise that each class progressively builds upon prior classes to form the next higher-ordered class. This arrangement "was based on the idea that a particular simple behavior may become integrated with other equally simple behaviors to form a more complex behavior" (Bloom, 1956, p. 18).

More recently, a group of experts refined Bloom's taxonomy (cognitive domain) and published their results in *Taxonomy for learning teaching and assessing*. A revision of Bloom's taxonomy (RBT) was an attempt to update the taxonomy to reflect current trends and practices in education. A similar group in the field validated the RBT in the same manner as the original taxonomy. This was essential to providing a refined taxonomy that would reflect educational change and modern practice (Anderson et al., 2001).

The RBT represents and demonstrates a broader and more effective use of the taxonomy in the field. The RBT consists of four major knowledge dimensions – factual, conceptual, procedural, and metacognitive knowledge, and six cognitive dimensions – remember, understand, apply, analyze, evaluate, and create (Anderson et al., 2001). Unlike the original taxonomy, the cognitive dimensions span each knowledge dimension. Essentially, this means the six cognitive dimensions that make up the original taxonomy – knowledge, comprehension, application, analysis, synthesis, and evaluation became action-verbs and is foundational components in RBT. In the new taxonomy, evaluate and create represent levels 5 and 6. In the original taxonomy, level 5 was synthesis and level 6 was evaluation. The meaning and purpose for each category remain the same. However, the four knowledge dimensions seem to reflect aspects of the effective and psychomotor domains. In other words, the new taxonomy reflects a more comprehensive approach to teaching, learning, and measurement. This taxonomy provides the yardstick for measuring an LT professional's skill capabilities.

In a study conducted by Ven and Chuang (2005) they were able to classify information technology competencies into Bloom's taxonomy categories. These two researchers collected professional competencies for information technology occupations from America, Australia, and Taiwan (Ven & Chuang, 2005). The competencies were gathered from national level data published by each countries government (Ven & Chuang, 2005). From the competency lists gathered, they constructed an action verb lexicon using the action verbs extracted from each competency statement in the lists gathered. The classification schema used included writing a program to compute the frequency distribution for each action verb according to Bloom's levels. The final data showed the action verb, frequency distribution, and accumulation (Ven & Chuang, 2005). The final action verb lexicon will be used in the data collection procedures for this present study.

Integrated Skill Assessment

Intelligence and competency are two complementary and mutually exclusive ideas. One is for constructing knowledge and is cognitively innate, while the other is for applying knowledge and is behaviorally concrete. Both serve a unique purpose in the individual, but the fusion of each increases human potential. Connell et al. (2003) referred to this integrated potential as unrealized abilities and they define it as a space of possible competencies. Researchers and professionals commonly refer this to as expertise. Developing, demonstrating, and maintaining expertise has many facets (see Ericsson, 2006b; Feltovich et .al, 2006; Horn & Masunaga, 2006; Zimmerman, 2006), which goes far beyond notions of specialization. Rather, development of expertise requires a multiple set of skills in more areas other than subject matter specialty (Bereiter & Scardamalia, 1993; Welker, 1991). This integrated potential is essential to ISD practice. The emphasis on individualized and isolated studies of intelligence and competency measurements has dominated the research literature but few studies considered the combined effect these cognitive components can have on human development and performance. A first step to establishing a valid and reliable IPA method requires developing and validating the ISD Performance Inventory. The method outlined in Chapter 3 seeks to establish a solid foundation for further research to produce a reliable and valid IPA method. A person's perception of his or her own performance versus objectively assessed performance compared to demonstrated performance is not always in alignment. According to Schön (1983):

> Every competent practitioner can recognize phenomena – families of symptoms associated with a particular…[issue, problem, or situation] – for which he cannot give a reasonably accurate or complete description. In his day-to-day practice he makes innumerable judgments of quality for which he cannot state adequate criteria, and he displays skills for which he cannot state the rules and procedures. Even when he makes conscious use of research-based theories and techniques, he

> is dependent on tacit recognitions, judgments, and skillful performances. (pp. 49-50)

As previously noted in Chapter 1, what someone thinks he or she is capable of doing, how others know that he or she is capable, and how that capability may be demonstrated is not always in alignment. These notions can place challenges on performance assessments because most people treat expertise "as something intrinsic to the individual…[however] expertise is an extrinsic judgment assessed on an observable performance that depends on an intrinsic competence." (Connell et al., 2003, p. 152). Psychometric approaches to studying expertise must take into account inter-individual and intra-individual differences (Ackerman & Beier, 2006; Chi, 2006). To overcome these challenges, "a combination of assessment instruments [both objective measurements and subjective judgments] to achieve fair and defensible practice performance assessment results [is attainable]" (Schuwirth et al., 2002, p. 926). Reynolds et al. (2006) suggested, "important decisions should not be based on the results of a single test or other assessment procedures" (p. 11). Rather several tools such as résumés, tests, observations, or portfolios can be used to improve individual assessments. A comprehensive measurement methodology that looks at the skill capabilities of LT professionals from a quantitative and qualitative perspective provides a way to identify their skill integration or skill imbalance from more than one perspective. Thus making the method more defensible and reliable and enabling the researcher to see a fuller picture of skill capabilities (Schuwirth et al., 2002).

Skill Capabilities: MI Constructs and ISD Competencies

Past research studies in psychometric theory and skill measurements provided a strong foundation for developing the MIISD construct map and ISA scale. For example, a cognitive relationship between intelligence and competence educed through normal brain operations is inherent in human cognition and tied together through manifestations of appropriate behaviors and observations of desired outcomes produced by those behaviors. Connell et al. (2003) suggested:

> A key implication of this theoretical framework is that it reveals one possibility for identifying two [complimentary but mutually exclusive] sources of individual variation in human abilities. First, there is individual variation…[because of] variation in raw intelligences…. The more tightly this source of variation is tied to vertical faculties, the more spontaneous and "innate" it will appear to be early in development, and the more we would expect it to be a…[cause] in domains requiring competencies in which vertical faculties (including pure intelligences) play a central role (for example, theoretical mathematics, musical analysis). Second, there is a different kind of variation…[because of] the capacity for coordinating different vertical faculties into more integrated processing mechanisms. For example, developing models for economic forecasting requires mathematical intelligence, but integrated with an intuition for human psychology and behavior rather than in pure form. We propose that the vertical variation in mathematical intelligence that produces a great theoretical mathematician (for instance) is different from the horizontal (integrative) variation that produces a great economic adviser. (pp. 142-143)

The complexities of these operations can be hard to decipher and have eluded even the best psychometric theorist. Even with this challenge, scientific evidence has shown the possibility that intelligence and competency is measurable. The method or approach employed that is of utmost importance in psychometric measurements. According to Gardner (1999) "certain…[multiple] intelligences can be measured quickly and easily but many others cannot" (p. 136). Not all knowledge required to execute a task or perform a function resides in the mind of the individual performer; rather knowledge gets distributed (Gardner, 1993). Distribution of knowledge is what makes performance assessments more complex and daunting. Gardner (1999) explained it in this way:

> Human cognitive competence [is] an emergent capacity, one likely to be manifested at the interaction of three different constituents: the "individual," with his or her skills knowledge, and…[abilities]; the structure of a "domain of knowledge," within which these skills can be aroused; and a set of institutions and roles – a surrounding "field" – which judges when a particular performance is acceptable and when it fails to meet specification. (p. 173)

Proctor and Dutta (1995) also suggested that methods for measuring skills are distributed and are classified as performance measures, verbal protocol analysis, psycho-physiological and neurological methods, and modeling techniques. Each offers another perspective from which to measure an individual's skill capabilities. Performance measures are used to determine an individual's speed and accuracy on task performance. Verbal protocol analysis, a method used in previous qualitative studies of ISD practice, consists of verbal reports made by the subject during task completion (Perez & Emery, 1995). Psycho-physiological and neurological measures are electrical and magnetic manifestations recorded at the person's scalp and are time locked to an external stimulus event. In modeling, a modeler models the behavior using either a production system methodology or a connectionist methodology (Proctor & Dutta, 1995). Regardless of method used, the connection between three levels of performance measurement: perceived, assessed, and demonstrated performance that clearly describes a person's skill capabilities.

Performance Measurement Levels

A closer examination of the LT professional helps to place the theoretical components of the IPA model in context. The LT professional then becomes the unit of analysis. The first two components of the system – MI constructs (linking components) and ISD competencies (enabling components) are the skill capabilities that are inherent in LT professionals. Systems thinking, the process used to fuse MI constructs and ISD competencies (competency-intelligence clusters) together describes a professional's skill capability. This thinking process is central to the entire IPA method. The linking components are internal constructs that provide a direct or indirect link to the enabling components; however, reciprocity between these two components. Cognitive ability is a representation of this dynamic interaction as information is processed. This feedback mechanism is internal and serves as the communication portal by which internal or external inputs such as information, facts, rules, principles, concepts, procedures, processes, cognition, intuition, motivation, cultural perspectives, environmental issues, contextual issues, and technology are educed, introduced, manipulated, stored, and transmitted.

This interactive thinking mechanism is synonymous with Gardner's notion of distributed knowledge. The enabling components (ISD competencies) have a dual function. Internally, they are cognitive constructs poised ready to be used at any given moment. Externally, they are skills, hence competencies that are manifested as behaviors and performance outcomes. Cognitive processes, such as storing, retrieving, and using information are the dynamic, cyclical, and iterative controls used to "solve problems…create products [, or develop projects] that are of value in a culture" (Gardner, 1999, p. 34). A closer look at perceived performance, assessed performance, and demonstrated performance, as a central way to evaluate skill capabilities, provides a comparative means for assessing skill integration and skill imbalance from a quantitative and qualitative perspective.

Perceived performance. Perception is idiosyncratic. It represents assessment level one. Most people use their perception as a basis for making judgments of others. Llinas (2001) stated our "capacity to predict the outcome of future events [that are] critical to successful movement [and] is most likely, the ultimate and most common of all global brain functions" (p. 21). Hawkins (2004) claimed, "perception is pervasive and is the basis for how…[we] understand the world" (p. 91). Perception is the foundation of all intelligent behavior. Without it we would not be able to perform even the simplest of human actions such as eating or going to the bathroom. Hawkins (2004) further noted that "predictions [are] the primary function of the neocortex, and the foundation of intelligence" (p. 89). He also suggested that if we want to understand intelligence, how the brain works, and what creativity is, we need to understand the nature of predictions and how the cortex makes them (Hawkins, 2004). A direct link exists between intelligence and competency and it occurs real-time through normal brain activity, as we learn, understand, and develop our potentials. “What we perceive is a combination of what we sense and of our brains’ memory-derived predictions” (Hawkins, 2004, p. 87).

Moreover, perception serves as the central feedback mechanism through which cognitive processes are routed. It guides all decision-making strategies related to human performance and is employed continually through ruminating techniques, and individual performance assessment methods such as résumés and self-rater surveys. The résumé is one method for measuring a person’s skill capabilities. The résumé serves as an initial invitation to an interview (Rosenberg & Hizer, 2003). The résumé is a level one-perception tool put forth by an individual as he or she artfully writes it to convey detailed examples of his or her work experiences and accomplishments. Moreover, self-rater surveys or self-report measures are a method used by an individual to describe subjective perception of his or her skill capabilities and experiences (Reynolds, Livingston & Wilson, 2006). The self-rater survey can be used to gather objective data from a third-party; however, the individual performing the rating also uses his or her perception to make judgments about the individual they may be rating. The ISD Performance Inventory is a self-rater instrument. The ISD Performance Inventory is the tool that will be used to measure perceived performance as apart of this present study and all future research studies described in the IPA research plan.

Assessed performance. Successful performance hinges on one’s ability to measure, monitor, and regulate their behavior. Traditionally, methods for measuring an individual’s performance have been channeled through performance appraisal techniques, such as 360-degree reviews and self-reporting measures. The 360-degree review measures an individual's performance from multiple perspectives. The individual and others that know him or her conduct the performance evaluation. These assessment tools are inherently problematic because "our ability to use them as selection and appraisal tools [beyond qualitative (perceptual) data]…is limited" (Kravetz, 2004, p. 5). Although these are common methods used to measure performance, they remain highly subjective.

The differences between what a person thinks he or she is capable of doing, how others know that he or she is capable, and how that capability may be demonstrated is central to any discussion about performance assessment. Kravetz (2004) claimed, "when the focus is on doing we are better able to observe and measure the behavior" (p. 24). To overcome the subjective limitation of self-reporting measures and 360-degree reviews, a better and more objective performance assessment method is attainable through criterion-referenced testing. A criterion-referenced test measures what a person knows or can do compared to what he or she must be able to know or do in order to perform a job or task successfully (Reynolds et al., 2006; Swezey, 1981). Criterion-referenced tests are designed to measure a person's skill capabilities against known performance standards. For this present study, the known performance standards include the 2000 IBSTPI and 2003 NWCET standards.

In 1990, Stepp conducted research to validate a testing instrument to discriminate between masters and non-masters of instructional design using the IBSTPI standards as a framework. Stepp's final instrument consisted of 50 test items for the original item bank in paper and pencil test format. Content review for validity was conducted with two subject matter experts and the final item bank consisted of 35 items. This instrument was administered to 257 participants. Eighty-three participated in item analysis and the remaining 184 participated in instrument validation, which resulted in a Pearson point-biserial coefficient of .695 for validity and a Cronbach alpha of .746 for reliability (Stepp, 1990). Discriminate analysis of the instrument showed that all but 4 questions were successful discriminating between masters and non-masters. Omission of these four questions increased the phi coefficient to .758 and the Cronbach alpha coefficient increased to .762 (Stepp, 1990).

Several conclusions and recommendations were made to further this research effort and improve upon the approach. First, comments made by many masters during the study, suggested that Stepp's instrument should be used more as a research tool rather than a certification tool. Although Stepp used a norm-referenced approach in his overall design, it was limited by his extrapolation and omission of certain competencies that represent higher ordered thinking, interaction, and complexity. The decision was made to focus on developing a norm-referenced instrument, which would not require all competencies to distinguish between masters and non-masters. This was due, in part, to Song's belief that certain competencies were immeasurable (Reynolds et al., 2006; Schwurith et al., 2005; Stepp, 1990). Performance assessment methods, such as direct observations and portfolios are alternative means that can be used to ascertain higher levels of skill capability. Reynolds et al. (2006) posited, "performance assessments require test takers to complete a process or produce a product in a context that closely resembles real-life situations" (p. 239). Second, further research is required to reinvigorate and expand upon the efforts made by Stepp in his study. An extended research study could 1) focus on replicating Stepp's study, 2) focus on a criterion-referenced approach to look at the entire set of IBSTPI and NWCET standards, and 3) broaden the scope of subject groups used for the study.

The MIISD construct map and ISA scale study, as discussed in Chapter 1, offers an alternative method and first attempt to extend this past research beyond its current limitations. Although a valid test method can be devised to obtain an objective measure of skill capabilities, a need still exists to overcome the limitations of this assessment method by using "a formal [qualitative] assessment method in which a…[person's] skills in carrying out an activity and producing a product is observed and judged" (Joint Committee on Standards for Educational Evaluation, 2003, p. 230).

Demonstrated Performance. Earlier in this chapter, the changes in ISD theory and practice were discussed. Previous ISD studies focused heavily on qualitative efforts to define and describe the differences between novice and expert practitioners (see Atchinson, 1996; Rowland, 1992; Tessmer & Wedman, 1995; Wedman & Tessmer, 1993; Winer & Vazquez-Abad, 199). These studies used various qualitative techniques to examine novice and expert practices such as, verbal protocols, interviews, direct observations, and video and audio recordings. Moreover, there have been a few quantitative studies to identify and describe competency standards for IDs (see NWCET, 2003; Richey et al., 2001; Song, 1998). These studies employed the survey method to better understand IDs practice. While there have been several qualitative and quantitative studies undertaken to understand the differences between novice and expert practice, none have sought to combine the strengths of each approach to investigate expertise. "The major advantage of [any] measurement is in taking the guesswork out of scientific observation" (Nunnally & Bernstein, 1994, p. 6).

To conduct a performance assessment one must consider several reasons. First, assessments should be designed to reflect real-life settings and applications (Hintze, 2005; Reynolds et al., 2006). Second, some types of assessments can overcome limitations in traditional paper-and-pencil tests. Third, assessments allow researchers to observe performance behaviors real-time. True objectivity is impossible to attain with a single measurement technique for several reasons. These include subjectivity, bias, and measurement error. However, objectivity is strengthened through triangulation and use of multiple assessment techniques to improve reliability and validity. Triangulation "builds on the strengths of both quantitative and qualitative data…[and helps] to provide a complete picture of a research problem" (Creswell, 2002, p. 568). In fact, it serves to provide a broader profile of an individual's skill capabilities.

The entire IPA research plan will use both quantitative and qualitative methods to assess and examine the skill capabilities of LT professionals to identify the differences between professionals and understand their strengths and weaknesses to assist with selection, placement, career planning and professional development. Finally, the ISD Performance Inventory study will serve as a first step toward accomplishing the full IPA research plan.

Conclusion

The IPA model serves as an integrated measurement method to measure an LT professional's skill capabilities on three different levels: perceived, assessed, and demonstrated performance. This model can assist individuals, employers, and educational organizations with selection, placement, career planning, and professional development in an incessantly changing profession. Theoretically, this model is central to the entire assessment methodology. Development and validation ISD Performance Inventory was the first step toward validating the IPA method. A detailed discussion of the research methodology for study one will be presented in Chapter 3.

Summary

As stated previously, change through evolutionary progress is evident in the instructional technology field. Incessant economic shifts; globalization of business; modifications in ISD processes, methods, tools; and technological change are affecting instructional technology practice in education, business, industry, and government. It has become increasingly obvious that technology, among other causes, is the key driver of change. Practitioners in every area of the field are faced with the daunting task of maintaining a versatile skill set. Even more important is the continual fluctuations in the industry, and the process of adapting to new software tools and practices at the speed of change seems insurmountable. Nonetheless, updating and expanding one's skill set to include new competencies at an accelerated pace is a new reality for LT professionals. As a result, any performance assessment method must be flexible enough to help LT professionals cope under these fluctuating conditions by allowing them to regulate, maintain, augment, and keep up with changing trends.

Given these perplexing challenges, the IPA offers a refreshing approach to professional development. This approach is the IPA model, which can be realized by continuing the entire IPA research plan. Theory and practice governs this model. The theoretical and practical components consist of ISD competencies, MI constructs, systems thinking, and cognitive abilities. A dichotomous relationship exists between each component in that each component serves as systemic elements at the macro and microlevels. For example, each component represents a unique operation that is an inherent construct in an individual at the macro-level. Yet, at the same time, an individual can regulate the use of each component through information processing and holistic template matching at the micro-level. According to Dreyfus and Dreyfus (1986):

> The manipulation of unambiguously defined context-free elements by precise rules is called 'information processing'. If…[a person] recognize[s] a letter E because it has certain horizontal and vertical lines in a certain relationship, …he or she…[has] done so by information processing. If you recognize it because it matches what you have seen before and learned [what an] E is, you have used holistic template matching, not information processing. (p. 21)

This dichotomy serves as the essence of feedback in the human system. In fact, feedback is a way to monitor, regulate, augment, and maintain optimal performance under varying environmental conditions, internally and externally. Internally, the individual maintains, regulates, and controls feedback. Externally, assessment measurements maintain, regulate and control feedback.

CHAPTER 3: METHOD

When LT professionals do not ensure that their competencies and skills are in alignment with the fluctuating demands and challenges of the workplace, a serious and ineffective performance problem arises. This critical problem can be ameliorated by clearly establishing a valid and reliable performance assessment methodology to identify a professional's strengths and weaknesses on core industry defined competency standards. The purpose of any personnel selection process is to provide a valid, reliable, and objective means to assess, predict, and test a person's skill capabilities. When making educational or employment-related decisions, the information obtained from reliable and valid performance measurements are used to "hire, train, place, certify, compensate, promote, terminate, transfer, or take other actions that affect [a person's educational and] employment status" (Society for Industrial and Organizational Psychology, 2003, p. 2). Procedures created to gauge a person's knowledge, skills, or abilities must adhere to validation principles. The purpose of this quantitative study was to measure and examine the professional competencies of LT professionals (specifically IDs and IDv professionals). The details of the research design approach, appropriateness of the design, four-step scale validation process, ethical implications for conducting the study, and data collection methods provide necessary explanations of the research study method.

Research Design

Chapter 2 discussed the theoretical underpinnings of the entire IPA research plan. Chapter 1 discussed and defined the four studies represented in the larger IPA research plan (see Figure 1). The first of these four studies was the ISD Performance Inventory study (the focus of this dissertation study); followed by the MIISD construct map study, the ISA scale study, and finally the IPA study. The ISD Performance Inventory study is an initial and important step toward fulfilling the ultimate goal of the larger IPA research plan. This dissertation study specifically sought to answer the research question: What are the reliable competencies for assessing the preparation and performance of LT professionals? A valid and reliable method for scoring LT professionals on ISD competencies will provide a foundation for continuing the IPA research plan and serve as an empirical basis for studies two, three, and four. As noted in chapter 2, there were few quantitative studies conducted to establish the validity and reliability of ISD competency standards as a basis for measuring professional competency in instructional technology and related fields (see Atchison, 1990; NWCET, 2003; Richey et al., 2001; Song, 1998).

The ISD Performance Inventory study will move beyond these studies to 1) establish a framework for scoring LT professionals across all instructional technology domains and related disciplines on known competency standards, 2) classify and explicate ISD competencies to reflect stages of growth and development using Bloom's taxonomy and the Dreyfus model, and 3) expand the validity and reliability of ISD competency standards through quantitative analysis. IBSTPI and NWCET sought to validate similar but discrete competency standards for LT professionals. IBSTPI developed and validated a set of 23 competencies across four separate knowledge domains (Richey et al., 2001). NWCET developed and validated a set of 18 competencies across three career clusters (NWCET, 2003). This dissertation study sought to establish a valid measurement instrument based on the combined set of IBSTPI and NWCET standards. The domains, competencies, and performance statements identified and refined in previous studies (see Atchison, 1990; NWCET, 2003; Richey et al., 2001; Song, 1998) served as a content validity matrix to create the initial item pool. Bloom's taxonomy and the Dreyfus model were used as the rating scale for each item. The rating scale was constructed in such a way to allow categorization of items based on Bloom's taxonomy and the Dreyfus model. The action verb lexicon that resulted from Ven and Chuang's (2005) study served as the Skill Level Classification Rubric used to rate items in the initial item pool for the inventory. Finally, development of the final inventory depended on establishing the validity and reliability of the instrument through quantitative analysis. To accomplish the goals of this dissertation study a four-step scale development and validation process was used. This methodology was proven to be a reliable approach for developing and validating measurements (DeVellis, 2003; Netemeyer et al., 2003; Viswanathan, 2005).

Appropriateness of the Design

As noted in chapter 2, "a combination of assessment instruments [, objective measurements and subjective judgments,] to achieve fair and defensible practice performance assessment results" (Schuwirth et al., 2002, p. 926) is necessary to develop and validate the IPA method. Reynolds et al. (2006) claimed, "important [hiring and performance] decisions should not be made based on the results of a single test or other assessment procedures" (p. 11). Rather a blend of methods should be used such as résumés, tests, skill inventories, performance assessments, and portfolios. A holistic measurement method that looks at the skill capabilities of LT professionals from a quantitative and qualitative perspective provides a way to identify their level of skill integration or skill imbalance. Thus making the method more defensible and reliable (Schuwirth et al., 2002).

Instrument validation is the only way to obtain valid and reliable scores for LT professionals on known ISD competencies as defined by the IBSTPI and NWCET standards. The ISD Performance Inventory served as a group of scales for measuring ISD competencies. According to Netemeyer et al. (2003, p. 2), “the indirect assessment of these [variables and] constructs is accomplished via self-report/paper-and-pencil, [or online survey] measures.” DeVellis (2003) claimed “we develop scales when we want to measure phenomena that we believe to exist because of our theoretical understanding of the world, but that we cannot assess directly” (p. 9). A four-step method was essential to develop and validate the ISD Performance Inventory, control reliability and validity, and reduce measurement error. Measurements are the sum of a true score and error. Random and systemic errors represent two types of measurement error. Random error is chance error and happens as a result of inconsistent non-repeatable effects (Viswanathan, 2005). Two types of random error exist: idiosyncratic and generic. Systematic error, on the other hand, is any error that is repeatable, consistent, and inaccurate (Viswanathan, 2005). Two types of systematic errors also exist: additive and correlative. Five measurement techniques were employed to control for random and systematic error. These included: domain delineation and item generation, internal consistency reliability (item-to-total correlations and coefficient alpha), test-retest reliability (test-retest correlations), exploratory factor analysis (factor loadings and extractions), and validity tests (construct, criterion, and predictive). A detailed discussion of each process step and the measurement techniques used to establish validity and reliability are essential to data analysis.

The intent of this first study was to establish a valid measurement method that organizations and practicing professionals could use for selection, placement, career planning, and professional development. A research website devoted to furthering the larger IPA research plan provided a place to conduct the study. The website will also serve as an online community where professionals can obtain resources, tools, and training to guide professional development. The ultimate goal will be to establish a valid and reliable measure for assessing the skill capabilities of LT professionals that is usable in the field.

Step 1: Construct Delineation

A first step in the scale development procedure is to identify the specific constructs, dimensions, and factors for the inventory. This is known as domain delineation (DeVellis, 2003; Netemeyer et al., 2003; Viswanathan, 2005). Domain delineation is the single most important step in the entire measurement development method because "the goal of domain delineation is to explicate the construct to the point where a measure can be designed and items can be generated" (Viswanathan, 2005, p. 11). Netemeyer et al. (2003) suggested good measures of a construct depend on first understanding the construct's dimensionality. To determine whether underlying factors of a construct are unidimensional or multidimensional requires construct dimensionality. A unidimensional construct is one in which individual items relate to a single factor and a multidimensional construct has items that tap more than one factor (DeVellis, 2003; Netemeyer et al., 2003; Nunnally & Bernstein, 1994; Viswanathan, 2005).

Higher Order Factors

This dissertation study investigated seven higher order factors, also referred to as knowledge domains. These are the broad skill categories taken from the IBSTPI and NWCET standards (see Tables A15, A16, A17, A18, A19, A20, and A21). The IBSTPI standards contained four domains, 23 competencies, and 121 performance statements. The NWCET standards consist of three domains, 18 competencies, and 121 performance statements. The combined set of competency standards included seven domains, 41 competencies, and 242 performance statements (NWCET, 2003; Richey et al., 2001). The seven domains (higher ordered factors) identified by the standards are professional foundations, planning and analysis, design and development, implementation and management, digital media, technical writing, and web development and administration.

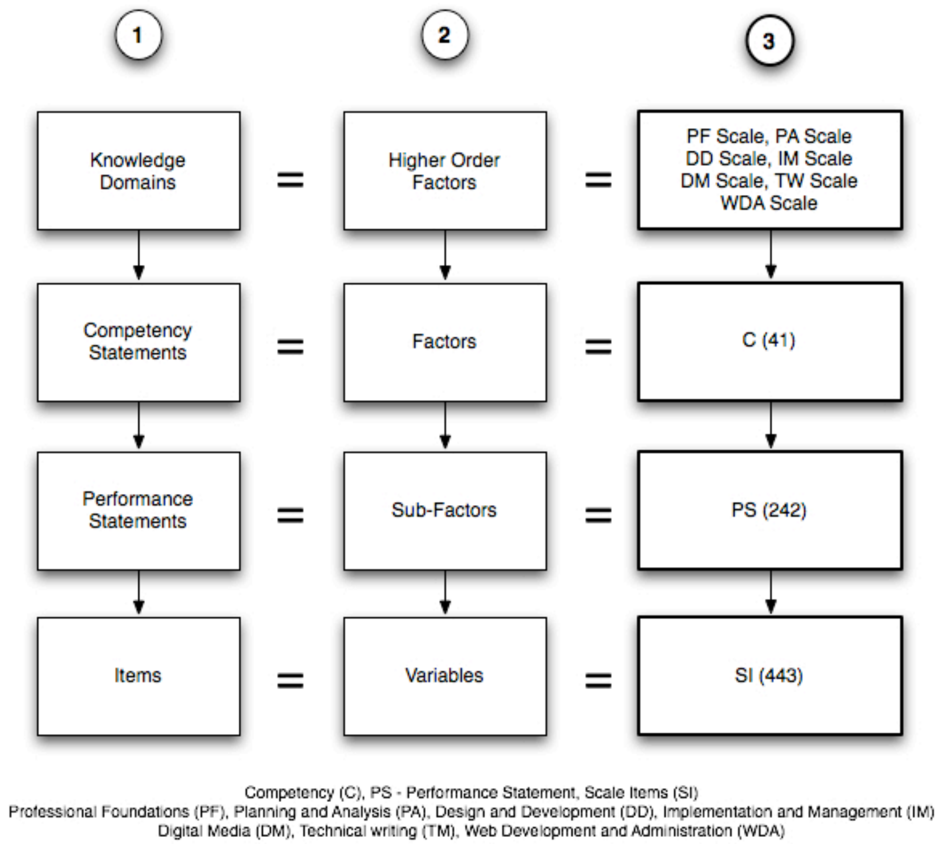


Figure 6. Factor item structure illustrating relationships between theoretical constructs, inventory scales, and scale items.

Factors

There were 41 competency statements in the entire combined set of ISD competencies. These competency statements served as the underling factors to which groups of performance statements associate. Groups of competencies form higher ordered factors. Factor analysis was an effective method for extracting and analyzing items to establish factor loadings between variables. "Factor analysis assumes that the observed variables are linear combinations of some…[unknown] source variables" (Kim & Mueller, 1978, p. 8). Another reason to establish construct dimensionality first is to mitigate confounding the relationships between variables. Exploratory factor analysis was used to explicate the variance between variables (Kim & Mueller, 1978; Kline, 1994; Thompson, 2004).

Sub-Factors

There were approximately three to ten performance statements for each competency statement in the combined set of IBSTPI and NWCET standards. Performance statements are observable variables. These observed variables are involved in the creation of one or more factors (Kim & Mueller, 1978; Kline, 1994; Thompson, 2004). Performance statements were used to develop the initial item pool in alignment with each competency statement.

Variables

There were approximately 443 scale items written from performance statements. Scale items represented quantifiable variables. These variables create one or more sub-factors (Kim & Mueller, 1978; Kline, 1994; Thompson, 2004). The scale items developed for the initial item pool were written to align with each performance statement.

Control Variables

There were six control variables. These included gender, education, experience, job role, industry, and geographic location. A control variable is a "factor controlled by the experimenter to cancel out or neutralize any effects they might otherwise have on observed phenomena" (Tuckman, 1999, p. 100). These control variables were used to describe the global characteristics of the audience as it relates to the research question.

Step 2: Item Generation

The next logical step in scale development requires generating an initial item pool. Items for each factor, in this case each performance statement taken from the IBSTPI and NWCET standards, were written to create the initial item pool. Item creation is domain sampling. Domain sampling entails writing scale items that tap the universe of items for a specific construct and exhibit face validity and content validity (DeVellis, 2003; Netemeyer et al., 2003).

Item Pool

The current set of competency statements was replete with compounded performance statements. Each performance statement was refined to clearly define one unitary behavioral objective. This was necessary to create a valid and reliable measure. "It is…impossible to develop a reliable and valid set of test items which directly match objectives unless the objectives themselves are unitary" (Swezey, 1981, p. 32). An analysis of performance objectives determined if each described a single performance task (Swezey, 1981). Another factor considered was to ascertain whether the behavior described in the performance statement was overt (observable) or covert (non-observable). "If a statement does not include a visible performance, it isn't yet an objective" (Mager, 1997, p. 52). An overt objective is one in which the action or performance is visible or audible; a covert objective is one in which the action or performance is invisible (not seen directly) or inaudible (Mager, 1997). To convert each covert performance statement into an overt one, behavioral performance indicators were added to the performance statement during item creation. Mager (1997) suggested that "if the performance happens to be covert, add an indicator behavior through which the main intent can be detected" (p. 107). The IBSTPI and NWCET standards, defined one unique competency statement for one or more performance statements. Each competency statement represented a unique factor or construct, which consisted of multiple performance statements. A group of performance statements associated with a competency statement was considered an observable measure of that competency (see Tables A15, A16, A17, A18, A19, A20, and A21).

Response Format

Five skill levels as described by the Dreyfus model were combined with six Bloom's taxonomy levels to form the skill level ratings (see Table 1). These include: novice, advanced beginner, competent, proficient, and expert (Dreyfus & Dreyfus, 1986). These skill levels correspond to the five-point Likert scale format used in the ISD Performance Inventory.

Table 1

Skill Level Ratings

Rating	Bloom's Levels	Dreyfus's Levels	Perceived Levels
1	Knowledge	Novice	Absolutely need
2	Comprehension	Advanced Beginner	Strongly need

3	Application	Competent	Definitely need
4	Analysis	Proficient	Somewhat need
5	Synthesis Evaluation	Expert	No need

Perceived levels in the inventory included: 1 = absolutely need professional development, 2 = strongly need professional development, 3 = definitely need professional development, 4 = somewhat need professional development, and 5 = no need for professional development. These five ratings represent each level in the Dreyfus model and include: 1 = novice, 2 = advanced beginner, 3 = competent, 4 = proficient, and 5 = expert. These five ratings are an indication of a person's perceived skill capability on individual performance statements, which also describe a person's perceived skill level in core industry defined standards. According to Dreyfus and Dreyfus (1986):

> As human beings acquire skill through instruction or experience, they do not appear to leap suddenly from rule-guided 'knowing-that' to experienced-based knowing-how. A careful study of skill acquisition process shows that a person usually passes through at least five stages of qualitatively different perceptions of his or her task or mode of decision making as his or her skill improves. (p. 19)

Detailed descriptions of each skill level are as follows:

Novice. A skill level in which the person has had little to no experience in a given domain, area, or job; and performance focuses on rules, facts, concepts, or procedural steps that are context-free (Benner, 2001; Dreyfus, 1986).

Advanced beginner. A skill level in which the person has had marginal experience in a given domain, area, or job (typically less than 2 years); and performance focuses on his or her ability to cope with new situations in a real-world context, but continues to rely on rules, facts, concepts, or procedural steps (Benner, 2001; Dreyfus, 1986).

Competent. A skill level in which the person has had considerable time in a given domain, area, or job (typically 2 to 3 years); and performance focuses on his or her ability to contemplate future problems, consciously analyze complex problems, and prioritize and set short and long range plans or goals (Benner, 2001; Dreyfus, 1986).

Proficient. A skill level in which the person has had significant experience in a given domain, area, or job (typically 3 to 5 years); and performance focuses on his or her ability to adapt to new and emerging situations, reflect on previous experiences and maxims to guide the decision making process, and be more responsive and adaptive to emerging phenomena while generating alternative solutions real-time (Benner, 2001; Dreyfus, 1986).

Expert. A skill level in which the person has had extensive experiences in a given domain, area, or job (typically 6 or more years); and performance focuses on using his or her deep understanding and intuitive grasp of each new or similar problem and zeros in on the accurate region of a problem without wasteful consideration of too many alternative diagnoses and solutions (Benner, 2001; Dreyfus, 1986).

Expert Review

Scale items for the initial item pool were written based on each performance statement in the combined ISD competency standards (see NWCET, 2003; Richey et al., 2001). First, modifications to current performance statements were made to clarify the intent of a statement. This was necessary to ensure that scale items were written to measure a single behavior. Since a scale item represented each performance statement taken from the IBSTPI and NWCET standards it was also necessary to make revisions to each compounded statement and to separate out individual behaviors to ensure that each statement was unitary. The initial item pool was then developed based on each performance statement. An expert panel of five LT professionals judged scale items to ensure face validity and content validity. Then, a Skill Level Classifications Evaluation rubric was distributed and pilot tested to ensure interrater reliability and skill level validity while judging the clarity of items related to content, relevancy, and accuracy. Correlations established between each rater helped to refine the evaluation rubric. The final evaluation rubric was then used to rate each scale item during validation testing. Netmeyer et al. (2003) suggested “five judges or more [be selected] to rate each item in terms of suitability, specificity, and clarity, and then retain items that exhibit high levels of inter-judge agreement” (p. 103). Scale items had to be omitted or refined, then re-evaluated until agreement between judges attained. This iterative process helped to ensure that the original composition and intent of the IBSTPI and NWCET standards remained intact.

Step 3: Pilot Study

A pilot study to test the item pool was conducted using a small sample from the targeted population. This step helped to test the reliability and validity of the scale items, revise the initial item pool, identify the underlying dimensions in the inventory, and establish a baseline. Sample size, sample composition, item reliability, and item validity are critical to pilot testing the initial item pool (DeVellis 2003; Netmeyer et al., 2003).

Sample Composition

The larger population from which the sample was drawn included all persons in the instructional technology field who demonstrated ISD competencies on the job regardless of their job role or training (Richey et al., 2001). A population is a group of individuals to whom the researcher wants to generalize the results of a study (Creswell, 2002; Salkind, 2003; Tuckman, 1999). Selection of the sample requires establishing boundary conditions to specify who will and will not be included in the study (Tuckman, 1999). For this dissertation study, the target population consisted of approximately 1100 LT professionals working for a large semiconductor manufacturing company with geographical locations in North and South America, Middle East, Asia, and Europe. This included all IDv and IDs professionals performing one or more of the following job roles: training specialist, instructional designer, senior instructional designer, instructional developer, senior instructional developer, training developer, senior training developer, multimedia developer, eLearning developer, or any role required to perform specific ISD tasks.

Sample Size

A significant sample size ensures validity, reliability, and generalization of results to the larger LT population. To ensure an appropriate sample size, it was essential to look at the number of scale items and number of scales in the initial item pool (DeVellis, 2003; Netmeyer et al., 2003). In scale development, sample size is difficult to estimate. Therefore, sample size estimation is the most feasible approach. DeVellis (2003) suggested, "if only a single scale is to be extracted from a pool of 20 items, fewer than 300 subjects might suffice" (p. 88). Clark and Watson (1995) suggested that a sample of

100 to 200 is sufficient. While Netmeyer et al. (2003) suggested that samples of 100 to 200 are sufficient only if the scale has 20 or fewer items. However, this approach alone has limitations. Several other options to consider include, measurement purpose, number of composited scale items developed and common factors used, and the relationship of scale items to common factors measured. Recent research has suggested a number of important characteristics to consider. Fabrigar. Wegener, MacMallum and Strahan, (1999) suggested:

> The primary limitation in such a guideline is that adequate sample size is not [solely] a function of the number of measured variables…but is instead influenced by the extent to which factors are over determined and the level of commonalities of measured variables….[In fact,]…when each common factor is over determined and the commonalities are high (i.e. an average of .70 or higher), accurate estimates of population parameters can be obtained with samples as small as 100….It is worth noting that obtaining parameter estimates that closely approximate population values is only one criterion a researcher might consider when determining sample size." (p. 274).

As a result, it was necessary to distinguish between a scale and an index to select an adequate sample size. A scale consists of effect indicators. According to Loehlin (1998) and Bollen (1989) effect indicators are variables that are caused by an underlying factor or construct. These effect variables are the ISD competencies, which are factors. An index, on the other hand, is a set of items that are cause indicators, and these determine the construct level or factor (DeVellis, 2003).

> This means that items are not the result of any one thing, but …[each may] determine the same outcome. A more general term for a collection of items that one might aggregate into a composite score…[this] includes collections of entities that share a certain characteristic and can be grouped under a common category heading. (DeVellis, 2003, p. 10)

In the ISD Performance Inventory, groups of scale items formed sub-factors and those sub-factors (performance statements) formed the factors (ISD competencies), which represent individual scales in the inventory. Each of the seven higher order factors, as defined by the IBSTPI and NWCET standards, represents a unique scale. An individual's score on each scale in the inventory contributes to a composite score for the entire inventory on each of the sub-factors, factors, and higher order factors. This means that each group of competencies (PF, PA, DD, IM, TW, DM, and WDA) represents a separate scale. Each scale provides access to data for generating a composite score. An aggregate score on each scale makes the ISD Performance Inventory an index. This format and structure makes the final inventory more amenable to continuing the planned IPA research plan, as a part of studies two, three, and four (see Figure 1).

A split sample was useful for conducting the pilot study (DeVellis, 2003; Netmeyer et al., 2003). This is known as multi-stage cluster sampling. Creswell (2002) noted that this sampling technique is helpful when the population cannot easily be identified or is too large. It was possible to obtain a complete list of clustered groups from the target population. Three multi-stage clustered samples consisted of a sample of 30 participants targeted for pilot study, a sample of 100-150 participants targeted for validation studies A and B, and a sample of 75 participants targeted for validation study

C. The first independent sample helped to pilot test the initial ISD Performance Inventory with the goal of trimming and revising the initial item pool. The second independent sample helped to confirm the final set of items to establish validity and test-retest reliability. The third independent sample helped to establish cut-off scores for criterion and predictive validity.

Item Analysis and Evaluation

The next logical step after collecting data from the samples was to analyze the results for reliability and validity of all items. This included, assessing for internal consistency, means, variances, average inter-item correlations, and factor structure (DeVellis, 2003; Netmeyer et al., 2003; Viswanathan, 2005).

Exploratory factor analysis. The combined ISD competency standards consisted of seven domains, 41 competency statements, and 242 performance statements. These translated into seven higher ordered factors, 41 factors, and 242 sub-factors. These factors and sub-factors served as the model for writing scale items in step 2. The scale items generated in step 2 made up the ISD Performance Inventory. Path diagrams of factor-item relationships for each domain, factor, sub-factor, and variable are shown in Figures B12, B13, B14, B15, B16, B17, and B18.

The competencies were latent constructs that represented factors in this dissertation study. These indicators were conceptual. Performance statements were sub-factors. These were operational indicators and one or more of these sub-factors loaded on associated factors. Scale items were variables. These were observable (measurement) indicators that load on one or more sub-factors. To determine the relationship between latent constructs at the conceptual level factor analysis allowed for the examination of covariation between observable variables (DeVellis, 2003; Kim & Mueller, 1978; Netmeyer et al., 2003; Thomas, 2004). The relationship between conceptual indicators, operational indicators, and observable indicators may confound constructs. This is because “measures that aim to assess a specific construct may indeed assess a related construct [or have multiple dimensions]” (Viswanathan, 2005, p. 10).

Exploratory factor analysis helped to determine the factor structure of the ISD Performance inventory. The factor structure produced from the IBSTPI and NWCET standards was conceptual and supported primarily from content validity and face validity studies. Since no statistical data existed to support the model, exploratory factor analysis served as the primary technique to help establish initial factor loadings and set a baseline for confirmatory factor analysis and more advanced structural equation modeling as a part of future planned research studies. Exploratory factor analysis also helped to revise and trim the initial item pool and assess the dimensionality of constructs through factor extractions (DeVellis, 2003; Netemeyer et al., 2003; Nunnally & Bernstein, 1994; Pett, Lackey, & Sullivan, 2003; Viswanathan, 2005). Specifically, execution of the maximum likelihood technique allowed for the calculation and identification of factor loadings and weights of specific variables in relationship to each factor. This was necessary to attenuate correlations among variables and to parse variables into common factor sets (Fabrigar et al., 1999).

Reliability. Reliability is the degree to which items consistently yield the same or comparable results (DeVellis, 2003; Netmeyer et al., 2003; Richey et al., 2001; Shrock & Coscarelli, 2000; Viswanathan, 2005). Reliability measures consisted of: internal consistency and test-retest. Internal consistency assessed if items covaried and test-retest reliability determined whether there was stability of item measurements over time between samples (DeVellis, 2003; Netmeyer et al., 2003; Viswanathan, 2005). Coefficient alpha helped to assess internal consistency between items. An examination of inter-correlations among scale items, between scale items, and the total score determined coefficient alpha. According to Viswananthan (2005), "items that are internally consistent [sh]ould have [a] high correlation with the total score" (p. 24). Scale item means and variances are other statistics used to examine and double check internal consistency. "Items with means too near to an extreme of the response range will have low variances, and those that vary over a narrow range will correlate poorly with other items" (DeVellis, 2003, p. 94). Following factor analysis and reliability assessment techniques, trimming of the inventory occurred. Scale items were deleted to achieve higher coefficient alphas to maximize internal consistency of the inventory (Viswanthan, 2005). The goal of internal consistency procedures is to maximize coefficient alpha, or the proportion of variance attributable to common sources (Cronbach, 1951; DeVellis, 2003).

Validity. Reliability is a necessary but insufficient measure of validity (DeVellis, 2003; Nitko, 2004; Reynolds et al., 2006; Shrock & Coscarelli, 2000; Viswanathan, 2005). Validity is the degree to which an item measures what it intended or expected to measure (DeVellis, 2003; Netmeyer, 2003; Richey et al., 2001; Shrock & Coscarelli, 2000; Viswanathan, 2005). Validity also determines " [if a]… variable is the underlying cause of item covariation" (DeVellis, 2003, p. 49). Also, face validity and content validity, helped to test and confirm the correlation between items to assess how well each measures what it should measure (DeVellis, 2003; Netmeyer et al., 2003; Viswanathan, 2005). Correlations used to judge construct validity served as measures for criterion-related validity and concurrent validity. The difference between these two measures may be distinguishable by the purpose and intent of each, rather than statistical values (Shrock & Coscarelli, 2000). In this dissertation study, an examination of the correlation between scale items helped to determine how well each scale item measured what it intended to measure (DeVellis, 2003; Netmeyer et al., 2003; Viswanathan, 2005). Concurrent and predictive validity were also important measurements to inspect. Although both are often confused, each served two distinctive purposes. "Concurrent validity means that a test can correctly classify test-takers [by their current]… known competence; [whereas] predictive validity means that a test can accurately predict future competence" (Shrock & Coscarelli, 2000, p. 146).

Instrument Administration

Three separate samples from the population provided a basis for analyzing mean item scores using factor analysis, reliability, and validity testing. The first sample helped initial data collection and revisions for validity and reliability. The second sample also allowed for revisions to be made, clarified item relationships to further quantify factor loadings, confirmed the factor structure, and established test-retest reliability. The third sample established concurrent validity of the inventory. Finally, revisions to scale items provided a basis to mitigate any adverse effect on factor loadings, factor structure, reliability, and predictive nature of the instrument.

Step 4: Validation Studies

This is the concluding and fine-tuning step. Similar to the pilot study, sample size, sample composition, exploratory factor analysis, item reliability, and item validity was critical to validating the inventory. The first step was to finalize scale items by conducting item-to-total and inter-item correlations (DeVellis, 2003; Viswanathan, 2005). To accomplish this it required executing data gathering methods and analysis procedures similar to those employed in step 3. Second, to assess test-retest reliability sample participants retook the ISD Performance Inventory within a 2-week period. Finally, concurrent validity data would help to confirm and validate the integrity of the final inventory as a valid measurement instrument to discriminate between skill level classifications.

Concurrent validity, also referred to as criterion-related validity, has often been confused with predictive validity because the statistical procedures for determining both are the same (Shrock & Coscarelli, 2000). Cut-off scores help to establish concurrent validity. According to Shrock and Coscarelli (2000, p. 186), “there is no simple, cookbook solution to establish the standards for a test, and there is no formula for determining the cut-off score that eliminates the sticky business of human judgment in standard setting procedures.”

However, there are three widely accepted procedural methods useful for accomplishing cut-off scores. These include: informed judgment, Angoff, and contrasting groups’ methods. Effective use of each of these methods depends on four key considerations. These considerations included: analyzing the consequences of misclassification, gathering performance data to see how participants perform on the measurement, soliciting expert judgment of key stakeholders (this can include participants, managers, or coworkers, or some other knowledgeable informant), and establishing cut-off scores (Shrock & Coscarelli, 2000).

A combination of these methods helped to establish criterion validity. The informed judgment method required the use of contrasting groups. Contrasting groups categorize individuals by skill level. The skill levels used to categorize participants included novice, advanced beginner, competent, proficient, and expert. The contrasting groups' method required a unique set of individuals who could be grouped into five separate skill categories based on their perceived skill level. Shrock and Coscarelli (2000) suggested a minimum sample size of 15 for each group. The Angoff method required the use of an expert panel of professionals who had familiar knowledge with the ISD competency standards and could select participants based on their proficiency level to be categorized into contrasting groups. The Angoff method enabled score comparisons between participants and a third party. Participants were asked to identify two people such as a peer or manager or both to rate them on the ISD Performance Inventory. Coded pairs of instruments were created and used so that individual names were left out of the data to ensure anonymity.

Feasibility of Study

This dissertation study consisted of two phases. Phase one focused on instrument development and phase two focused on instrument validation. In phase one, the inventory was developed and tested for content validity, face validity, inter-rater reliability, and skill level validity. In phase two, a small study sample (n=30) was pulled from the population to pilot test the inventory and establish the initial factor loadings and reliability of the inventory. Information obtained from the pilot study helped to refine the instrument. After pilot testing, three validation studies were completed. The first validation study (Part A) helped to confirm the results obtained from the pilot study. This dissertation study used approximately 100-150 participants from the population. The second validation study (Part B) helped to establish test-retest reliability. The third validation study (Part C) helped to establish concurrent validity. The Part C study pulled 75-150 participants from the population.

Each Part C participant needed to select two people such as a colleague, manager, or some other third party who was familiar with his or her skill capabilities to rate him or her on the ISD Performance Inventory. However, steps to mitigate participant self-selection needed to be taken to reduce the possibility of not having participants provide a third-party reviewer. Therefore, other methods would have to be explored to obtain third-party reviewers because those who did not provide a reviewer could represent only a small or unusual condition within the overall population. If this method proved to be insufficient for data analysis, then LT content experts with knowledge of the skill capabilities of potential participants could help by identifying five or more individuals for whom they knew fit into each of the five skill categories. Participants identified by experts could be solicited to participate specifically in Part C.

Nonetheless, these four sub-studies were necessary to ensure the feasibility of the overall research study effort. By dividing the entire research study into smaller individual studies, it was possible to remain flexible to unforeseen occurrences due to scope and variability in participation thus making it easier to manage the research study.

Conducting The Dissertation Study Ethically

In every research study that require human participants, steps to obtain permissions and ensure confidentiality for all parties must be taken, also all benefits for participating must be equally shared with all participants (Creswell, 2002; Salkind, 2003; Tuckman, 1999).

Confidentiality

All data collected were specific to the research study to ensure anonymity and confidentiality. Sensitive data, such as social security number or medical information, were not collected. All data collected, such as names and identities, were disguised for confidentiality. Proper security methods were employed to ensure security of data and an electronic consent form asked participants to voluntarily register to participate in the study (see Appendix D). Formal registration provided immediate consent to participate. Instructions and information about the study, how data were being collected, stored, and communicated was shared with each participant. Every effort was made to ensure that critical and private information would not be disclosed. Participants were informed that data collected would be stored and maintained in a secure location for three years. At the end of three years, all data will be destroyed.

Informed Consent

Permission to conduct the study was obtained from the corporate sponsor prior to starting (see Appendix C). Participation in the study was voluntary (see Appendix D). Information about the research plan, purpose, and instructions for when and how to participant in the study were given before, during, and after the study. This was necessary to increase confidence with participants that all information and data would be properly handled and to reaffirm anonymity, confidentiality, and protection.

Benefits of Participation

As a reward for participating in this research study, every participant who voluntarily participated in and completed the pilot and validation studies could choose to take one of two online training courses designed for this research study in partnership with a training vendor. A thank you notification was sent to each registered participant at the conclusion of the research study informing them about the training. A website link provided notification and the time frame allowed for participation in the training. Research study results were made available to the corporate sponsor and all participants.

Data Collection

An online survey method provided the best means for conducting the study. Advantages and disadvantages to using both online and traditional survey methods, such as design and development, administration, confidentiality and privacy issues exist. The use of web-based surveys for research is subject to the same issues of development and administration as traditional paper-and-pencil methods. However, using web-based surveys does not present any more problems than traditional methods (Andrews, Nonnecke & Preece, 2003). In fact, the advantages of using web-based assessment methods such as surveys or tests outweigh the disadvantages of using the traditional method. For example, web-based surveys are more cost effective and easier to distribute than traditional methods (Andrews et al. 2003; Czaja & Blair, 2005; Granello & Wheaton, 2004). Moreover, online research tools like Qualtrics make it more cost effective and less challenging to develop and administer web-based assessment instruments. To fulfill university requirements an online format made it possible to incorporate iterative test cycles to execute the development and validation process. Also, an online format was representative of the global work environment of the target population, and therefore proved to be the best method to employ for data collection.

Summary

Domain delineation, item generation, pilot testing, and validation was essential to developing the ISD Performance Inventory. By establishing a valid and reliable measure to measure an LT professional's competency on ISD knowledge domains, it will be possible to obtain a proficiency score on core ISD competency standards. This dissertation study served as a first step toward fulfilling the goal of the larger IPA research plan as well as validating a skills inventory that could be used in the field. A four-step scale development process is the most effective and reliable empirical method available to accomplish this immediate task. This process includes construct delineation, item generation, pilot testing, and validation. Phase one of this dissertation study focused on construct delineation and item generation. Construct delineation focused on creating a content validity matrix comprised of the IBSTPI and NWCET standards to establish a sound framework for scale item generation. Scale item generation focused on developing scale items that align to each competency statement and performance statement contained in the content validity matrix. Additionally, the content validity matrix served as an evaluation tool for the expert panel to establish content validity, face validity, inter-rater reliability, and skill level validity of each scale in the full inventory. In phase two, pilot testing and validation testing focused on the full inventory. Pilot testing helped to establish initial factor loadings and reliability coefficients to trim the inventory and set initial validity and reliability scores for each scale item. Validation testing focused on confirming the initial validity and reliability of each scale item, further trimming of the inventory based on each scale items performance, test-retest reliability, and concurrent validity.

To execute this process online, a secure website provided the best medium for conducting pilot and validation studies. This enabled global distribution and marketing of the online surveys for each study, provided a means to solicit and maximize participation, ensured security and confidentiality of collected and stored data. The results from this dissertation study will inform future research to establish and validate a comprehensive measurement method to allow for the assessment of an LT professional's skill capabilities. Organizations and professionals may then use the performance measure to judge and guide important decisions as a part of selection, placement, career planning, and professional development.

CHAPTER 4: RESULTS

The ISD Performance Inventory developed in this dissertation study aided objective assessment of instructional designers and developers working for a large semiconductor company with geographical locations in North and South America, Middle East, Asia, and Europe. The inventory was a self-reporting instrument developed for individual practitioners, employers, and educators to assess the degree of instructional design competency in one or more skill domains. This research effort also served as the first study in a series of studies to validate the IPA research method. The purpose of each study was to determine a person's fit to a specific organization, job role, or career path and to quantify the relationship between perceived, assessed, and demonstrated performance. This chapter contains a detailed explanation of the ISD Performance Inventory study the procedure used to develop and validate the inventory, data collection procedures, analysis of the data, and a discussion of the findings.

ISD Performance Inventory

The initial ISD Performance Inventory consisted of 443 scale items. The inventory contained seven scales, which included: Professional Foundations (PF), Planning and Analysis (PA), Design and Development (DD), Implementation and Management (IM), Digital Media (DM), Technical Writing (TW), and Web Development and Administration (WDA). The IBSTPI and NWCET standards served as the theoretical constructs used for scale development. The first four scales represent IBSTPI standards and include the PF, PA, DD, and IM scales. The last three scales represent NWCET standards and include the DM, TW, and WDA scales. There were two phases in the study. Phase one focused on scale development and included construct delineation and item generation. Phase two focused on scale validation and included pilot testing and final instrumentation.

Scale Development

A content validity matrix (see Tables A15, A16, A17, A18, A19, A20, and A21) made up of the IBSTPI and NWCET competency standards served as a model for writing scale items. Items in the initial inventory were written to measure corresponding performance statement in the competency standards.

Construct Delineation

Knowledge domain categories represented the standards. The IBSTPI standards consisted of four domains (PF, PA, DD, and IM), 23 competencies, and 121 performance statements. Table A15, A16, A17, and A18 show the complete set of IBSTPI competency standards. The NWCET standards consisted of three domains (DM, TW, and WDA), 18 competencies, and 121 performance statements. Table A19, A20, and A21 show the NWCET standards designated to support the instructional technology profession. The entire content validity matrix contained seven domains, 41 competencies, and 242 performance statements. This combined group of competencies and performance statements comprised the full inventory (INV). The seven domains represented higher-ordered factors and included PF, PA, DD, IM, DM, TW, and WDA scales. Each higher-ordered factor contained five to nine competency statements. Each competency statement had two or more performance statements. Figure 6 shows the factor-item structure and illustrates the relationship between higher-ordered factors, factors, sub-factors, and variables; with knowledge domains, competency statements, performance statements, and scale items.

Item Generation

The content validity matrix showed the relationship between higher-ordered factors, factors, and sub-factors. The initial item pool contained scale items written for each performance statement. Knowledge domains represented higher-ordered factors. Competency statements represented factors, performance statements represented sub-factors, and scale items represented variables. The seven scales used in the ISD Performance Inventory represented the unique knowledge domains as defined by the standards and contained approximately five or more competency statements. Each competency statement contained at least two or more performance statements. The entire inventory contained seven higher-order factors (scales), 41 competency statements (factors), 242 performance statements (sub-factors), and 443 scale items. Table A105 shows the scale composition for the initial item pool written for the inventory. The item pool consisted of 443 scale items, before content validity review. Five experts made up the Delphi panel. The content validity matrix served as an aid to mitigate confounding variable relationships. The Delphi group helped to establish content validity, face validity, interrater reliability, and skill level validity. All five experts reviewed and judged each scale item using the content validity matrix created from the IBSTPI and NWCET standards. An eight-step item review assisted reviewers with judging content validity, face validity, interrater reliability, and skill level validity.

Eight-Step Item Review. This was a qualitative and quantitative review (see Appendix G). This process was iterative and cyclical. Expert reviewers read each scale item to determine unitary value, clarity, duality focus, functional purpose, face validity, interrater reliability, and skill level validity. The review occurred in two stages. The first stage was qualitative. The second stage was quantitative. The expert panel rated each scale item to insure that each scale item captured the essence of each performance statement written in the original IBSTPI and NWCET standards. Several factors can threaten validity and reliability. For example, dropping scale items from the inventory that represent critical performance statements; measuring knowledge domains or skill clusters outside the IBSTPI or NWCET standards; generating factor scores that disproportionately measure one domain over other domains; and if the instrument proves to be too difficult to administer or too difficult for participants to complete (Viswanathan, 2005).

Qualitative review data collection. The first round of expert content validity reviews was manual. Expert reviewers completed printed copies of each scale by rating each item using the content validity matrix. Feedback was returned after one month. The time allotted to collect and analyze run one data exceeded the original project schedule. To control the project schedule it was necessary to finish content validity using online surveys to reduce expert fatigue and to account for conflicting work schedules. An evaluation scale was the tool used to classify scale items. Five category colors classified each scale item black, orange, red, green, and blue. This color-coding scheme helped to distinguish scale items by revision level. Scale items with a mean score less than 1.5 received a black label. These scale items required minor revisions. Scale items with a mean score greater than 1.5 and less than 1.8 received an orange label. These scale items required major revisions. Scale items with a mean score greater than 1.8 received a red label. These scale items required critical revisions. New scale items written and added to a scale received a green label. Scale items dropped from a scale received a blue label.

Scale items classified as major (orange), critical (red), and new (green) were counted as significant revisions that required additional review in the expert review cycle. Dropped (blue) items were not significant and removed from the inventory. Table 2, 3, and 4 show the summary results for each content validity review cycle.

In run one, 242 scale items required revisions. In run two, 48 scale items required revisions. In run three, 14 scale items required revisions. Table A22, A23, A24, A25, A26, A27, A28, A29, A30, A31 A32, A33, A34, A35, A36, A37, A38, A39, and A40 show a summary of the number of scale items needing revisions for each scale during content validity review cycles. The refined item pool increased from 443 to 448 scale items prior to quantitative review data collection.

Table 2

Summary of Content Validity Run 1

Category	INV	PF	PA	DD	IM	DM	TW	WDA
Black	254	45	44	52	21	40	12	40
Orange	170	17	21	5	34	22	31	40
Red	19	2	2	1	0	3	8	3
New	19	0	2	1	0	3	3	10
Deleted	34	4	14	4	3	5	1	3
Refined Items	242	23	39	11	37	33	43	53

Table 3

Summary of Content Validity Run 2

Category	INV	PF	PA	DD	IM	DM	TW	WDA
Black	64	4	6	2	18	2	12	20
Orange	39	0	0	0	34	0	0	5

Red	0	0	0	0	0	0	0	0
New	9	0	0	2	0	0	1	6
Deleted	0	0	0	0	0	0	0	0
Refined Items	48	0	0	2	34	0	1	11

Table 4

Summary of Content Validity Run 3

Category	INV	PF	PA	DD	IM	DM	TW	WDA
Black	13	2	0	0	2	0	0	9
Orange	4	0	0	1	2	0	0	1
Red	0	0	0	0	0	0	0	0
New	4	3	1	0	0	0	0	0
Deleted	6	0	0	0	1	0	1	4
Refined Items	14	3	1	1	3	0	1	5

Quantitative review data collection. During this stage, the Delphi panel of expert reviewers completed a series of quantitative surveys. The first survey determined face validity. The second survey determined interrater reliability. The third survey established skill level validity using confidence intervals. For an itemized listing of the results see Tables A41-54, A55-68, and A69-82 for face validity, interrater reliability, skill level validity and confidence interval results. Face validity and interrater reliability (survey two and three) had concurrent administration. During run one, 27 scale items (Table 5) and 37 scale items (Table 8) needed revisions for face validity and interrater reliability. During run two, six scale items needed revisions for face validity (Table 6) and interrater reliability (Table 9). Twelve scale items needed revisions for this round. In run three, 12 scale items needed revisions. Final validity and reliability confirmation, for the remaining

12 scale items, attained consensus through email correspondence. Appendix H shows a sample of the scale items sent to one particular expert reviewer to focus each expert's attention only on those scale items that he or she had disagreed with other experts and to establish agreement on those remaining scale items.

Only one rater disagreed on all scale items listed. Two items had two raters disagree. All other scale items had only minor revisions based on written comments. Appendix I show the comments and suggestions made by one particular expert on the scale items that she had disagreed on. Scale items that did not perform well needed revisions to improve reliability coefficient alpha. As variance decreased, coefficient alpha increased until all scale items showed no variance between raters and each scale reached an alpha coefficient of 1.00 (see Table 7 and Table 10). The refined scale composition following face validity and interrater reliability studies decreased from 448 to 440 scale items.

Table 5

Summary of Face Validity Run 1

Statistic	INV	PF	PA	DD	IM	DM	TW	WDA
Cronbach	.96	.84	1.00	.63	.63	.38	1.00	1.00
Mean	32.60	8.60	4.80	6.00	6.00	3.60	2.40	0
Variance	71.30	5.30	3.20	2.00	2.00	.80	.80	0
SD	8.44	2.30	1.70	1.41	1.41	.89	.89	0
Refined Items	27	7	4	5	5	3	2	1

Table 6

Summary of Face Validity Run 2

Statistic	INV	PF	PA	DD	IM	DM	TW	WDA
Cronbach	.95	1.00	1.00	1.00	.38	1.00	1.00	1.00
Mean	9.60	0	0	3.60	3.60	0	0	0
Variance	9.30	0	0	1.80	.80	0	0	0
SD	3.05	0	0	1.34	.89	0	0	0
Refined Items	6	0	0	3	3	0	0	0

Table 7

Summary of Face Validity Run

Statistic	INV	PF	PA	DD	IM	DM	TW	WDA
Cronbach	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Mean	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Variance	0	0	0	0	0	0	0	0
SD	0	0	0	0	0	0	0	0
Refined Items	0	0	0	0	0	0	0	0

Table 8

Summary of Interrater Reliability Run 1

Statistic	INV	PF	PA	DD	IM	DM	TW	WDA
Cronbach	.89	.42	.89	1.00	.63	-.67	1.00	.95
Mean	45.40	6.00	2.60	3.60	6.00	2.40	0	23.60
Variance	62.30	1.50	1.80	1.80	2.00	.30	0	43.80
SD	7.89	1.22	1.32	1.34	1.42	.55	0	6.62
Refined Items	37	5	2	3	5	2	1	19

Table 9

Summary of Interrater Reliability Run 2

Statistic	INV	PF	PA	DD	IM	DM	TW	WDA
Cronbach	0.70	1.00	1.00	0.80	1.00	1.00	1.00	1.00
Mean	7.40	0	0	2.60	2.40	0	0	0
Variance	4.30	0	0	1.80	.80	0	0	0
SD	2.07	0	0	1.34	.89	0	0	0
Refined Items	6	0	0	2	2	2	0	0

Table 10

Summary of Interrater Reliability Run 3

Statistic	INV	PF	PA	DD	IM	DM	TW	WDA
Cronbach	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Mean	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Variance	0	0	0	0	0	0	0	0
SD	0	0	0	0	0	0	0	0
Refined Items	0	0	0	0	0	0	0	0

Before pilot testing, expert reviewers completed a series of review cycles to test the consistency of reviewers following the instructions written in the Skill Level Classification Review Rubric. The review rubric described an evaluation procedure for judging each scale item. Three rounds of skill level reviews were completed. Run one did not yield any valid results (see Tables A69, A70, A71, A72, A73, A74, and A75). Adjustments made to the evaluation rubric aided in testing the repeatability and consistency of the instructions. Expert reviewers completed a second review with changed instructions. The data obtained from run two did not yield any repeatable validity results (see Tables A76, A77, A78, A79, A80, A81, and A82). Before run three, the researcher interviewed each expert to understand problems with the instructions. Based on expert interviews, the instructions for the review rubric needed revisions to ensure clarity and to mitigate misinterpretation by reviewers. Appendix J shows the interview questions and responses received from four of the expert reviewers. The changes made clarified the review procedure. Screen shot graphics and descriptive examples were added to illustrate the sequence and priority for judging the skill level of each scale item using the Action Verb Lexicon contained in the review rubric. The instructions in the review rubric addressed the problems described by expert reviewers (see Appendix K). To mitigate reviewer fatigue because the number of scale items needing review for a third time (440 scale items for the entire inventory); only two factors (factor four from the PF scale and factor seven from the PA scale) from the inventory was given to experts for review. Each factor selected from the inventory equally contained ten scale items. The data from all three runs determined the final validity and reliability results using confidence intervals (see Table A84) and mean comparisons (see Figure 7 and Table A83).

Confidence intervals for each factor helped to determine skill level validity because the sample size (n=5) was too small. Confidence intervals helped to judge the validity of scale item scores based on upper and lower limits on the normal curve. These limits were an indication the mean score met the 95% confidence interval. Scale items that fall outside the limits suggested there were differences between test runs. Run one scale item mean scores fell within the upper and lower limits, however, scale item mean scores for runs two and three showed an increase and many of the scale item mean scores fell outside the limits.

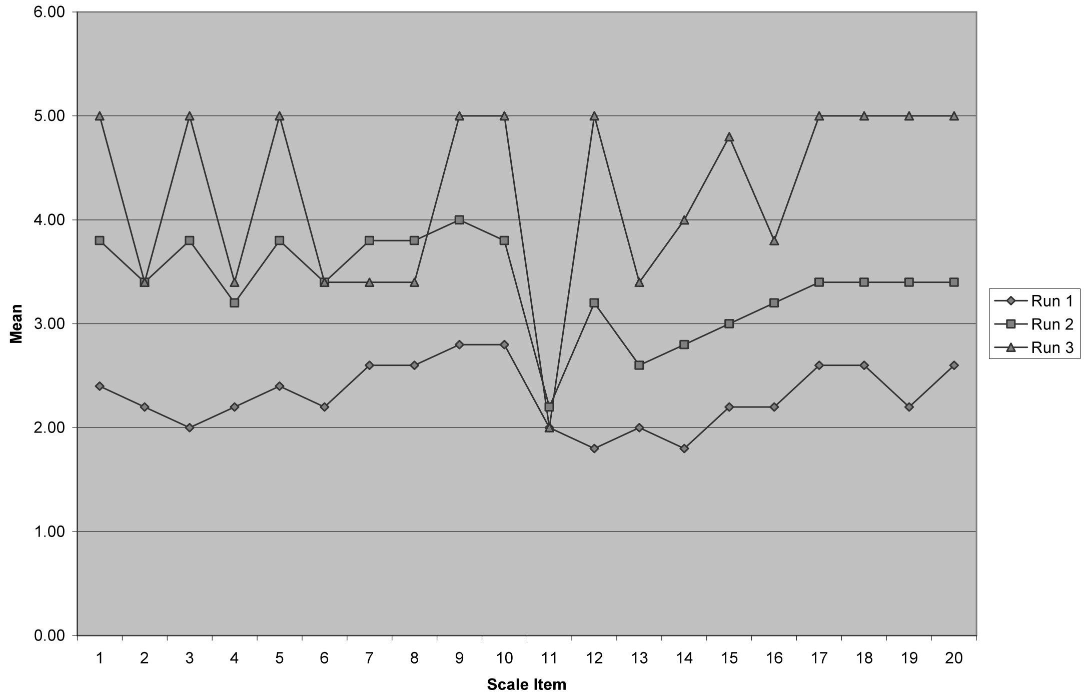


Figure 7. Skill level runs 1-3 mean comparisons

As shown in each table the variability of individual rater scale item scores decreased from run one to run three. Cronbach alpha coefficients for run one was .79 to .99 except for factors three and twelve, which were -.35 and .64 respectively. Cronbach alpha coefficients for run two ranged from .71 to 1.00 except for factor two and three, which were .34 and .65. Run three reliability coefficients were not estimated because the data collected was for only two factors (four and seven). The scale item means of run one through three were compared for factors four and seven (see Table A85, A86, and A87). The small sample size, scale reduction to mitigate reviewer fatigue, and limited variability between scores were the reasons for minimal data collected (see Table A88). The results suggest a significant increase in validity and reliability between runs; given the refined instructions from run one to run three. The refined review rubric in run three served as the review tool for scale validation studies.

Scale Validation

Phase two included pilot testing and instrument validation. Scale validation was a series of four studies. However, only three of the four studies were completed. The first study focused on pilot testing the inventory to refine it and determine the initial factor scores for each item. The second (Part A), third (Part B), and fourth (Part C) studies focused on validity and reliability to finalize the instrument. The sample used for this research study consisted of 1100 LT professionals working for a large semiconductor company with geographical locations in North and South America, Middle East, Asia, and Europe. When the minimum sample size proposed could not be reached, an invitation went out to registered members of AECT, ASTD, ISPI, IT Forum, and Training Developer Forum to help increase the sample size.

By extending the study to a wider LT audience (AECT, ASTD, ISPI, IT Forum, and Training Developer Forum), the population increased to over 10,000 possible participants. This included all instructional designers and instructional developers performing one or more of the following job roles: training specialist, instructional designer, senior instructional designer, instructional developer, senior instructional developer, training developer, senior training developer, multimedia developer, teacher, educator, curriculum developer, course developer, eLearning developer, or any other job role.

Demographics

Participant demographics for the study included two categories registered and focal participants. One hundred fifty-one participants voluntarily registered to participate in the research study (see Figure 8). Seventy-four of these registered participants contributed to the research study. Registered participant demographics consisted of 86 females and 65 males. Registered male and female participants (95%) received a formal education. Seventy-nine percent of the registered participants had more than six years experience in the field. Fifty-five percent held a masters' degree, 26% held a doctoral degree, 13% held a bachelors degree, four percent did not have any degree and nearly two percent had earned a professional certificate of some sort (see Figure 9). For typical job roles, 81% considered themselves to be both instructional designers and instructional developers; whereas 17% considered themselves instructional designers and two percent considered themselves instructional developers. Seventy-four percent worked in business and industry, 25% worked in higher education, and one percent worked in K-12 (see Figure 10).

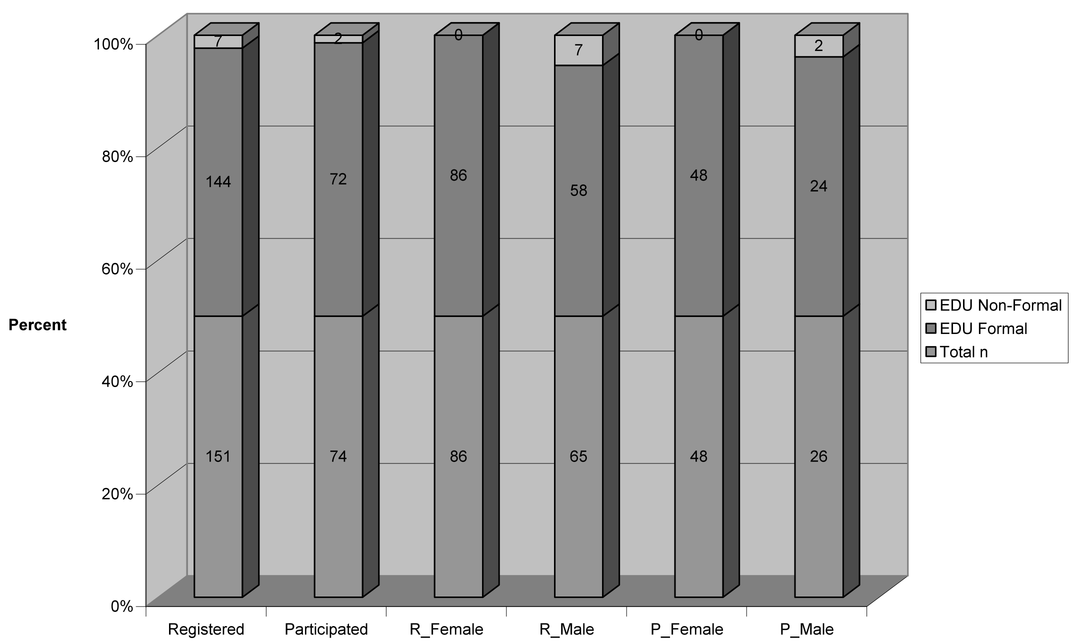


Figure 8. Male and female participant demographics for education

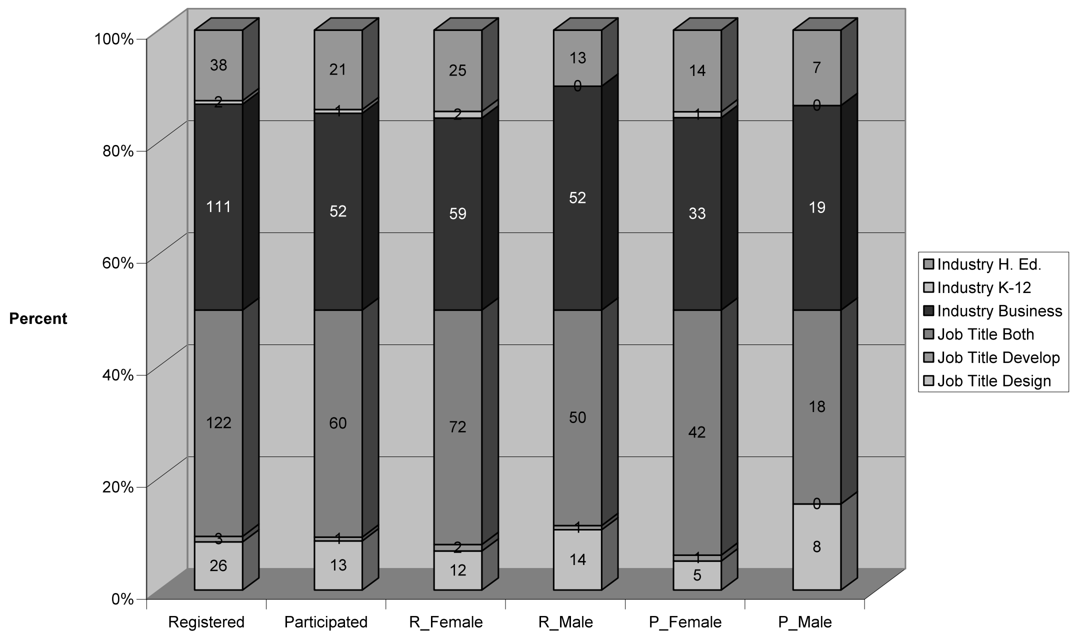
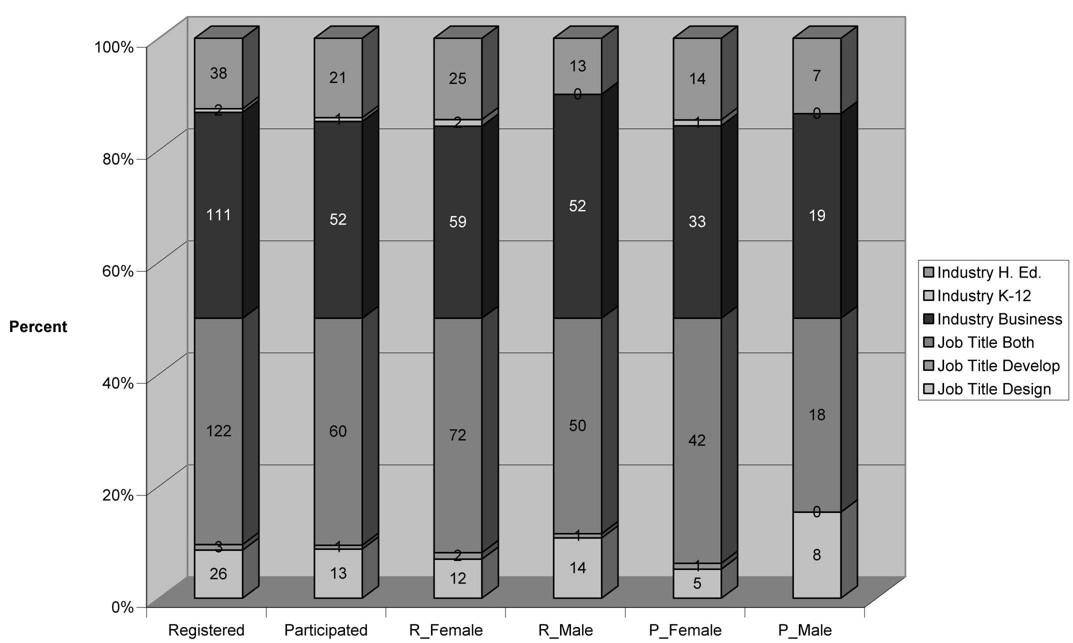


Figure 9. Male and female participant demographics for degree and experience


100%
80%
60%
40%
20%
0%
Percent
38
21
25
13
14
7
2
1
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111
52
59
52
33
19
122
60
72
50
42
18
3
1
2
1
1
0
26
13
12
14
5
8
Registered
Participated
R_Female
R_Male
P_Female
P_Male
Industry H. Ed.
Industry K-12
Industry Business
Job Title Both
Job Title Develop
Job Title Design

Figure 10. Male and female participant demographics for job title and industry

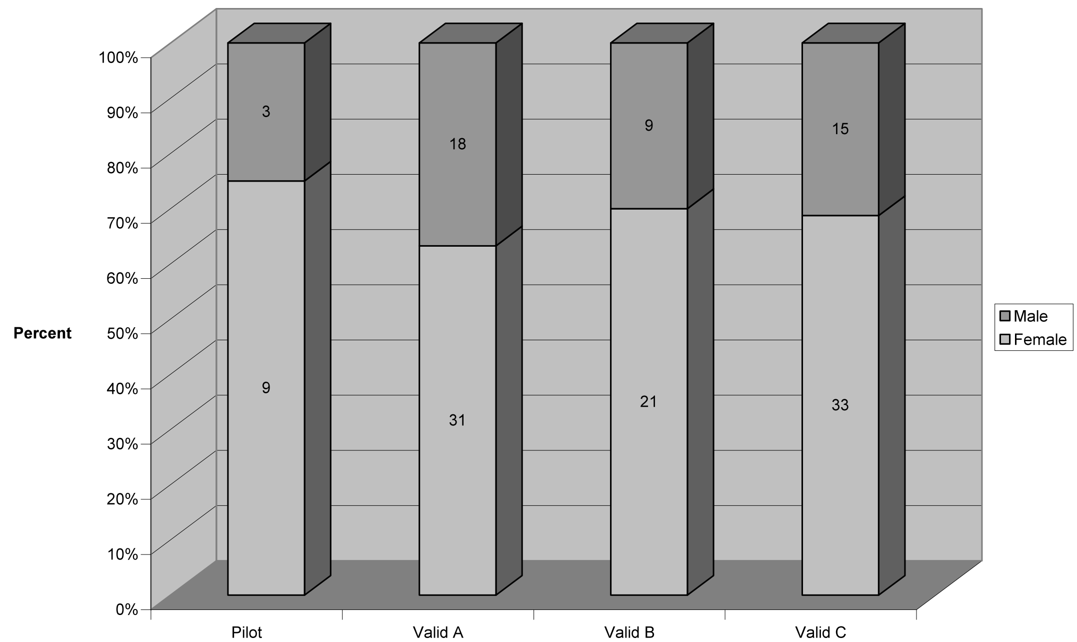

Figure 11. Male and female participant study demographics for validation studies

Before the start of data collection, the initial sample size proposed was 100 to 150 participants for validation study Part A and B and 75 participants for validation study Part C. Final sample sizes were 13 participants for the pilot study, 49 participants for Part A and 30 participants for Part B. The sample size for Part C was 48 participants (see Figure 11).

Pilot Study

After the item generation phase, the next step was to pilot test the inventory with a small sample group to test the initial performance of the inventory through validity and reliability testing. Thirteen participants responded to the pilot test survey from the 30 participants sent an invitation to participate. The response rate for returned results was 43.33%. Scale items that did not perform well had to be dropped from the inventory. The purpose of the pilot study was to confirm and refine the inventory by establishing the initial factor loadings for each scale item and the reliability of the inventory. Factor loading classifications were high, medium, and low. High loadings had a Pearson correlation coefficient range of .80 to 1.00, medium loadings had a range of .40 to .79, and low loadings had less than .40. Scale items with a factor loading less than .40 had to be dropped from the inventory (see Tables A87, A88, A89, A90, A91, A92, A93, A94, and A95). Only high and medium loaded scale items remained. An examination of Cronbach alpha coefficient calculations for each factor yielded several key results. Factors 2, 3, 33, 38, and 39 reached a Cronbach alpha coefficient less than .90 (see Table A96). The Cronbach alpha coefficient for these five factors was .34, .65, .82, .71, and .88. All other factors reached a Cronbach alpha coefficient of .90 to 1.00. Dropped scale items included: 19 from the PF scale, 24 from the PA scale, 12 from the DD scale, three from the IM scale, two from the DM scale, six from the TW scale, and six from the WDA scale. After the pilot study, the results warranted a reduction in scale size. Therefore, the scale composition for the inventory was decreased from 440 items to 367 items (see Table 11).

Table 11

Pilot Study Postmortem Scale Composition

Scale	Before	Dropped	Retained
PF	64	19	45
PA	59	24	35
DD	58	13	45
IM	56	3	53
DM	63	2	61
TW	52	6	46

WDA	88	6	82
Total	**440**	**73**	**367**

Validation Studies

Instrument validation included testing the entire inventory with a much larger sample. The final step focused on validation of the inventory in preparation for its use in the field. This included thee independent studies: Part A, B, and C. Part A finalized the inventory by confirming the validity and reliability of the final item pool. Scale items that did not perform well had to be dropped from the inventory. Part B was to determine test-retest reliability. Part C was to establish concurrent validity. Part A and B studies used a sample of 120 of the registered participants. Forty-nine participants responded to Part A. The response rate was 40.83%. Thirty participants responded to Part B. The response rate was 25%. Part C used a sample of 140 registered participants. Forty-eight participants responded to Part C. The response rate was 34.29% (see Figure 11).

Part A. This dissertation study focused on confirming and finalizing the inventory by establishing factor loadings for each scale item. As with the pilot study, factor-loading classifications were high, medium, and low. High loadings had a Pearson correlation coefficient range of .80 to 1.00, medium loadings had a range of .40 to .79, and low loadings had less than .40. Scale items with a factor loading less than .40 had to be dropped from the inventory (see Tables A97, A98, A99, A100, A101, A102, and A103). Only high and medium loading scale items remained. Dropped scale items included: eight from the PF scale, four from the PA scale, 10 from the DD scale, 14 from the IM scale, 12 from the DM scale, eight from the TW scale, and six from the WDA scale.

Part B. It was necessary to calculate Cronbach alpha coefficients for each scale item to confirm test-retest reliability of the inventory. Cronbach alpha coefficient classifications were high, medium, and low. High loadings had an alpha coefficient range of .70-1.00, medium loadings had an alpha coefficient range of .69-.40, and low loadings had an alpha coefficient less than .40. Scale items that attained an alpha coefficient less than .40 were identified as watch items for future validity and reliability studies (see Table A97, A98, A99, A100, A101, A102, and A103). Cronbach alpha coefficients were also calculated for each factor to compare the overall reliability of each factor between Part A and Part B studies. The Cronbach alpha coefficient for factors 2, 9, and 12 was .74, .84, and .37 for Part A and .87, .95, and .78 for Part B. Factors 2, 9, and 12 showed the largest differences in Cronbach alpha. Factor 2 had a difference of .12, Factor 9 was 0.11, and Factor 12 was .42 (see Table A104). All other factors reached a Cronbach alpha coefficient of .80 to 1.00. After completion of Part A and B, the results warranted a reduction in scale size. The scale composition for the inventory was decreased from 367 to 305 scale items (see Table 12).

Table 12

Validation Studies Postmortem Scale Composition

Scale	Before	Dropped	Retained
PF	45	8	37
PA	35	5	30
DD	45	9	36
IM	53	14	39
DM	61	12	49
TW	46	8	38

WDA	82	6	76
Total	**367**	**62**	**305**

Part C. To establish concurrent validity of the inventory required a sample size of 75 participants divided into five groups. These five groups included novice, advanced beginner, competent, proficient, and expert. Participants self-selected their perceived skill level before the study. Although 48 participants agreed to participant in Part C, few were willing to select a third-party rater to rate them on the inventory. One participant commented “sorry… I don't sign others up for work…I withdrew when I learned this was part of the deal.” The original plan was to use third-party participant to establish cut-off scores. Cut-off scores help to classify individuals by establishing concurrent validity (Shrock & Coscarelli, 2000). The alternative was to request help form the expert review panel. A request was made to the expert panel to help identify individuals who could be classified by skill level to participate. This request also proved to be challenging. Therefore, Part C remained incomplete because there was insufficient third-party participation.

Final scale composition. After completing validation studies, the number of performance statements and scale items in the inventory was reduced by dropping scale items that did not perform as expected. Table 13 shows a comparison between original, dropped, and retained competency (C) statements, performance statements (PS), and scale items (SI). Twenty-nine percent of the original scale items were deleted from the inventory and Seventy percent were retained. The intention was to improve the overall validity and reliability of the final inventory by dropping low performing scale items and retaining only medium to high performing items. This omission technique automatically affected the number of performance statements retained because the scale items were directly related to corresponding performance statements, and performance statements were directly related to competency statements found in the original IBSTPI and NWCET standards. All competency statements from the original IBSTPI and NWCET standards remained. However, Twenty-two percent of original performance statements got dropped and seventy-eight percent got retained. Seventeen scale items got tagged as watch items because the data showed that the validity and reliability scores of those few scale items fell at or just under the .04 cut-off criterion for validity (Pearson correlation coefficient) and .07 cut-off criterion for reliability (Cronbach alpha coefficient) (See Tables A97, A98, A99, A100, A101, A102, and A103).

Table 13

Final ISD Performance Inventory with Skill Standard Compositions

		Original			Dropped		Retained	
Standards	Scale	C	PS	SI	PS	SI	PS	SI
IBSTPI	PF	5	26	64	6	19	19	37
	PA	7	30	67	11	27	18	30
	DD	6	32	58	5	21	25	36
	IM	5	34	55	12	17	24	39
NWCET	DM	5	35	65	4	12	31	49
	TW	5	30	46	7	13	21	38
	WDA	8	55	83	5	12	51	76
Total		**41**	**242**	**438**	**50**	**121**	**189**	**305**

Summary

This dissertation study sought to answer the research question: What are the valid and reliable competencies for assessing the preparation and performance of LT professionals? A four-step scale development procedure served as the validation technique for the ISD Performance Inventory. The purpose was to develop a sound measure that LT professionals could use to link individual development to industry competency standards. The method used to develop and validate the inventory was useful for creating scale items to measure an LT practitioner's performance in aligned with IBSTPI and NWCET skill standards. The empirical data helped determine which competencies were valid and reliable to assess LT professionals.

The scale development method contained two phases. Phase one consisted of construct delineation and item generation. Phase two consisted of pilot and validation testing. During phase one, experts in the LT field (n=5) judged the content validity, face validity, inter-rater reliability, and skill level validity before phase two validation testing. Scale development began with construct delineation. During this stage, the IBSTPI and NWCET skill standards served as the content validity matrix used to judge each scale item in the inventory. A series of three tests performed using a Delphi sample of five experts focused on content validity, face validity, interrater reliability, and skill level validity. These review cycles were necessary to refine each scale item to ensure that each aligned to the skill standards and met item review criteria. Revisions made to the inventory instructions helped mitigate internal error in the completion of the inventory by expert reviewers. These early studies were recursive and cyclical until all experts unanimously agreed, and all items had no variance between rater scores and each scale reached a Cronbach alpha coefficient of 1.00. The scale item composition for the inventory, following phase one, contained 440 scale items (see Table A105). The results obtained in phase one established initial content validity, face validity, interrater reliability, and skill level validity of the inventory before empirical testing.

In the pilot study, Cronbach alpha coefficient and correlation coefficient calculations for each factor determined the reliability and validity of each scale and each scale item. As shown in Table A96, the alpha coefficient except for factors 2 and 3 suggested high correlations between scale items. Cronbach alpha coefficient data provided significant but inadequate information about the validity of each scale. To further confirm the validity of the inventory Pearson correlation coefficient calculations were made. Some items did not perform as intended. Scale items omitted from the final inventory had Pearson coefficients of .40 or less. As scale items got dropped, it was necessary to omit some performance statements from the final inventory. When there was no scale item to measure against a stated performance statement in the inventory, then the performance statement got dropped. Scale items that scored above .40 got retained for the final inventory (see Tables A89, A90, A91, A92, A93, A94, and A95). The refined inventory before validation testing contained 367 scale items (see Table 11).

Validation testing was a series of three studies: Part A, Part B, and Part C. Part A study was to finalize the inventory using a sample of 49 registered participants. Part B study was to determine test-retest reliability using a sample of 30 participants. Part C study was to establish concurrent validity using a sample of 48 participants. Part A and B studies got completed using the same data analysis procedures used in the pilot study. Cronbach alpha coefficients and Pearson correlation coefficients calculations helped to determine the validity and reliability of each scale and scale item. Each scale item had to score .40 or above to be statistically significance in Part A (see Tables A97, A98, A99, A100, A101, A012, and A103) and .70 and above in Part B (see Table 104). The scale item composition for the final inventory was 308 (see Table12). Part C was not completed because few registered participants were willing to provide the name and email address of a third-party rater who could rate them on the inventory. An alternative method used to enlist help from the expert review panel proved to be just as difficult. Therefore, inadequate data were obtained and cut-off scores to compare results between focal participants and third-party rater participants were incomplete.

Obtaining ideal sample sizes proved to be arduous and perplexing. Nonetheless, the results obtained suggested the initial statistical significance of the inventory. The data served as an initial first step and proof for subsequent research work to establish stronger empirical evidence to support the use of the inventory in the field. The primary focus of this dissertation study was to develop and validate the ISD Performance Inventory. The study also served as an initial first step to develop of a broader measurement method and to provide more robust tools to make individual performance assessments more objective, valid, reliable, and easy to use for practitioners, employers, and educational organizations. Chapter 5 will examine results; explain findings through interpretative and inferential analysis; and present research accomplishments, recommendations, implications, and significance to support findings and conclusions.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

The purpose of this research study was to solve a perplexing and progressively expanding problem in the instructional technology field. Currently, when LT professionals do not ensure that their competencies and skills are in alignment with fluctuating demands and challenges of the workplace, a serious and ineffective performance problem arises. This problem emerged from continuous global competition, new methods and tools, fluctuations in the world market, business acumen and strategy, positioning and technological innovations. As a result, LT professionals face many challenges to develop and maintain a competitive and expansive skill set that is not only current with changing trends but in alignment with industry standards.

To ameliorate this problem, an investigation to develop a valid and reliable measurement method proved to be an effective technique for gauging and monitoring LT professionals' skill capabilities. This could enable professionals to make better educational or employment-related decisions (such as, selection, placement, and career planning) about individual development needs. Employers and educational organizations could improve decision making on issues related to recruitment, selection, career planning, professional development, and succession planning. To accomplish the task of overcoming individual performance problems the IPA research plan is a viable solution. This research plan outlined four major research studies. Each study represented essential components for the development and validation work needed to establish a reliable performance measurement method. Therefore, it was necessary to distill the research plan into smaller milestones beginning with study one (see Figure 1). This made the overall research design more manageable and tenable within the scope of this dissertation. Study one of the IPA research plan was the focus of this doctoral research study.

A single research question proposed for this dissertation study was what are the valid and reliable competencies for assessing the preparation and performance of LT professionals? The research question had four underlying goals. Goal one was to expand the validity and reliability of ISD competencies through quantitative analysis. Goal two was to better classify and explicate ISD competencies to reflect stages of growth and development using Bloom's taxonomy and the Dreyfus model. Goal three was to develop and validate the ISD Performance Inventory to establish an initial framework for scoring LT professionals across all knowledge domains on known industry competency standards. Goal four was to provide a focal point of investigation expected to lead to more elaborate and complex studies defined in the IPA research plan (see Figure 1).

Several critical assumptions from past research conducted by IBSTPI and NWCET applied to this present study. All assumptions are outlined in Chapter 1. Assumptions one through seven were from the IBSTPI standards, assumptions eight through ten are from the NWCET standards and assumptions eleven through thirteen were original assumptions specific to this present study.

Several limitations identified had significance from the beginning. First, there was the issue of sample scope. The initial sample focused on a large international semiconductor organization. During the study, the scope increased to include a larger population size. Working professionals, within the industry, received a chance to contribute to the study. Second, there was the issue of sample size. Small sample sizes can threaten the validity, reliability, and generalization of an instrument (DeVellis, 2003;

Netemeyer et al., 2003). However, sample size alone is not the only indicator for validity and reliability (Fabrigar et al., 1999). Despite the small sample size, the results indicated early evidence of validity and reliability. Third, there was the issue of nonparticipation from registered participants or an unwillingness to complete certain phases of the study. This too remained a perplexing issue throughout the study.

A four-step scale development and validation method provided guidance for executing the study. These four steps consisted of 1) construct delineation, 2) item generation, 3) pilot test and 4) validation. This process served as the best empirical method for developing and validating measurement instruments (DeVellis, 2003; Netemeyer et al., 2003; Viswanathan, 2005). Throughout the remainder of this chapter, detailed interpretations and discussions of findings, conclusions, significance, implications, accomplishments, and recommendations for action are shared to inform professional practice and future research and development.

Interpretation and Conclusions

Data collection occurred in two phases. These two phases included scale development and scale validation. Several independent studies performed in each phase represented a step in the scale development and validation process, which included construct delineation, item generation, pilot study, and validation studies. The demographics for this dissertation study were an integral part of the measurement method. Demographics presented later in this chapter will explicate conclusions based on prior research trends and industry observations. Overall, the focus of this dissertation study was to address the research question: What are the valid and reliable competencies for assessing the preparation and performance of LT professionals?

Construct Delineation

"The starting point for measure development is the definition of…construct[s] to be measured and delineation of…[the constructs] domain" (Viswanathan, 2006, p. 162). Reuse of industry competency standards simplified the technique for creating valid constructs. The competency standards defined by IBSTPI and NWCET served as the content validity matrix for judging the content validity of scale items. The initial construct map contained seven knowledge domains, 41 competencies, and 242 performance statements (See Table A2-8). Earlier research studies conducted to show the initial validity and reliability of the competency standards (see Atchison, 1996; NWCET, 2003; Richey et al., 2001; Song, 1998) indicated that the combined set of competency standards could serve as a theoretical model for the inventory, scales, and scale items.

Item Generation

During this step, 443 scale items served as initial variables for the full inventory. The Delphi expert group reviewed each scale item for content validity, face validity, inter-rater reliability and skill level validity. Three rounds of expert reviews provided validity and reliability results.

Content validity results. Scale items for each scale in the inventory aligned to competency standards. According to Viswanathan (2006, p.162), "procedures to generate and edit items tapping into the domain of a construct are crucial for the content validity of a measure." The mean score for each scale item showed variance between each test round until data showed no variance. Table 2, 3, and 4 show a complete summary of the number of items that needed revisions for each scale during content validity review cycles. The refined item pool consisted of 448 scale items before quantitative review data collection.

Content validity conclusion. The results obtained during this test sequence indicated that each item for each scale showed content validity. Unanimous agreement between reviewers suggested the inventory was valid and ready for further testing. Content validity of the inventory also determined the domain for each item. DeVellis (2003) suggested that content validity should focus on establishing item adequacy within a specific content domain. Netemeyer et al. (2003) claimed establishing content validity for scales is a crucial first step used to establish clarity for scale dimensions and definitions. The combined set of IBSTPI and NWCET standards provided the model needed to align domain specific content to each item in the inventory.

Face validity and interrater reliability results. Similarly, face validity and interrater reliability tests used the same review method applied in content validity tests. The analysis focused on examining Cronbach alpha coefficient, mean, variance, and standard deviation. Table 5, 6, 7, 8, 9, and 10 shows summary results for run one through run three. The refined item pool consisted of 440 scale items before pilot testing the inventory.

Face validity and interrater reliability conclusion. Coefficient alpha measures the variance between items as well as the degree of relatedness or agreement (Netemeyer et al., 2003). The results obtained during this test sequence indicated that as variance decreased, coefficient alpha increased until all scale items showed no variance between raters and each scale attained an alpha coefficient of 1.00. Nunnally (1994) suggested that a value of .70 is an acceptable lower limit for coefficient alpha. DeVellis (2003, p. 95) claimed, "[that] .65 to .70 is minimally acceptable, .70 to .80 respectable, .80 to .90 good and above .90 consider trimming the scale." The results obtained in both tests indicated that face validity and interrater reliability of the scales were statistically significant.

Skill level validity results. For skill level validity, the approach to test validity and reliability for skill level validity used the same methods as performed in face validity and interrater reliability tests. When the data collected for run one did not yield any repeatable results, this indicated that some internal error could be present in the Skill Level Classification Review Rubric (see Appendix K). Internal error can threaten the validity of measurements. To overcome problems with internal error, modifications to the instructions and review procedure provided a means for making improvements. Run two was repeated. Again, none of the results were consistent. Before run three, expert reviewers completed a one-to-one interview questionnaire to determine the cause of the problem. Feedback from expert reviewers led to specific review rubric modifications to improve upon the procedure and instructions. This led to distributing a sub-section of the inventory to expert reviewers to mitigate fatigue because of the large number of scale items reviewed during each run. Only two factors were reviewed in run three. As a result, this change in the composition of the survey administered made it necessary to look at confidence intervals for each factor to determine skill level validity. The variance between individual rater scores decreased between tests (see Table A84, A85, A86 and A87). Cronbach alpha coefficients were also calculated for each test run. Run one and two reliability coefficients were above .70 with the exception of two factors. Run three reliability coefficients were not estimated because there was insufficient data collected. Run three reliability coefficients could not be computed because of the small sample size, scale reduction to mitigate reviewer fatigue, and limited variability between scores (see

Table A88). The number of scale items sampled was too small to calculate Cronbach alpha coefficients because data collected was for two factors (four and seven). The scale item means of run one through three were compared for factors four and seven (see Table A85, A86, and A87). The results suggested a significant increase in validity and reliability between runs; given the refined instructions from run one to run three. The refined review rubric in run three served as the review tool for scale validation studies.

Skill level validity conclusion. "Knowing the exact nature of measurement error enables solutions for its correction" (Viswanathan, 2006, p. 178). Results indicated a significant increase in validity and reliability between runs, given the refined review rubric instructions in run three. The refined rubric created for run three was used to conduct scale validation studies. Isolating the source of error in the review rubric procedure and instructions helped to remove error because of survey administration.

Pilot Study

During pilot testing, the sample size for the pilot test group was 13. The pilot test helped to obtain an initial baseline of the validity and reliability of the inventory. The pilot test served as a revision technique to trim the size of the inventory by deleting items that did not perform as expected.

Pilot study results. Factor loading classifications were high, medium, and low for Pearson correlation coefficient. High loadings had a correlation coefficient range of .80 to 1.00, medium loadings had a correlation coefficient range of .40 to .80, and low loadings had a correlation coefficient less than .40. Scale items that attained a factor loading less than .40 got dropped from the inventory (see Tables A89, A90, A91, A92, A93, A94, and A95). Only high and medium loaded items remained. The correlation coefficient determines the relationship between two sets of scores and can have a magnitude range of -1 to +1. The plus and negative signs represent direction and the number represents the magnitude (McDonald, 2002). “The closer the correlation coefficient is to +1, the more accurate the test at predicting the criterion (McDonald, 2002, p. 160).

Cronbach alpha coefficient calculations must be at least .70 to be statistically significant. Scale items hade to score .70 or above to be retained. Dropped scale items include: 19 from the PF scale, 24 from the PA scale, 12 from the DD scale, three from the IM scale, two from the DM scale, six from the TW scale, and six from the WDA scale. Seventy-three scale items got dropped from the entire inventory. Sample size was also a critical factor in the collection and analysis of data. The sample was small (n=13), but the initial data suggested results were valid and reliable.

Pilot study conclusions. The sample size for the pilot study was 13. Only 43.33% of registered participants randomly selected to participate contributed to the study. After the pilot study, scale composition for the inventory decreased from 440 scale items to 368 scale items (see Table 11). The Pearson correlation coefficient ranges for all retained scale items were good. This indicated the validity of remaining scale items were significant enough to retain; thus making the validity of each scale statistically significant.

Cronbach alpha for each of the 41 factors in the inventory were good. These results indicated the reliability of the scales were statistically significant (see Table A96). The results from the pilot test provided an initial confirmation that it was possible to classify expert levels according to Bloom’s taxonomy and the Dreyfus model. However, there still remains a need to determine whether or not the Skill Level Classification

Review Rubric (see Appendix K) is amenable to other types of research studies and methods. Ven and Chuang (2005) conducted a study to classify information technology competencies into categories of Bloom's taxonomy. They suggested that action verbs are useful for classifying levels of competency outcomes. Specifically, "action verbs must reflect the level of competency outcomes. These levels can usually be classified based on Bloom's cognitive taxonomy, namely: knowledge, comprehension, application, analysis, synthesis and evaluation (Bloom, 1956); from the lowest level of simple recall or recognition of facts-knowledge, to the highest level of critical thinking-evaluation" (Ven & Chuang, 2005, pp. 136-137).

Validation Studies

The sample sizes for the validation study groups were 49 participants for Part A, 30 participants for Part B and 48 participants for Part C (see Figure 11). This was an insufficient sample. Ideally, for a 369-scale item inventory the sample size should have been at least 410, if sample size was the only indicator of scale validity. DeVellis (2003, p. 137) claimed, "the larger the number of items to be factored and the larger the number of factors anticipated, the more subjects should be included in the analysis." A general rule of thumb is to use a ratio of 5 to 10 subjects for each item. No definitive criterion for sampling exists. However, some researchers have suggested the ratio of subjects to item becomes more relaxed as the sample size approaches and exceeds 300 (DeVellis, 2003). Since sample size is not the only indicator of scale validity, cross-validation of scale items in relation to factors also has an important role. Cross-validation can offset sample size because it also serves as a measure of scale validity. According to Fabrigar et al. (1999), sample size and cross-validation of constructs serve as indicators of validity.

Although the sample was small, the validity and reliability results showed promise toward future use of the inventory. Each sub study in this step helped validate the inventory to prepare for use in the field. This was done in three parts. Part A finalized the inventory by confirming the validity and reliability of the item pool following pilot testing. Scale items that did not perform well got dropped from the inventory. Part B was to determine test-retest reliability. Part C was to establish concurrent validity.

Validation Part A test results. As with the pilot study, factor loadings classifications were high, medium, and low. Scale items that attained a factor loading less than .40 got dropped from the inventory (see Tables A97, A98, A99, A100, A101, A102, and A103). Only high and medium loaded scale items remained. Dropped scale items included: Eight from the PF scale, four from the PA scale, 10 from the DD scale, 14 from the IM scale, 12 from the DM scale, eight from the TW scale, and six from the WDA scale. The Pearson correlation coefficient ranges for all retained scale items were good.

Validation Part A conclusions. The sample size for Part A was too small to validate the inventory for use in the field. Only 40.83% of the participants selected to participate contributed to the study. This resulted in 49 responses for Part A. With a low number of respondents, results indicated the validity of remaining items were significant enough to retain; thus making each scale statistically significant. As mentioned previously, the ideal sample size should have been at least 410 subjects if sample size were the only indicator of scale validity. Since sample size is not the only indicator for validity, cross-validation of scale items with factors will help to offset the sample size and allow for a more realistic sample that is approximately 200 subjects.

Moreover, consistency in scale performance from the pilot study to validation study Part A provided evidence that skill level classifications were possible using Bloom's taxonomy and the Dreyfus model. Again, this does not address the need to determine whether or not the Skill Level Classification Review Rubric is reusable in other research studies and methods. Other studies focused on replicating the use of the Skill Level Classification Rubric needs to be completed.

Validation Part B results. This dissertation study focused on confirming test-retest reliability of the inventory. Cronbach alpha coefficient classifications were high, medium, and low. High loadings had an alpha coefficient range of .70 to 1.00, medium loadings had an alpha coefficient range of .40 to .69, and low loadings had an alpha coefficient less than .40. Scale items labeled watch items attained an alpha coefficient less than .40 (see Table A97, A98, A99, A100, A101, A102, and A103). Cronbach alpha coefficients served as comparable data points for each factor to determine the overall reliability of each factor between Part A and Part B studies. Factor 2, 9, and 12 showed the largest difference in Cronbach alpha (see Table A104). All other factors attained a Cronbach alpha coefficient well above the .70 cut-off score.

Validation Part B conclusions. The sample size for Part B was also small compared to the ideal numbers needed to validate the inventory for use in the field. Only 25% of the participants selected to participate in Part A contributed to the study in Part B. Part B and Part A data comparisons were necessary to inspect each scale item individually before dropping it from the final inventory. There were two choices available to determine retention or omission of items. A scale item that met the correlation coefficient criterion (.40 or above) and the reliability coefficient criterion (.40

or above) the scale item did not get dropped. Scale items that did not meet the correlation coefficient criterion or the reliability coefficient criterion had to be dropped. This simplified decision making for retaining or dropping scale items. This action was necessary to account for the fact that the sample for Part A was smaller than the sample for Part B, which made it difficult to determine if the difference in sample size was a reason for the differences observed in the data.

Also, the samples for each test were small and this elimination method made it possible to retain scale items without prematurely excluding some scale items. Research studies to establish stronger evidence of validity and reliability for the inventory must be able to generalize to a larger population across the learning technology landscape. Moreover, factor 12 fell below the ideal cut-off criterion for reliability to be significant. The remaining 40 factors met the .70 cut-off score. This indicated the reliability of the scales were statistically significant (see Table A45).

Ultimately, the scale composition for the inventory decreased from 368 scale items to 308 scale items (see Table 12). Part A and B combined results determined the scale composition of the final inventory. Cronbach alpha coefficient reliability ranges for all retained scale items were good (see Table A104). These results indicated the reliability of remaining items were significant enough to retain; thus making the reliability of each scale statistically significant.

Validation *Part C results.* To establish concurrent validity of the inventory this required a sample size of 75 participants divided into five groups. These five groups included novice, advanced beginner, competent, proficient, and expert. Although 48 participants agreed to participant in Part C, few were willing to select a third-party rater to rate them on the inventory. One participant commented “sorry… I don't sign others up for work…I withdrew when I learned this was part of the deal.” The original plan was to use third-party participant to establish cut-off scores. Cut-off scores help to classify individuals by establishing concurrent validity (Shrock & Coscarelli, 2000). The alternative was to request help form the expert review panel. A request was made to the expert panel to help identify individuals who could be classified by skill level to participate. This request also proved to be challenging.

Validation *Part C conclusions.* Insufficient third-party participation did not allow for completion of Part C. With no third-party rater data, cut-off score comparisons between focal participants and third-party participant could not be calculated. Concurrent validity of the inventory is still needed.

Demographics

Demographic data provided some insight into the characteristics of the sample pulled from the population. While the primary focus of the study was to develop and validate the performance inventory, analysis of this additional demographic data supports prior research and industry observations (See Larson & Lockee, 2004; Lui et al., 2002; Lui, Jones & Hempstreet, 1998; Richey et al., 2001; Seels & Richey, 1994; Wedman & Tessmer, 1993; Winer & Vazquez-Abad, 1995). This data also supports the findings from this present study, informs the industry about emerging instructional design practice, and establishes preliminary profile data about LT professionals in general.

Participant results. One hundred and fifty-one participants volunteered to participate in the research study. Seventy-four of these registered participants contributed to the research study. Registered participants included 86 females and 65 males. The number of participants that made a contribution to the study included 48 females and 26 males. Most registered male and female participants (95%) earned a formal degree (see Figure 8). Fifty-five percent of registered participants held a masters degree, 26% held a doctoral degree, 13% held a bachelors degree, four percent did not have any degree and approximately two percent had earned a professional certificate of some sort. Seventy-nine percent of registered participants had more than six years experience in the field (see Figure 9).

Participant conclusion. These statistics indicated the practice of instructional design in the industry and more important in the workplace has matured. In the past, the typical route into the profession was through informal learning avenues such as on-the-job training and job shadowing (Lui et al, 2002, Richey et al., 2001). Today, that trend has dwindled. The typical route into the profession occurs through formal learning avenues such as bachelor, masters, and doctorate degree. Professional certification programs have emerged through professional organizations such as ASTD and ISPI. These results are a reflection of changing industry trends.

Job role results. For typical job roles, 81% of registered participants considered themselves to be both instructional designers and instructional developers; whereas 17% considered themselves instructional designers and two percent considered themselves instructional developers. Seventy-four percent worked in business and industry, 25% worked in higher education and one percent worked in K-12 (see Figure 10).

Job role conclusion. A new trend that has emerged is the dual role and multiple skill sets required of the LT professional. Today, more LT professionals consider themselves to be professionals in both instructional design and development. This suggested that a technology component has emerged in the profession. This is also consistent with previously conducted instructional design studies (See Larson & Lockee, 2004; Lui et al., 2002; Lui, Jones & Hempstreet, 1998; Richey et al., 2001; Seels & Richey, 1994; Wedman & Tessmer, 1993; Winer & Vazquez-Abad, 1995). Richey et al. (2001) explicated the difference between dual and specialized roles of traditional instructional design work. In small organizations and even in some large organizations the generalist role can be the norm as well as the specialist role, depending on the organization and the nature of the learning or performance problem needing a resolution. A team of professionals or a single individual can complete projects. In a team configuration, two or more professionals may work together focusing on a specific instructional design domain, whereas a single professional with skills in all domains could perform the same tasks solo. Many variables play a role in selection of work configuration. Nonetheless, there has always been a separation between the designer role and the developer role. However, more of the work today requires more skill versatility and agility to execute learning programs and technologies in the workplace (See Lui et al. 2002; Lui, Jones & Hempstreet, 1998; Richey et al., 2001; Seels & Richey, 1999).

Research Accomplishments

Four overarching research goals drove the activities in this present study. The first goal was to expand the validity and reliability of the IBSTPI and NWCET competency standards using empirical methods. Equally important to this goal was the need to develop a valid set of scale items that would aid in identifying empirically valid and reliable competency statements and performance statements. This goal was accomplished by 1) conducting a series of content validity, face validity, interrater reliability, and skill level validity studies using a Delphi panel of five experts; 2) establishing initial factor loading scores for each item and scale reliability through pilot testing; and 3) confirming the final scale compositions for dropped and retained items through validation testing.

The second goal was to establish an objective, valid, and reliable rating inventory to measure and score practitioners on the combined set of competency standards. To accomplish this goal it was necessary to test the effectiveness of the Skill Level Classification Rubric as a scale item evaluation tool. This tool enabled correct classification of scale items during pilot and validation studies.

The third goal was to develop a performance assessment inventory for working professionals, students, employers, educational organizations, and professional organizations to aid them in making informed talent management decisions. To accomplish this goal it was necessary to concurrently execute goals one and two. The results obtained confirmed the initial validity and reliability of the inventory. The results also provided support for a new, updated, and expanded set of competency standards for use in the field.

The fourth goal was to establish a strong foundation for continuing this research beyond the dissertation to further the larger IPA research plan. The accomplishments of goal one through three set a strong foundation for continuing this research beyond the dissertation. While the initial outcomes for goals one, two, and three looked promising, additional work is necessary to strengthen the present results beyond the limitations of this present study and before the inventory can serve as a valid and reliable performance assessment tool or research tool.

Recommendations for Action

The data obtained in this dissertation study confirmed the initial statistical significance of the validity and reliability of the ISD Performance Inventory. The study also confirmed the repeated validity and reliability of competency standards based on empirical evidence, which went beyond the content validity and face validity studies conducted by IBSTPI and NWCET. Although the IBSTPI standards have been in existence for more than two decades, today, LT professionals still have no way to manage and track performance to the standards. The NWCET standards recently emerged in the industry and no present way exists to manage and track performance against these supplementary standards either. Both sets of standards describe what performance should be to be a competent LT professional. An LT professional’s work life is constantly changing and new methods, tools and technologies have an immediate impact on individual performance and professional development. To perform the work tasks of the LT role (such as, e-Learning designers and developers, multimedia designers and developers, training designers and developers, course designers and developers), in any work environment, practitioners need the ability to measure and monitor their performance on industry defined competency standards. This would enable them to assess their strengths and weaknesses on core competency standards.

The recommendations presented in this section provide significant implications adoptable by industry stakeholders to support talent management such as learning, performance, compensation, career planning, and succession planning. Industry stakeholders include working professionals, employers, educational organizations, and professional organizations. Highlighting the connection between industry trends, best practices, and research to ongoing performance monitoring and individual development of LT professionals is important. Therefore, assumptions gleaned from prior research studies, industry trend data, and professional observations are included to support recommendations for professional practice. The recommendations for future research provide support to continue this validation effort beyond the limitations experienced in this present study to establish stronger evidence of validity and reliability of the inventory and to continue the larger IPA research plan.

Recommendations for Professional Practice

Recommendation 1. Professional competencies in all areas of instructional design require assessment on a recurring basis to ensure that a professional's expertise remains current with changing trends.

Implication of 1. Instructional design practice requires skill versatility because of emerging and constantly changing trends in the industry. The generalist role is still a dominant role in the industry and some organizations use both generalists and specialists to accomplish their learning and performance goals. "In many organizations instructional designers continue to perform all five phases of a design project, but there is an increasing trend towards specialization" (Richey et al., 2001, p. 107). These role specializations include analyst, evaluator, eLearning specialist, and project manager (Richey et al., 2001). Today, the expectation is that LT professionals possess a multiple skill set. They must continually update and expand their skills to align with industry trends and meet immediate demands and business needs (Colteryahn & Davis, 2004; Richey et al., 2001; Rothwell & Kazanas 2004; Seels & Richey, 1994; Verstegen, Barnard, & Pilot 2008). To expand one's skill set on a recurring basis requires a valid and reliable assessment measure that can assist professionals, employers, educational organizations, and professional organizations with identifying a person's strengths and weaknesses on core industry defined competency standards.

Significance of 1. No valid or reliable performance assessment method is available to assess LT professionals on core industry defined competency standards across all instructional design knowledge domains. This dissertation study served as an initial first step toward accomplishing this recommendation. The initial results of the ISD Performance Inventory provided a strong foundation for establishing an objective, valid, and reliable performance measurement method in the field.

Recommendation 2. Professional competencies focused on an integrated approach to instructional design practice should be ongoing, recurring, and align with performance assessment methods.

Implication of 2. Multiple skills are paramount in the LT profession. Even with skill specializations many of the tasks and functions that are evident in the generalist role cross over into many of the specialist roles. This overlap in job roles and responsibilities indicates a core set of skills is common between roles. Core skills represent a common set of foundational competencies needed across each role (NWCET 2003; Richey et al., 2001). This implies that certain skills are necessary regardless of the role an individual may be executing, at any given period in time. Hence, a professional may leverage core skills when exercising professional judgment about which role or hat he or she will wear when solving learning and performance problems.

Any performance assessment measurement created must consider the integrated nature of LT practice as a part of comprehensive assessment of a professional. "Upward movement [in a knowledge] domain…has been difficult to show equivalency or even a relationship across domains, [and to a lesser]… less extent show behaviors that integrate domains" Gander (2006a, p. 12). However, a shift from using a single approach focused on levels of difficulty to one that uses multiple perspectives to assess a person's capability provides a foundation for integrated assessment. One potential assessment method used in this present study was the Skill Level Classification Rubric. This tool provided the initial framework needed to demonstrate the initial validity and reliability of the ISD Performance Inventory. Recommendation 8, discussed later in this section, explores ways to replicate this present study to strength the use of the Skill Level Classification Rubric as a tool to measure individual performance.

Significance of 2. Competence is essential for developing expertise and expert performance. "Competency [standards] may enable people to achieve success, but they do not ensure it" (Teodorescu & Binder, 2004, p. 8). Alone, competencies are descriptions that state what professionals must be able to do to be competent performers. To move beyond these descriptors of performance to definitive performance outcomes a integrated performance assessment solution provides the greatest benefit as a comprehensive approach considering the complexities of the LT profession. Developing the assessment measures needed to describe performance is an essential first step because it connects competencies to work flow; best practices, and desired on-the-job performance (Gander, 2006b).

Recommendation 3. An expansion of the instructional designer and instructional developer job role in organizations should encompass multiple knowledge domains.

Implication of 3. The standards clearly define the competencies and performance statements needed to perform the role of instructional designer in the instructional technology and information technology fields. Traditionally, this role was for individuals who obtained knowledge, skills, and experience through informal and formal learning paths in education. Today, the role has expanded to include a wider range of disciplines in arts and science. Convergence of instructional technology with information technology is not uncommon in the profession. Historically, the profession has leveraged more mature disciplines as a basis for theory and practice (Richey et al., 2001; Seels & Richey, 1999). NWCET (2003) generated a list of instructional design job roles and titles that an individual may fulfill in some capacity. The NWCET standards represented the competency standards for instructional designers working in any area of information technology. The media technologist role represents the many job roles and titles defined in the NWCET standards. The media technologist role is a technical job classification that has emerged in the field in recent years. This specific job role focuses on more creative, innovative and technical functions (e.g. programming, applications, and digital media technologies), which were traditionally reserved for more creative and technical professions. What is more, the information technology field akin to the education and training field is transcendent. Transcendent fields have a horizontal function, which indicates cross-disciplinary influence.

With a new role emerging from the information technology field, the LT role has further expanded. This role reflects the seemingly complex and integrated nature of the types of programs, projects, and organizational initiatives that instructional design professionals must solve and work on. Instructional design professionals must engage and work with content experts, application architects, business analysts, engineers, and many other professional roles depending on the situation or need. According to Verstegen et al. (2008, p. 353), “The design of [complex design solutions and advanced instructional] products is more complex, not only because of the technology involved but also because of the many different parties involved and the many different…requirement requests.” What is more, LT professionals are finding it necessary to make conscious and informed decisions to further nurture and develop their minds to be able to perform at expert levels. Gardner (2007) posited that individuals will need to develop several types of minds for the future to be able to thrive and adapt in a new emerging world that is manifesting and shifting at an accelerated pace.

The LT role encapsulates each of the five roles defined by Richey and her colleagues with the added complexity of using a core skill set combined with systems thinking. Figure B19 illustrates a conical geometric shape (top view in diagram). The illustration suggests depth, complexity, and breadth embedded within the LT role, which requires a systems thinking approach. The focal point (center of cone) represents core skills. Ideally, an individual must use these core skills continuously throughout the execution of instructional systems design techniques wherever needed. This further indicates that an individual may find it necessary to extend his or her role responsibilities to perform tasks reserved for one or more of the other roles, given the complex nature of programs, projects, and organizations. A person could also seek to focus on a single role or multiple roles as a part of individual development. However, focus on a single role may severally impede a person’s professional growth and development as the field becomes progressively more complex and sophisticated.

Significance of 3. Expansion of the LT role undoubtedly provides for greater control, better agility, increased expertise, and technical leadership. Professionals who possess and demonstrate an integrated skill set will represent a unique group of practitioners in the field. These professionals will be able to: 1) Handle multiple tasks and job roles; 2) Recognize when to assume a more specialized role given the needs of a program, project, product, or service; 3) Identify and diagnose problems early during the analysis and design steps; 4) Work in integrated teams or workgroups, in a single or specific role, or carry all the roles for an entire project; 5) Manage multiple projects from beginning to end.

By adding the media technologist role as well as the LT role to the current list of roles in the profession this will allow for greater freedom to exercise skill versatility and expand LT professionals' competency set. Adding both roles provides opportunities for practitioners to have more control over the strategic process involved in identify and executing learning and performance solutions. It also enables them to leverage and build more robust, creative, innovative, and faster solutions based on a specific business need or problem using multiple types of media technologies and competency sets. The "profession is at risk if LT professionals do not learn how to help organizations create and innovate" (Colteryahn & Davis, 2004, p. 29). Role expansion also enables increased expertise across all competency domains. Finally, role expansion enables practitioners to assume a more technical leadership role in any organization in which they may work. With organizational support focused on enabling the workforce, the time is ripe for practitioners to gain leeway in demonstrating their expanded value within organizations. LT professionals must be able to "demonstrate a payback from [work] efforts in the form of improved organizational [and individual] performance…with measurable results" (Colteryahn & Davis, 2004, p. 34). "A first step in linking learning to [human performance requires]…recognizing the strategic business importance of learning within the enterprise" (Chaisson, 2005, p. 2).

Recommendation 4. Expansion of education and training programs will provide a interdisciplinary approach to professional development.

Implication of 4. Current education and training programs provide a strong foundation in the tenets of instructional systems design. At universities numerous academic programs are being offered. New certification programs have also emerged through professional organizations such as ASTD and ISPI, and training has become available in the application and use of various new media software applications and tools. However, a present need to expand, update and create education and training programs to align to industry standards will help to provide LT professionals with the developmental programs they will need. Education and training programs must also provide opportunities to strengthen and build integrated skill capabilities by combining learning and technical theory with practice. Performance based education and training is essential in all areas of instructional design to support role expansion of LT professionals. Specific curricula should focus on teaching principles such as graphic design, scripting and programming, digital video, and digital audio to name a few. The curricula should also focus on blending learning theory and technical theory, leveraging context based instructional programming, and implementing performance based assessments that align to industry standards. This will further enable more efficient, effective, and robust solution development while applying various learning and performance technologies.

Significance of 4. Expansion of educational curricula and training programs to include additional content domains from complementary disciplines is necessary to meet the professional development needs of LT professionals. For example, learning capability can and should link individual performance to business performance. Prieto and Revilla (2006) claimed knowledge stocks and learning flows intertwine so one complements the other. “Learning capability can be sustained as a source of non-financial [sic] performance through the creation of value for stakeholders and, thus as a decisive channel for financial performance” (Prieto & Revilla, 2006, p. 503). LT professionals need flexibility and options that allow them to control and manage their own professional development. Similarly, employers, educational organizations, and professional organizations need the same flexibility and control to be able to make decisions regarding employees; job and student applicants; and project, program, and curricula development needs.

Recommendation 5. Education and training programs should complement a person’s individual development plan.

Implication of 5. Education and training programs designed to meet the needs of a mass population has been the format for formal and informal educational practices. The assumption is that one size fits all. The problem with this assumption is that one size does not fit all. Performance-based education and training is the most effective way to develop and measure individual learning and performance. Mager (1997) suggested to enable effective learning performance objectives must describe a measurable outcome. Mager also suggested that performance objectives be written in the form of performance statements. Alone performance statements do not provide the evidence needed to judge how well a person met the performance outcome. It only describes what the performance should be for competency to be present. Any performance-based curriculum plan should consider the individual needs of the learner or performer, the conditions under which to perform effectively, and the criterion by which to judge the learning outcome (Mager, 1997). This does not suggest that performance objectives and outcomes should be different for each person. Rather, it means that more flexibility and alterative options should be provided to allow individuals to focus their development plans on their weaknesses rather than their strengths. This will enable holistic skill development in all knowledge domains. Another equally important factor to raise performance levels would be to remove measurement-imposed barriers. According to Binder (2003) measurement methods, procedures, and teaching materials can limit performance through deficit-imposed ceilings. Methods and materials must be designed to enable fluid performance rather than hinder it.

Significance of 5. LT professionals must be able to develop skill versatility to meet the demands of an incessantly changing industry. Redefining how we plan, develop, and deliver education and training programs will transform the expertise capability of LT practitioners. These professionals would become more capable and exhibit leadership versatility as technical leaders within the profession. Versatility refers to the ability to be able to continually adjust…[one's behavior,] deftly apply the right approach to the right degree, for the circumstance at hand" (Kaplan & Kaiser, 2003, p. 22). The idea is to mitigate skill imbalance. Skill imbalance refers to overly focusing on developing and using one's strengths while neglecting one's weaknesses. What is more, this will also supplant the expanded LT role in the workplace thus allowing for increased visibility, influence and business value.

Recommendation 6. Adoption of the combined IBSTPI and NWCET standards proposed is essential to align with emerging technology trends and instructional technology practice.

Implications of 6. The first edition of the IBSTPI standards defined and published in 1986, which got updated in 2000 to reflect industry changes (Richey et al., 2001). A few years after the publication of the IBSTPI standards NWCET defined and published a set of standards to reflect instructional design practices specifically for the information technology field. The IBSTPI standards do not reflect instructional design practices for information technology. The combined competency framework used in this present study must be adopted if we are to meet the challenges of tomorrow.

Significance of 6. The combined competency framework provides a valid and reliable competency framework that can be used to guide educational programming, performance assessment, talent management, and research. It supports the planning, development, and implementation of education and training programs that focuses on all areas of LT practice.

Recommendations for Future Research

Recommendation 7. Update industry competency standards must be updated on a regular and recurring basis to stay current with changing trends in technology and emerging LT practice.

Implication of 7. Competency standards provide key information in the assessment of individual practitioners. The data obtained through the use of competency standards can provide direction in the process of assessing professionals and assist with individual career advancement as well as add value to organizations (NWCET, 2003; Richey et al., 2001). Requiring professionals to stay current with changing trends also requires updated competency standards on a regular and recurring basis to align with industry trends.

Significance of 7. Updating competency standards on a regular recurring basis will provide the necessary expansive and uniform framework that could be used by all stakeholders across the field. Competency standard updates also provide the necessary foundation for future enhancements of performance assessment measurement tools. Finally, competency standard updates provide a guideline for what competent performance should be and provides direction for research (Richey et al, 2001).

Recommendation 8. Replicate this research to test the reusability of the Skill Level Classification Review Rubric to further validate the ISD Performance Inventory and to test reuse in other types of quantitative research.

Implication of 8. Study replication is an effective way to further establish scale validity and reliability of the inventory. It will also help to confirm the reuse of research design techniques and methods with additional independent samples. DeVellis (2003) suggested that replication of the factor analytical process on an independent sample would aid in demonstrating that the results obtained are not a one-time chance occurrence. In a study conducted by Ven and Chuang (2005) they were able to classify information technology competencies into Bloom's taxonomy categories. The action verb lexicon that resulted from Ven and Chuang's study was included in the item review process to rate scale items in the inventory. The initial results of this dissertation study showed great potential for the use of Bloom's taxonomy to classify items during scale development, which provided a strong basis for classifying scale items in the final inventory.

Significance of 8. The results from this dissertation study demonstrated empirical evidence for the use of Bloom's taxonomy as an alternative method to classify expertise in the development of performance measures. Only through the replication of future studies will more evidence to support or refute the use of the classification rubric be obtained. Supporting evidence indicated initial progress toward establishing an objective and reliable measure that can be linked to other performance assessment levels.

Recommendation 9. Establish concurrent validity of the ISD Performance Inventory not completed in Part C of this present study.

Implication of 9. Because Part C of this dissertation study could not be completed cut-off scores could not be established. Cut-off scores help to correctly classify individuals by establishing concurrent validity (Shrock & Coscarelli, 2000). With no third-party rater data, comparisons between focal participant and third-party participant ratings could not be completed. A future study should consider working closely with an employer or educational organization to conduct the study with smaller groups and individual scales from the inventory. This approach offers greater opportunity to increase agreement to participate because focal and third-party participants would have a stronger relationship. A smaller group sample with one or two organizations provides for greater control and confidentiality. Additionally, many of the participants that could be enlisted to participant would be internal managers and their direct reports or peer coworkers. A close relationship between managers, direct reports, and peer coworkers would exist thus making it more likely to aid in increasing participation. Conducting smaller study groups with one or two scales rather than the full inventory will also mitigate participant fatigue and time constraints, which could lead to increased participation.

Significance of 9. Concurrent validity must be completed to establish the necessary cut-off scores. Concurrent validity data will further provide empirical evidence to confirm the use of the Skill Level Classification rubric in future research studies. The data will also help to establish the concurrent validity of the inventory.

Recommendation 10. Conduct future research to establish valid and reliable scale items for performance statements dropped in this present study.

Implication of 10. Throughout the validation process scale items got dropped from each scale of the inventory. All items were aligned directly to a performance statement and each performance statement was aligned to a competency statement. Any scale items that got dropped from the final inventory also addressed a specific performance statement, which also increased the possibility of a performance statement of being dropped. This validation process resulted in omitting 134 items and 79 performance statements from the final inventory. No competency statements were omitted. The final scale composition for the inventory is shown in Table A46. This table also summaries the results of scale compositions by validation process.

Significance of 10. A finite number of performance statements had to be dropped because a valid and reliable number of scale items did not warrant keeping them. This suggests that future research needs to establish the validity and reliability of those performance statements that had to be dropped. The scale items written for each of the performance statements did not provide a consistent measurement. As a result, new scale items must be written or existing scale items that got dropped refined to address each performance statement that got dropped. Another scale validation study will be needed to obtain empirical evidence for these additional performance statements and scale items to further establish the validity and reliability of the inventory.

Recommendation 11. Extend this present study to include a larger sample to further confirm the validity and reliability of the ISD Performance Inventory.

Implication of 11. The sample sizes obtained included 49 participants for Part A, 30 participants for Part B and 48 participants for Part C. These samples were insufficient. As noted earlier the ideal sample needed at the start of validation should have been approximately 410 participants, but only if sample size was the only indicator of validity. Current results led to a reduction of the entire inventory. Table 14 shows required sample sizes based on the final ISD Performance Inventory. The DM scale and WDA scale require a sample size greater than 200. Ideally, a sample size of 200-380 is appropriate using sample size estimations as a single measure for scale validity. Since sample size alone is not the only measure for validity, a cross-validation method must be used to offset the suggested sample size. Therefore, a more realistic sample size would be approximately 150-250.

Table 14

Recommended Scale Sample Compositions for Future Studies

Standards	Scale	C	PS	SI	Sample
IBSTPI	PF	5	19	37	185
	PA	7	18	30	155
	DD	6	25	36	185
	IM	5	24	39	195

	DM	5	31	49	255
NWCET	TW	5	21	38	195
	WDA	8	51	76	380
Total		41	189	305	200-380

With the sample obtained the data did show proof of the initial validity and reliability of the inventory. However, to strengthen the current results, continuation and replication of this research must be conducted with a larger sample from the population. To improve on the possibility of obtaining a representative sample, future studies should look at ways to test configurations. For example, one possible test configuration would be to administer individual scales at different times to reduce the number of scale items in each survey administered. This will undoubtedly mitigate participant fatigue because of the large number of scale items reviewed during each administration. Another possible test configuration would be to administer individual scales concurrently across various samples pulled from the field to also reduce fatigue among participants and the time and effort required to complete and administer each scale survey.

Significance of 11. Extending this present study to include a larger representative sample will generate more empirical data. This would further strengthen the validity and reliability of the inventory and allow for generalization of results to the larger population.

Recommendation 12. Continue the IPA research plan beyond the dissertation to establish the validity and reliability of the entire IPA method.

Implication of 12. As noted at the start of this research effort, this dissertation study was a first step toward establishing a more objective, valid, and reliable measurement method. Currently, no way exists for LT professionals to track and manage performance against industry competency standards. Today, the standards exist as valid descriptors of performance. Yet to be usable and measurable an objective, valid, and reliable method stands the best chance for leveraging existing competency standards that reflect the nature of LT practice and to link learning and performance together with the current state of the industry.

Significance of 12. LT professionals must do more to expand their present role in organizations world-wide, these professionals need support to manage and control their own careers to be able to accomplish and exceed the challenges that lie ahead. What is more, employers, educational organizations, and professional organizations also need similar control to better manage talent within each specific context. Execution of the IPA research plan will provide the necessary foundational research and support needed to enable and empower stakeholders across the industry towards accomplishing this recommendation.

Summary

At the start of this research study effort there were four underling goals to accomplish. The data obtained in this dissertation study carried out each goal as follows. Goal one sought to provide a focal point of investigation expected to lead to more elaborate and complex studies defined in the IPA research plan. Recommendation eight through twelve specifically addressed this first goal. Goal two sought to develop and validate the ISD Performance Inventory to establish an initial measure for scoring LT professionals across all knowledge domains and related disciplines on known competency standards. Recommendation seven through eleven specifically addressed this goal. Goal three sought to better classify and explicate ISD competencies to reflect stages of growth and development using Bloom's taxonomy and the Dreyfus model.

Recommendation eight addressed this goal. Goal four sought to expand the validity and reliability of ISD competencies through quantitative analysis. Recommendation seven through eleven specifically addressed this goal. Carrying out each of these goals provided the necessary foundation needed to create an integrated performance assessment method that could lead to valid and reliable performance measures (perceived, assessed, and demonstrated). Overall, this dissertation study served as the first study in a series of studies to validate the IPA research plan, which can also be used to determine a person's fit to a specific organization, job role, or career path.

In today's rapidly changing, global economy, LT professionals have no way to manage and track performance to industry competency standards. An LT professional's work life is constantly changing and new methods, tools, and technologies have an immediate impact on individual performance and professional development. To perform the functions of the expanded LT role professionals need to be able to measure and monitor their performance on industry defined competency standards. This would enable them to assess their strengths and weaknesses on core competency standards. According to Rothwell and Kazanas (2004, p. 386), LT professionals "have a responsibility to keep their skills current." Richey et al. (2001) claimed updating and improving one's knowledge, skills, and abilities is an important and essential competency. Global and emerging technologies now make it essential for continuous professional development. What is more, employers and educational organizations require a means for measuring, tracking, and scoring an employee's competencies and skills against industry standards to assist with talent management.

The data suggested that linking individual performance to competency standards would enable effective judgments about a person's performance in a specific job role or work task. Competency standards are useful for nominating, selecting, and placing individuals for a specific job role or educational program (Reynolds et al., 2006; Society for Industrial and Organizational Psychology, 2003). Competency standards are difficult to apply beyond subjective judgments unless a valid instrument for measuring performance against the competency standards is also available to the assessor. With the right measurement methodologies and tools professionals would be able to measure, score, and monitor their own performance on existing competency standards. This would also enable them to make better professional development and career planning decisions. Similarly, employers, educational organizations, and professional organizations would also be able to measure and check individual performance for recruitment, selection, placement, succession planning, educational programming and training, compensation and career counseling.

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APPENDIX A: TABLES

Table 15

IBSTPI Professional Foundations Competency Standards

Competency	Performance
1. Communicate Effectively in visual and oral form.	• Create messages that accommodate learner needs and characteristics, content, and objectives. • Write and edit text to produce messages that are clear, concise, and grammatically correct. • Apply principles of message design to page layout and screen design. • Create visuals that instruct, orient, or motivate. • Deliver presentations that effectively engage and communicate. • Use active listening skills in all situations. • Present and receive information in a manner that is appropriate for the norms and tasks of the group or team. • Seek and share information and ideas among individuals with diverse backgrounds and roles. • Facilitate meetings effectively.
2. Apply current research and theory to the practice of instructional design.	• Promote, apply and disseminate the results of instructional design theory and research. • Read instructional design research, theory and practice literature. • Apply concepts, techniques and theory of other disciplines to problems of learning, instruction and instructional design.
3. Update and improve one's knowledge, skills, and attitudes pertaining to instructional design and related fields.	• Apply developments in instructional design and related fields. • Acquire and apply new technology skills to instructional design practice. • Participate in professional activities. • Document one's work as a foundation for future efforts, publications or professional presentation. • Establish and maintain contacts with other professionals.
4. Apply fundamental research skills	• Use a variety of data collection tools

to instructional design projects.	and procedures. • Apply appropriate research methodologies to needs assessment and evaluation. • Use basic statistical techniques in needs assessment and evaluation. • Write research and evaluation reports.
5. Identify and resolve ethical and legal implications of design in the workplace.	• Identify ethical and legal dimensions of instructional design practice. • Anticipate and respond to ethical consequences of design decisions. • Recognize and respect intellectual property rights of others. • Recognize the ethical and legal implications and consequences of instructional products. • Adhere to regulatory guidelines and organizational policies.
Total = 5	**Total = 26**

Table 16

IBSTPI Planning and Analysis Competency Standard.

Competency	Performance
6. Conduct a needs assessment.	• Describe the problem and its dimensions, identifying the discrepancies between current and desired performance. • Clarify the varying perceptions of need and their implications. • Select and use appropriate needs assessment tools and techniques. • Determine the possible causes of the problem and potential solutions. • Recommend and advocate non-instructional solutions when appropriate. • Complete a cost benefit analysis for recommended solutions.
7. Design a curriculum program.	• Determine the scope of the curriculum or program. • Specify courses based upon needs assessment outcomes. • Sequence courses for learners and groups of learners. • Analyze and modify existing curricula or programs to insure adequate content coverage. • Modify an existing curriculum or program to reflect changes in society, knowledge base, or the organization.
8. Select and use a variety of techniques for determining instructional content.	• Identify content requirements in accordance with needs assessment findings. • Elicit, synthesize and validate content from subject matter experts and other sources. • Determine the breadth and depth of intended content coverage given instructional constraints. • Determine prerequisites given the type of subject matter, the needs of the learners and the organization. • Use appropriate techniques to analyze varying types of content.
9. Identify and describe target population characteristics.	• Determine characteristics of the target population influencing learning transfer.

	• Analyze, evaluate, and select learner profile date for use in a particular design situation.
10. Analyze the characteristics of the environment.	• Identify aspects of the physical and social environment that impact the delivery of instruction. • Identify environmental and cultural aspects that influence attitudes toward instructional interventions. • Identify environmental and cultural factors that influence learning attitudes and performance. • Identify the nature and role of varying work environments in the teaching and learning processes. • Determine the extent to which organizational mission, philosophy, and values influence the design and success of a project.
11. Analyze the characteristics of existing and emerging technologies and their use in an instructional environment.	• Specify the capabilities of existing and emerging technologies to enhance motivation, visualization, interaction, simulation, and individualization. • Evaluate the capacity of a given infrastructure to support selected technologies. • Assess the benefits of existing and emerging technologies.
12. Reflect upon the elements of a situation before finalizing design solutions and strategies.	• Generate multiple solutions to a given problem or situation. • Remain open to alternative solutions until sufficient data have been collected and verified. • Assess the consequences and implications of design decisions on the basis of prior experience, intuition, and knowledge. • Revisit selected solutions continuously and adjust as necessary.
Total = 7	**Total = 30**

Table 17

IBSTPI Design and Development Competency Standards

Competency	Performance
13. Select, modify, or create a design and development model appropriate for a given project.	• Consider multiple design and development models. • Select and create a model suitable for the project based on an analysis of the model elements. • Modify a model if project parameters change. • Provide a rationale for the selected design and development model.
14. Select and use a variety of techniques to define and sequence the instructional content and strategies.	• Use appropriate techniques to identify the conditions that determine the scope of the instructional content. • Use appropriate techniques to specify and sequence instructional goals and objectives. • Select appropriate media and delivery systems. • Analyze the learning outcomes and select appropriate strategies. • Analyze the instructional context and select appropriate strategies. • Select appropriate participation and motivational strategies. • Select and sequence assessment techniques. • Prepare a design document and circulate for review and approval.
15. Select or modify existing instructional materials.	• Identify existing instructional materials for reuse or modification consistent with instructional specifications. • Select materials to support the content analyses, proposed technologies, delivery methods and instructional strategies. • Use cost-benefit analyses to decide whether to modify, purchase, or develop instructional materials. • Work with subject matter experts to validate material selection or modification.

	• Integrate existing instructional materials into the design.
16. Develop instructional materials.	• Develop materials that support the content analyses, proposed technologies, delivery methods, and instructional strategies. • Work with subject matter experts during the development process. • Produce instructional materials in a variety of delivery formats.
17. Design instruction that reflects the understanding of the diversity of learners and groups of learners.	• Design instruction that accommodates different learning styles. • Be sensitive to the cultural impact of instructional materials. • Accommodate cultural factors that may influence learning in the design.
18. Evaluate and assess instruction and its impact.	• Construct reliable and valid test items using a variety of formats. • Identify the processes and outcomes to be measured given the identified problem and proposed solution. • Develop and implement formative evaluation plans. • Develop and implement summative evaluation plans. • Develop and implement confirmative evaluation plans. • Determine the impact of instruction on the organization. • Identify and assess the sources of evaluation data. • Manage the evaluation process. • Discuss and interpret evaluation reports with stakeholders.
Total = 6	**Total = 32**

Table 18

IBSTPI Implementation and Management Competency Standards

Competency	Performance
19. Plan and manage instructional design projects.	• Establish project scope and goals. • Use variety of techniques and tools to develop a project plan. • Write project proposals. • Develop project information systems. • Monitor multiple instructional design projects. • Allocate resources to support the project plans. • Select and manage internal and external consultants. • Monitor congruence between performance and project plans. • Troubleshoot project problems. • Debrief design team to establish lessons learned.
20. Promote collaboration, partnerships and relationships among the participants in a design project.	• Identify how and when collaboration and partnerships should be promoted. • Identify stakeholders and the nature of their involvement. • Identify subject matter experts to participate in the design and development process. • Build and promote effective relationships that may impact a design project. • Determine how to use cross-functional teams. • Promote and manage the interactions among team members. • Plan for the diffusion of instructional or performance improvement products.
21. Apply business skills to manage instructional design.	• Link design efforts to strategic plans of the design function. • Establish strategic and tactical goals for the design function. • Use a variety of techniques to establish standards of excellence. • Develop a business case to promote the critical role of the design function. • Recruit, retain, and develop instructional design personnel.

	• Provide financial plans and controls for the instructional design function. • Maintain management and stakeholder support of the design function. • Market services and manage customer relations.
22. Design instructional management systems.	• Establish systems for documenting learner progress and course completion. • Establish systems for maintaining records and issuing reports of individual and group progress. • Establish systems for diagnosing individual needs and prescribing instructional alternatives.
23. Provide for the implementation of instructional products and programs.	• Use evaluation data as a guide for revision of products and programs. • Update instructional products and programs as required. • Monitor and revise the instructional delivery process as required. • Revise instructional products and programs to reflect changes in professional practice or policy. • Revise instructional products and programs to reflect changes in the organization or target population. • Recommend plans for organizational support of instructional programs.
Total = 5	**Total = 33**

Table 19

NWCET Digital Media Competency Standards

Competency	Performance Statement
24. Performance Analysis.	• Gather data to identify internal and external customer requirements. • Define scope of work. • Develop, present, and test concepts. • Create preliminary design. • Research content. • Present cost and benefit data. • Prepare and present functional requirements. • Identify technical constraints and prepare specifications and project plan.
25. Produce Visual and Functional Design.	• Determine media types and delivery platform. • Complete basic design and storyboard. • Develop and produce drafts and rough-cuts. • Design and evaluate user interface, visual appeal, and functional design. • Develop, evaluate, and refine simulations. • Select appropriate software and hardware tools. • Document design process. • Coordinate with design team to ensure design meets business goal.
26. Perform Media Production and Acquisition.	• Develop evaluate and revise text and scripts. • Create prototypes. • Identify available media and content sources. • Produce or acquire content elements. • Map project to design specifications and timelines. • Substantiate make-or-buy decisions. • Participate in interactive development with clients and team members. • Ensure media productions and acquisitions meet legal and copyright

	requirements.
27. Implement Design.	• Create and produce finished content. • Implement and refine navigation and interface design. • Implement database connectivity. • Create and incorporate application components. • Optimize design for maintainability. • Document implementation process.
28. Test and Deliver Product.	• Develop and perform usability and functionality tests. • Identify and resolve defects. • Document testing process and test results. • Conduct customer acceptance testing and deliver product. • Conduct periodic reviews and gather data for revisions.
Total = 5	**Total = 35**

Table 20

NWCET Technical Writing Competency Standards

Competency	Performance Statement
29. Analyze Project Requirements	• Gather data to identify customer requirements. • Interpret, evaluate, and customer requirements. • Define scope of work. • Identify time, technology and resource constraints and delivery options. • Review and refine document plan. • Define purpose, standards, and use of documentation. • Determine method of publication.
30. Perform Research	• Define research questions. • Identify and evaluate sources of information. • Gather background information. • Interview subject matter experts. • Interview and/or observe audience characteristics. • Interpret and report results.
31. Design Document	• Select design and publication tools. • Plan layout and document design. • Select style and tone. • Determine information flow and level of detail. • Identify appropriate visuals. • Provide feedback to development team/individuals.
32. Develop and Write Document	• Select, synthesize, and organize pertinent information to meet user needs. • Create content of document. • Develop feedback/validation vehicles. • Obtain feedback on information and technical accuracy. • Edit for readability, grammar, and usage. • Test, validate, and verify for usability.
33. Publish and Package	• Collaborate with graphics specialists. • Coordinate with printer and/or media production house. • Provide advice regarding delivery

	media and methodology. • Tailor composition and layout for delivery media. • Coordinate with website developer or administrator.
Total = 5	**Total = 30**

Table 21

NWCET Web Development and Administration Competency Standards

Competency	Performance Statement
34. Perform Technical Analysis	• Gather data to identify customer requirements and capacity. • Define scope of work. • Prepare and present functional and technical specifications. • Prepare preliminary application. • Create and refine preliminary design for mockup. • Review technical considerations and constraints. • Develop project plan.
35. Perform Web Programming	• Develop site map application models and user interface specifications. • Choose a site plan. • Select programming languages design tools and applications. • Write supporting code. • Identify major subsystems and interface. • Develop models. • Develop design and interface specifications. • Identify system platform, components, and dependencies. • Develop appropriate data models.
36. Develop, Deliver, and Manage Content	• Research content and information architecture. • Coordinate content development from multiple contributors. • Develop and present concept alternatives. • Create or adapt content. • Produce graphics layout elements and applicable code. • Update content.
37. Implement and Maintain Site and Applications	• Plan rollout. • Facilitate move to production system. • Hand off to customer or user. • Integrate customer feedback. • Perform application maintenance. • Recommend optimization and

	facilitate upgrades and improvements. • Document application and site changes. • Develop and implement contingency plans.
38. Manage Web Environment	• Evaluate and recommend web hardware, software, and third-party solutions. • Set up server software and hardware. • Manage server. • Support systems recovery.
39. Manage Enterprise-wide Web Applications	• Define and manage development standards. • Train designers and developers. • Evaluate web technologies and standards. • Provide quality customer service. • Perform ROI (Return on Investment) analysis to ensure business goals are met. • Design and document security plan. • Implement and enforce security requirements. • Maintain and improve security in response to industry developments and user experience. • Develop enterprise-wide legal and international privacy guidelines.
40. Perform Testing and Quality Assurance	• Develop test and acceptance plan. • Develop test procedures. • Develop and perform usability and integration testing. • Perform tests. • Document test results and take corrective actions. • Recommend and implement performance improvements.
41. Develop and Implement Web Database	• Develop physical database characteristics and create database objects. • Select unique identifiers and normalize the data model. • Support population of database. • Integrate high-level business rules. • Plan implementation and deploy database.

	• Define and implement user interface.
Total = 8	**Total = 55**

Table 22

Professional Foundations Scale Content Validity Run 1

Competency	C1																			
Performance Statement		PS1			PS2				PS3			PS4			PS5		PS6			PS7
Variable ID	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20
rater3	2	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	2	3	3	1	1	1	1	1	1	3	1	1	1	1	1	2	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	2	2	2	2
Mean	1.6	1.4	1.6	1.8	2.0	2.0	1.6	1.6	1.6	1.6	1.4	1.4	1.8	1.4	1.0	1.0	1.2	1.2	1.4	1.2
Standard Error	0.40	0.40	0.40	0.37	0.45	0.45	0.40	0.40	0.40	0.40	0.40	0.40	0.49	0.40	0.00	0.00	0.20	0.20	0.24	0.20
Median	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	2	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0.89	0.89	0.89	0.84	1.00	1.00	0.89	0.89	0.89	0.89	0.89	0.89	1.10	0.89	0.00	0.00	0.45	0.45	0.55	0.45
Sample Variance	0.80	0.80	0.80	0.70	1.00	1.00	0.80	0.80	0.80	0.80	0.80	0.80	1.20	0.80	0.00	0.00	0.20	0.20	0.30	0.20
Kurtosis	0.31	5.00	0.31	-0.61	-3.00	-3.00	0.31	0.31	0.31	0.31	5.00	5.00	-3.33	5.00	0.00	0.00	5.00	5.00	-3.33	5.00
Skewness	1.26	2.24	1.26	0.51	0.00	0.00	1.26	1.26	1.26	1.26	2.24	2.24	0.61	2.24	0.00	0.00	2.24	2.24	0.61	2.24
Range	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	2	2	2	2
Sum	8	7	8	9	10	10	8	8	8	8	7	7	9	7	5	5	6	6	7	6
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 22 (Cont.)

Professional Foundations Scale Content Validity Run 1

Competency	C1							C2						C3					
Performance Statement	PS8				PS9				PS1		PS2	PS3		PS1	PS2			PS3	
Variable ID	V21	V22	V23	V24	V25	V26	V27	V28	V29	V30	V31	V32	V33	V34	V35	V36	V37	V38	V39
rater3	1	1	1	1	1	2	1	2	2	1	1	2	1	2	2	1	1	1	1
rater4	1	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	2	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.4	1.6	1.2	1.2	1.2	1.6	1.2	1.6	1.4	1.2	1.2	1.4	1.2	1.4	1.4	1.2	1.2	1.4	1.2
Standard Error	0.24	0.24	0.20	0.20	0.20	0.24	0.20	0.24	0.24	0.20	0.20	0.24	0.20	0.24	0.24	0.20	0.20	0.24	0.20
Median	1	2	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1
Mode	1	2	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0.55	0.55	0.45	0.45	0.45	0.55	0.45	0.55	0.55	0.45	0.45	0.55	0.45	0.55	0.55	0.45	0.45	0.55	0.45
Sample Variance	0.30	0.30	0.20	0.20	0.20	0.30	0.20	0.30	0.30	0.20	0.20	0.30	0.20	0.30	0.30	0.20	0.20	0.30	0.20
Kurtosis	-3.33	-3.33	5.00	5.00	5.00	-3.33	5.00	-3.33	-3.33	5.00	5.00	-3.33	5.00	-3.33	-3.33	5.00	5.00	-3.33	5.00
Skewness	0.61	-0.61	2.24	2.24	2.24	-0.61	2.24	-0.61	0.61	2.24	2.24	0.61	2.24	0.61	0.61	2.24	2.24	0.61	2.24
Range	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Sum	7	8	6	6	6	8	6	8	7	6	6	7	6	7	7	6	6	7	6
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 22 (Cont.)

Professional Foundations Scale Content Validity Run 1

Competency	C3				C4									
Performance Statement	PS4		PS5		PS1				PS2		PS3		PS4	
Variable ID	V40	V41	V42	V43	V44	V45	V46	V47	V48	V49	V50	V51	V52	V53
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	2	2	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	2	2	1	1	1	1	2	2	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.2	1.2	1.2	1.2	1.4	1.4	1.2	1.2	1.2	1.2	1.6	1.6	1.2	1.2
Standard Error	0.20	0.20	0.20	0.20	0.24	0.24	0.20	0.20	0.20	0.20	0.24	0.24	0.20	0.20
Median	1	1	1	1	1	1	1	1	1	1	2	2	1	1
Mode	1	1	1	1	1	1	1	1	1	1	2	2	1	1
Standard Deviation	0.45	0.45	0.45	0.45	0.55	0.55	0.45	0.45	0.45	0.45	0.55	0.55	0.45	0.45
Sample Variance	0.20	0.20	0.20	0.20	0.30	0.30	0.20	0.20	0.20	0.20	0.30	0.30	0.20	0.20
Kurtosis	5.00	5.00	5.00	5.00	-3.33	-3.33	5.00	5.00	5.00	5.00	-3.33	-3.33	5.00	5.00
Skewness	2.24	2.24	2.24	2.24	0.61	0.61	2.24	2.24	2.24	2.24	-0.61	-0.61	2.24	2.24
Range	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Sum	6	6	6	6	7	7	6	6	6	6	8	8	6	6
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 22 (Cont.)

Professional Foundations Scale Content Validity Run 1

Competency	C5										
Performance Statement	PS1		PS2		PS3		PS4			PS5	
Variable ID	V54	V55	V56	V57	V58	V59	V60	V61	V62	V63	V64
rater3	2	2	1	1	2	1	3	1	1	1	1
rater4	2	2	1	1	2	2	2	2	2	2	2
rater2	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	2	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2
Mean	1.6	1.6	1.2	1.2	1.8	1.4	1.8	1.4	1.4	1.4	1.4
Standard Error	0.24	0.24	0.20	0.20	0.20	0.24	0.37	0.24	0.24	0.24	0.24
Median	2	2	1	1	2	1	2	1	1	1	1
Mode	2	2	1	1	2	1	2	1	1	1	1
Standard Deviation	0.55	0.55	0.45	0.45	0.45	0.55	0.84	0.55	0.55	0.55	0.55
Sample Variance	0.30	0.30	0.20	0.20	0.20	0.30	0.70	0.30	0.30	0.30	0.30
Kurtosis	-3.33	-3.33	5.00	5.00	5.00	-3.33	-0.61	-3.33	-3.33	-3.33	-3.33
Skewness	-0.61	-0.61	2.24	2.24	-2.24	0.61	0.51	0.61	0.61	0.61	0.61
Range	1	1	1	1	1	1	2	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	3	2	2	2	2
Sum	8	8	6	6	9	7	9	7	7	7	7
Count	5	5	5	5	5	5	5	5	5	5	5

Table 23

Planning and Analysis Scale Content Validity Run 1

Competency	C6												C7							
Performance Statement	PS1		PS2		PS3		PS4		PS5		PS6		PS1		PS2		PS3		PS4	
Variable ID	V65	V66	V67	V68	V69	V70	V71	V72	V73	V74	V75	V76	V77	V78	V79	V80	V81	V82	V83	V84
rater3	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1
rater4	2	1	2	2	1	1	1	1	2	3	1	3	3	2	1	1	1	1	2	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	2	1	1	1	1	2	1	1	1	2	1	2	1
rater5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Mean	1.6	1.4	1.6	1.6	1.4	1.4	1.4	1.6	1.6	1.8	1.4	1.8	2.2	1.6	1.4	1.4	1.6	1.4	1.8	1.4
Standard Error	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.49	0.40	0.49	0.37	0.40	0.40	0.40	0.40	0.40	0.37	0.40
Median	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1
Standard Deviation	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	1.10	0.89	1.10	0.84	0.89	0.89	0.89	0.89	0.89	0.84	0.89
Sample Variance	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	1.20	0.80	1.20	0.70	0.80	0.80	0.80	0.80	0.80	0.70	0.80
Kurtosis	0.31	5.00	0.31	0.31	5.00	5.00	5.00	0.31	0.31	-3.33	5.00	-3.33	-0.61	0.31	5.00	5.00	0.31	5.00	-0.61	5.00
Skewness	1.26	2.24	1.26	1.26	2.24	2.24	2.24	1.26	1.26	0.61	2.24	0.61	-0.51	1.26	2.24	2.24	1.26	2.24	0.51	2.24
Range	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Sum	8	7	8	8	7	7	7	8	8	9	7	9	11	8	7	7	8	7	9	7
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 23 (Cont.)

Planning and Analysis Scale Content Validity Run 1

Competency	C7						C8										
Performance Statement	PS5						PS1		PS2			PS3		PS4		PS5	
Variable ID	V85	V86	V87	V88	V89	V90	V91	V92	V93	V94	V95	V96	V97	V98	V99	V100	V101
rater3	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	2	2	1	1	1	2	2	2	2	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	3	3
Mean	1.6	1.6	1.6	1.4	1.4	1.4	1.6	1.6	1.4	1.2	1.2	1.4	1.4	1.4	1.4	1.4	1.4
Standard Error	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.24	0.20	0.20	0.24	0.24	0.24	0.24	0.40	0.40
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.55	0.45	0.45	0.55	0.55	0.55	0.55	0.89	0.89
Sample Variance	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.30	0.20	0.20	0.30	0.30	0.30	0.30	0.80	0.80
Kurtosis	0.31	0.31	0.31	5.00	5.00	5.00	0.31	0.31	-3.33	5.00	5.00	-3.33	-3.33	-3.33	-3.33	5.00	5.00
Skewness	1.26	1.26	1.26	2.24	2.24	2.24	1.26	1.26	0.61	2.24	2.24	0.61	0.61	0.61	0.61	2.24	2.24
Range	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	2
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	3	3
Sum	8	8	8	7	7	7	8	8	7	6	6	7	7	7	7	7	7
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 23 (Cont.)

Planning and Analysis Scale Content Validity Run 1

Competency	C9						C10											
Performance Statement	PS1			PS2			PS1				PS2		PS3		PS4		PS5	
Variable ID	V102	V103	V104	V105	V106	V107	V108	V109	V110	V111	V112	V113	V114	V115	V116	V117	V118	V119
rater3	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	3	1	3
rater4	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.4	1.4	1.2	1.2	1.2	1.2	1.4	1.4	1.4	1.6	1.4	1.4	1.4	1.4	1.4	1.8	1.2	1.6
Standard Error	0.24	0.24	0.20	0.20	0.20	0.20	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.37	0.20	0.40
Median	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1	1
Mode	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1	1
Standard Deviation	0.55	0.55	0.45	0.45	0.45	0.45	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.84	0.45	0.89
Sample Variance	0.30	0.30	0.20	0.20	0.20	0.20	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.70	0.20	0.80
Kurtosis	-3.33	-3.33	5.00	5.00	5.00	5.00	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-0.61	5.00	0.31
Skewness	0.61	0.61	2.24	2.24	2.24	2.24	0.61	0.61	0.61	-0.61	0.61	0.61	0.61	0.61	0.61	0.51	2.24	1.26
Range	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3
Sum	7	7	6	6	6	6	7	7	7	8	7	7	7	7	7	9	6	8
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 23 (Cont.)

Planning and Analysis Scale Content Validity Run 1

Competency	C11							C12				
Performance Statement	PS1			PS2		PS3		PS1	PS2	PS3	PS4	
Variable ID	V120	V121	V122	V123	V124	V125	V126	V127	V128	V129	V130	V131
rater3	1	1	3	1	1	2	1	1	1	1	1	1
rater4	1	1	2	2	3	1	1	1	3	3	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	2	1	1	1
rater5	2	2	2	2	2	2	2	2	3	3	3	3
Mean	1.2	1.2	1.8	1.4	1.6	1.4	1.2	1.2	2.0	1.8	1.4	1.4
Standard Error	0.20	0.20	0.37	0.24	0.40	0.24	0.20	0.20	0.45	0.49	0.40	0.40
Median	1	1	2	1	1	1	1	1	2	1	1	1
Mode	1	1	2	1	1	1	1	1	1	1	1	1
Standard Deviation	0.45	0.45	0.84	0.55	0.89	0.55	0.45	0.45	1.00	1.10	0.89	0.89
Sample Variance	0.20	0.20	0.70	0.30	0.80	0.30	0.20	0.20	1.00	1.20	0.80	0.80
Kurtosis	5.00	5.00	-0.61	-3.33	0.31	-3.33	5.00	5.00	-3.00	-3.33	5.00	5.00
Skewness	2.24	2.24	0.51	0.61	1.26	0.61	2.24	2.24	0.00	0.61	2.24	2.24
Range	1	1	2	1	2	1	1	1	2	2	2	2
Minimum	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	3	2	3	2	2	2	3	3	3	3
Sum	6	6	9	7	8	7	6	6	10	9	7	7
Count	5	5	5	5	5	5	5	5	5	5	5	5

Table 24

Design and Development Scale Content Validity Run 1

Competency	C13								C14								
Performance Statement	PS1			PS2		PS3		PS4	PS1		PS2		PS3			PS4	
Variable ID	V128	V129	V130	V131	V132	V133	V134	V135	V136	V137	V138	V139	V140	V141	V142	V143	V144
rater3	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1
rater4	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2
rater2	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.6	1.8	1.2	1.2	1.2	1.4	1.8	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Standard Error	0.24	0.37	0.20	0.20	0.20	0.24	0.37	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Median	2	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1
Mode	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0.55	0.84	0.45	0.45	0.45	0.55	0.84	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
Sample Variance	0.30	0.70	0.20	0.20	0.20	0.30	0.70	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Kurtosis	-3.33	-0.61	5.00	5.00	5.00	-3.33	-0.61	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33
Skewness	-0.61	0.51	2.24	2.24	2.24	0.61	0.51	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Range	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	3	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2
Sum	8	9	6	6	6	7	9	7	7	7	7	7	7	7	7	7	7
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 24 (Cont.)

Design and Development Scale Content Validity Run 1

Competency	C14						C15								
Performance Statement	PS5		PS6		PS7		PS1		PS2	PS3			PS4		PS5
Variable ID	V145	V146	V147	V148	V149	V150	V151	V152	V153	V154	V155	V156	V157	V158	V159
rater3	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1
rater4	2	2	2	2	1	2	2	2	1	1	1	1	2	2	2
rater2	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1
rater1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.4	1.4	1.4	1.4	1.2	1.4	1.4	1.4	1.4	1.4	2	1.2	1.4	1.4	1.4
Standard Error	0.24	0.24	0.24	0.24	0.20	0.24	0.24	0.24	0.24	0.24	0.45	0.20	0.24	0.24	0.24
Median	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1
Standard Deviation	0.55	0.55	0.55	0.55	0.45	0.55	0.55	0.55	0.55	0.55	1.00	0.45	0.55	0.55	0.55
Sample Variance	0.30	0.30	0.30	0.30	0.20	0.30	0.30	0.30	0.30	0.30	1.00	0.20	0.30	0.30	0.30
Kurtosis	-3.33	-3.33	-3.33	-3.33	5.00	-3.33	-3.33	-3.33	-3.33	-3.33	-3.00	5.00	-3.33	-3.33	-3.33
Skewness	0.61	0.61	0.61	0.61	2.24	0.61	0.61	0.61	0.61	0.61	0.00	2.24	0.61	0.61	0.61
Range	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2
Sum	7	7	7	7	6	7	7	7	7	7	10	6	7	7	7
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 24 (Cont.)

Design and Development Scale Content Validity Run 1

Competency	C16						C17			C18				
Performance Statement	PS1				PS2	PS3	PS1	PS2	PS3	PS1	PS2		PS3	
Variable ID	V160	V161	V162	V163	V164	V165	V166	V167	V168	V169	V170	V171	V172	V173
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	2	2	1	2	2	2	2	2	2	2
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.2	1.2	1.2	1.2	1.4	1.4	1.2	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Standard Error	0.20	0.20	0.20	0.20	0.24	0.24	0.20	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0.45	0.45	0.45	0.45	0.55	0.55	0.45	0.55	0.55	0.55	0.55	0.55	0.55	0.55
Sample Variance	0.20	0.20	0.20	0.20	0.30	0.30	0.20	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Kurtosis	5.00	5.00	5.00	5.00	-3.33	-3.33	5.00	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33
Skewness	2.24	2.24	2.24	2.24	0.61	0.61	2.24	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Range	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Sum	6	6	6	6	7	7	6	7	7	7	7	7	7	7
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 24 (Cont.)

Design and Development Scale Content Validity Run 1

Competency	C18											
Performance Statement	PS4		PS5		PS6	PS7		PS8		PS9		
Variable ID	V174	V175	V176	V177	V178	V179	V180	V181	V182	V183	V184	V185
rater3	1	1	1	1	1	1	1	1	3	1	1	1
rater4	2	2	2	2	2	2	2	2	2	1	2	2
rater2	1	1	1	1	2	1	1	1	1	1	1	1
rater1	1	1	1	1	2	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.4	1.4	1.4	1.4	1.8	1.4	1.4	1.4	1.8	1.2	1.4	1.4
Standard Error	0.24	0.24	0.24	0.24	0.20	0.24	0.24	0.24	0.37	0.20	0.24	0.24
Median	1	1	1	1	2	1	1	1	2	1	1	1
Mode	1	1	1	1	2	1	1	1	2	1	1	1
Standard Deviation	0.55	0.55	0.55	0.55	0.45	0.55	0.55	0.55	0.84	0.45	0.55	0.55
Sample Variance	0.30	0.30	0.30	0.30	0.20	0.30	0.30	0.30	0.70	0.20	0.30	0.30
Kurtosis	-3.33	-3.33	-3.33	-3.33	5.00	-3.33	-3.33	-3.33	-0.61	5.00	-3.33	-3.33
Skewness	0.61	0.61	0.61	0.61	-2.24	0.61	0.61	0.61	0.51	2.24	0.61	0.61
Range	1	1	1	1	1	1	1	1	2	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	2	2	3	2	2	2
Sum	7	7	7	7	9	7	7	7	9	6	7	7
Count	5	5	5	5	5	5	5	5	5	5	5	5

Table 25

Implementation and Management Scale Content Validity Run 1

Competency	C19													
Performance Statement	PS1	PS2	PS3	PS4	PS5		PS6	PS7		PS8		PS9		PS10
Variable ID	V186	V187	V188	V189	V190	V191	V192	V193	V194	V195	V196	V197	V198	V199
rater3	2	2	1	2	2	2	2	2	2	2	2	2	2	2
rater4	2	1	1	2	2	2	2	2	2	2	2	2	3	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	3	2	2	2	2
Mean	1.6	1.4	1.2	1.6	1.6	1.6	1.6	1.6	1.6	1.8	1.6	1.6	1.8	1.4
Standard Error	0.24	0.24	0.20	0.24	0.24	0.24	0.24	0.24	0.24	0.37	0.24	0.24	0.37	0.24
Median	2	1	1	2	2	2	2	2	2	2	2	2	2	1
Mode	2	1	1	2	2	2	2	2	2	2	2	2	2	1
Standard Deviation	0.55	0.55	0.45	0.55	0.55	0.55	0.55	0.55	0.55	0.84	0.55	0.55	0.84	0.55
Sample Variance	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.7	0.3	0.3	0.7	0.3
Kurtosis	-3.33	-3.33	5.00	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-0.61	-3.33	-3.33	-0.61	-3.33
Skewness	-0.61	0.61	2.24	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	0.51	-0.61	-0.61	0.51	0.61
Range	1	1	1	1	1	1	1	1	1	2	1	1	2	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	2	2	2	3	2	2	3	2
Sum	8	7	6	8	8	8	8	8	8	9	8	8	9	7
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 25 (Cont.)

Implementation and Management Scale Content Validity Run 1

Competency	C20										C21				
Performance Statement	PS1		PS2	PS3	PS4		PS5	PS6		PS7	PS1	PS2		PS3	PS4
Variable ID	V200	V201	V202	V203	V204	V205	V206	V207	V208	V209	V210	V211	V212	V213	V214
rater3	2	2	2	2	1	2	2	2	2	1	2	2	2	2	1
rater4	2	3	2	2	1	3	2	2	2	2	2	2	2	2	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.6	1.8	1.6	1.6	1.2	1.8	1.6	1.6	1.6	1.4	1.6	1.6	1.6	1.6	1.2
Standard Error	0.24	0.37	0.24	0.24	0.20	0.37	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.20
Median	2	2	2	2	1	2	2	2	2	1	2	2	2	2	1
Mode	2	2	2	2	1	2	2	2	2	1	2	2	2	2	1
Standard Deviation	0.55	0.84	0.55	0.55	0.45	0.84	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.45
Sample Variance	0.3	0.7	0.3	0.3	0.2	0.7	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2
Kurtosis	-3.33	-0.61	-3.33	-3.33	5.00	-0.61	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	5.00
Skewness	-0.61	0.51	-0.61	-0.61	2.24	0.51	-0.61	-0.61	-0.61	0.61	-0.61	-0.61	-0.61	-0.61	2.24
Range	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	3	2	2	2	3	2	2	2	2	2	2	2	2	2
Sum	8	9	8	8	6	9	8	8	8	7	8	8	8	8	6
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 25 (Cont.)

Implementation and Management Scale Content Validity Run 1

Competency	C21							C22					
Performance Statement	PS5			PS6	PS7	PS8		PS1		PS2		PS3	
Variable ID	V215	V216	V217	V218	V219	V220	V221	V222	V223	V224	V225	V226	V227
rater3	1	1	1	2	1	2	2	2	2	2	2	2	2
rater4	1	1	1	1	1	1	2	2	2	2	2	2	2
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.2	1.2	1.2	1.4	1.2	1.4	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Standard Error	0.20	0.20	0.20	0.24	0.20	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Median	1	1	1	1	1	1	2	2	2	2	2	2	2
Mode	1	1	1	1	1	1	2	2	2	2	2	2	2
Standard Deviation	0.45	0.45	0.45	0.55	0.45	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
Sample Variance	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Kurtosis	5.00	5.00	5.00	-3.33	5.00	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33
Skewness	2.24	2.24	2.24	0.61	2.24	0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61
Range	1	1	1	1	1	1	1	1	1	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	2	2	2	2	2	2	2
Sum	6	6	6	7	6	7	8	8	8	8	8	8	8
Count	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 25 (Cont.)

Implementation and Management Scale Content Validity Run 1

Competency	C23												
Performance Statement	PS1		PS2		PS3		PS4			PS5			PS6
Variable ID	V228	V229	V230	V231	V232	V233	V234	V235	V236	V237	V238	V239	V240
rater3	2	2	2	2	2	1	1	1	1	1	1	1	1
rater4	2	2	2	1	2	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.6	1.6	1.6	1.4	1.6	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Standard Error	0.24	0.24	0.24	0.24	0.24	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Median	2	2	2	1	2	1	1	1	1	1	1	1	1
Mode	2	2	2	1	2	1	1	1	1	1	1	1	1
Standard Deviation	0.55	0.55	0.55	0.55	0.55	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Sample Variance	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Kurtosis	-3.33	-3.33	-3.33	-3.33	-3.33	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Skewness	-0.61	-0.61	-0.61	0.61	-0.61	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24
Range	1	1	1	1	1	1	1	1	1	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	2	2	2	2	2	2	2
Sum	8	8	8	7	8	6	6	6	6	6	6	6	6
Count	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 26

Digital Media Scale Content Validity Run 1

Competency	C24														C25			
Performance Statement	PS1	PS2	PS3			PS4	PS5	PS6		PS7		PS8			PS1		PS2	
Variable ID	V241	V242	V243	V244	V245	V246	V247	V248	V249	V250	V251	V252	V253	V254	V255	V256	V257	V258
rater3	1	2	1	1	1	2	2	1	1	2	1	2	2	2	2	2	2	2
rater4	2	3	2	3	2	1	2	1	1	1	1	1	1	2	1	1	3	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.4	1.8	1.4	1.6	1.4	1.4	1.6	1.2	1.2	1.4	1.2	1.4	1.4	1.6	1.4	1.4	2	1.4
Standard Error	0.24	0.37	0.24	0.40	0.24	0.24	0.24	0.20	0.20	0.24	0.20	0.24	0.24	0.24	0.24	0.24	0.32	0.24
Median	1	2	1	1	1	1	2	1	1	1	1	1	1	2	1	1	2	1
Mode	1	2	1	1	1	1	2	1	1	1	1	1	1	2	1	1	2	1
Standard Deviation	0.55	0.84	0.55	0.89	0.55	0.55	0.55	0.45	0.45	0.55	0.45	0.55	0.55	0.55	0.55	0.55	0.71	0.55
Sample Variance	0.3	0.7	0.3	0.8	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.5	0.3
Kurtosis	-3.33	-0.61	-3.33	0.31	-3.33	-3.33	-3.33	5.00	5.00	-3.33	5.00	-3.33	-3.33	-3.33	-3.33	-3.33	2.00	-3.33
Skewness	0.61	0.51	0.61	1.26	0.61	0.61	-0.61	2.24	2.24	0.61	2.24	0.61	0.61	-0.61	0.61	0.61	0.00	0.61
Range	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	3	2	3	2	2	2	2	2	2	2	2	2	2	2	2	3	2
Sum	7	9	7	8	7	7	8	6	6	7	6	7	7	8	7	7	10	7
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 26 (Cont.)

Digital Media Scale Content Validity Run 1

Competency	C25														C26			
Performance Statement	PS3			PS4			PS5				PS6		PS7	PS8	PS1			PS2
Variable ID	V259	V260	V261	V262	V263	V264	V265	V266	V267	V268	V269	V270	V271	V272	V273	V274	V275	V276
rater3	2	3	2	2	2	3	1	2	3	2	1	1	2	2	1	2	2	2
rater4	3	3	3	1	1	1	1	1	1	1	2	2	1	2	1	1	1	3
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	2	2	1.8	1.4	1.4	1.6	1.2	1.4	1.6	1.4	1.4	1.4	1.4	1.6	1.2	1.4	1.4	1.8
Standard Error	0.32	0.45	0.37	0.24	0.24	0.40	0.20	0.24	0.40	0.24	0.24	0.24	0.24	0.24	0.20	0.24	0.24	0.37
Median	2	2	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2
Mode	2	3	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2
Standard Deviation	0.71	1.00	0.84	0.55	0.55	0.89	0.45	0.55	0.89	0.55	0.55	0.55	0.55	0.55	0.45	0.55	0.55	0.84
Sample Variance	0.5	1	0.7	0.3	0.3	0.8	0.2	0.3	0.8	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.7
Kurtosis	2.00	-3.00	-0.61	-3.33	-3.33	0.31	5.00	-3.33	0.31	-3.33	-3.33	-3.33	-3.33	-3.33	5.00	-3.33	-3.33	-0.61
Skewness	0.00	0.00	0.51	0.61	0.61	1.26	2.24	0.61	1.26	0.61	0.61	0.61	0.61	-0.61	2.24	0.61	0.61	0.51
Range	2	2	2	1	1	2	1	1	2	1	1	1	1	1	1	1	1	2
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	3	3	3	2	2	3	2	2	3	2	2	2	2	2	2	2	2	3
Sum	10	10	9	7	7	8	6	7	8	7	7	7	7	8	6	7	7	9
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 26 (Cont.)

Digital Media Scale Content Validity Run 1

Competency	C26									C27							
Performance Statement	PS3		PS4		PS5	PS6		PS7	PS8	PS1			PS2		PS3	PS4	
Variable ID	V277	V278	V279	V280	V281	V282	V283	V284	V285	V286	V287	V288	V289	V290	V291	V292	V293
rater3	2	3	2	2	1	2	3	2	2	2	3	2	2	2	2	2	2
rater4	2	2	1	1	1	1	1	1	1	2	2	2	2	1	1	2	2
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.6	1.8	1.4	1.4	1.2	1.4	1.6	1.4	1.4	1.6	1.8	1.6	1.6	1.4	1.4	1.6	1.6
Standard Error	0.24	0.37	0.24	0.24	0.20	0.24	0.40	0.24	0.24	0.24	0.37	0.24	0.24	0.24	0.24	0.24	0.24
Median	2	2	1	1	1	1	1	1	1	2	2	2	2	1	1	2	2
Mode	2	2	1	1	1	1	1	1	1	2	2	2	2	1	1	2	2
Standard Deviation	0.55	0.84	0.55	0.55	0.45	0.55	0.89	0.55	0.55	0.55	0.84	0.55	0.55	0.55	0.55	0.55	0.55
Sample Variance	0.3	0.7	0.3	0.3	0.2	0.3	0.8	0.3	0.3	0.3	0.7	0.3	0.3	0.3	0.3	0.3	0.3
Kurtosis	-3.33	-0.61	-3.33	-3.33	5.00	-3.33	0.31	-3.33	-3.33	-3.33	-0.61	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33
Skewness	-0.61	0.51	0.61	0.61	2.24	0.61	1.26	0.61	0.61	-0.61	0.51	-0.61	-0.61	0.61	0.61	-0.61	-0.61
Range	1	2	1	1	1	1	2	1	1	1	2	1	1	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	3	2	2	2	2	3	2	2	2	3	2	2	2	2	2	2
Sum	8	9	7	7	6	7	8	7	7	8	9	8	8	7	7	8	8
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 26 (Cont.)

Digital Media Scale Content Validity Run 1

Competency	C27		C28									
Performance Statement	PS5	PS6	PS1		PS2		PS3		PS4		PS5	
Variable ID	V294	V295	V296	V297	V298	V299	V300	V301	V302	V303	V304	V305
rater3	2	2	2	2	1	1	2	3	1	1	1	1
rater4	2	3	1	1	1	1	2	2	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.6	1.8	1.4	1.4	1.2	1.2	1.6	1.8	1.2	1.2	1.2	1.2
Standard Error	0.24	0.37	0.24	0.24	0.20	0.20	0.24	0.37	0.20	0.20	0.20	0.20
Median	2	2	1	1	1	1	2	2	1	1	1	1
Mode	2	2	1	1	1	1	2	2	1	1	1	1
Standard Deviation	0.55	0.84	0.55	0.55	0.45	0.45	0.55	0.84	0.45	0.45	0.45	0.45
Sample Variance	0.3	0.7	0.3	0.3	0.2	0.2	0.3	0.7	0.2	0.2	0.2	0.2
Kurtosis	-3.33	-0.61	-3.33	-3.33	5.00	5.00	-3.33	-0.61	5.00	5.00	5.00	5.00
Skewness	-0.61	0.51	0.61	0.61	2.24	2.24	-0.61	0.51	2.24	2.24	2.24	2.24
Range	1	2	1	1	1	1	1	2	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	3	2	2	2	2	2	3	2	2	2	2
Sum	8	9	7	7	6	6	8	9	6	6	6	6
Count	5	5	5	5	5	5	5	5	5	5	5	5

Table 27

Technical Writing Scale Content Validity Run 1

Competency	C29											C30					
Performance Statement	PS1	PS2			PS3	PS4		PS5		PS6	PS7	PS1	PS2			PS3	PS4
Variable ID	V306	V307	V308	V309	V310	V311	V312	V313	V314	V315	V316	V317	V318	V319	V320	V321	V322
rater3	1	2	2	1	2	2	2	1	1	2	2	2	2	2	3	1	1
rater4	1	2	2	1	2	2	2	1	1	2	2	1	2	2	2	1	1
rater2	1	2	2	2	2	2	1	2	1	1	2	2	1	1	2	1	1
rater1	2	2	2	2	2	1	2	1	1	1	2	1	2	1	1	1	1
rater5	2	2	2	2	3	3	3	3	3	3	2	2	2	2	2	2	2
Mean	1.4	2	2	1.6	2.2	2	2	1.6	1.4	1.8	2	1.6	1.8	1.6	2	1.2	1.2
Standard Error	0.24	0.00	0.00	0.24	0.20	0.32	0.32	0.40	0.40	0.37	0.00	0.24	0.20	0.24	0.32	0.20	0.20
Median	1	2	2	2	2	2	2	1	1	2	2	2	2	2	2	1	1
Mode	1	2	2	2	2	2	2	1	1	2	2	2	2	2	2	1	1
Standard Deviation	0.55	0.00	0.00	0.55	0.45	0.71	0.71	0.89	0.89	0.84	0.00	0.55	0.45	0.55	0.71	0.45	0.45
Sample Variance	0.3	0	0	0.3	0.2	0.5	0.5	0.8	0.8	0.7	0	0.3	0.2	0.3	0.5	0.2	0.2
Kurtosis	-3.33	0.00	0.00	-3.33	5.00	2.00	2.00	0.31	5.00	-0.61	0.00	-3.33	5.00	-3.33	2.00	5.00	5.00
Skewness	0.61	0.00	0.00	-0.61	2.24	0.00	0.00	1.26	2.24	0.51	0.00	-0.61	-2.24	-0.61	0.00	2.24	2.24
Range	1	0	0	1	1	2	2	2	2	2	0	1	1	1	2	1	1
Minimum	1	2	2	1	2	1	1	1	1	1	2	1	1	1	1	1	1
Maximum	2	2	2	2	3	3	3	3	3	3	2	2	2	2	3	2	2
Sum	7	10	10	8	11	10	10	8	7	9	10	8	9	8	10	6	6
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 27 (Cont.)

Technical Writing Scale Content Validity Run 1

Competency	C30				C31											C32		
Performance Statement	PS5		PS6		PS1		PS2				PS3		PS4	PS5	PS6	PS1		
Variable ID	V323	V324	V325	V326	V327	V328	V329	V330	V331	V332	V333	V334	V335	V336	V337	V338	V339	V340
rater3	1	2	2	2	2	2	2	3	1	2	2	2	2	2	2	2	2	2
rater4	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
rater2	1	1	1	1	1	2	2	1	1	1	1	1	1	1	2	1	1	1
rater1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.2	1.6	1.6	1.6	1.6	1.8	2	1.8	1.4	1.6	1.6	1.6	1.6	1.6	1.8	1.6	1.6	1.6
Standard Error	0.20	0.24	0.24	0.24	0.24	0.20	0.00	0.37	0.24	0.24	0.24	0.24	0.24	0.24	0.20	0.24	0.24	0.24
Median	1	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2
Mode	1	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2
Standard Deviation	0.45	0.55	0.55	0.55	0.55	0.45	0.00	0.84	0.55	0.55	0.55	0.55	0.55	0.55	0.45	0.55	0.55	0.55
Sample Variance	0.2	0.3	0.3	0.3	0.3	0.2	0	0.7	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3
Kurtosis	5.00	-3.33	-3.33	-3.33	-3.33	5.00	0.00	-0.61	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	5.00	-3.33	-3.33	-3.33
Skewness	2.24	-0.61	-0.61	-0.61	-0.61	-2.24	0.00	0.51	0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-2.24	-0.61	-0.61	-0.61
Range	1	1	1	1	1	1	0	2	1	1	1	1	1	1	1	1	1	1
Minimum	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2
Sum	6	8	8	8	8	9	10	9	7	8	8	8	8	8	9	8	8	8
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 27 (Cont.)

Technical Writing Scale Content Validity Run 1

Competency	C32										C33					
Performance Statement	PS2	PS3		PS4	PS5			PS6			PS1	PS2	PS3	PS4		PS5
Variable ID	V341	V342	V343	V344	V345	V346	V347	V348	V349	V350	V351	V352	V353	V354	V355	V356
rater3	2	2	2	2	1	1	1	1	1	1	2	2	2	2	2	2
rater4	2	2	2	2	1	1	1	1	1	1	2	2	2	2	2	2
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.6	1.6	1.6	1.6	1.2	1.2	1.2	1.2	1.2	1.2	1.6	1.6	1.6	1.6	1.6	1.6
Standard Error	0.24	0.24	0.24	0.24	0.20	0.20	0.20	0.20	0.20	0.20	0.24	0.24	0.24	0.24	0.24	0.24
Median	2	2	2	2	1	1	1	1	1	1	2	2	2	2	2	2
Mode	2	2	2	2	1	1	1	1	1	1	2	2	2	2	2	2
Standard Deviation	0.55	0.55	0.55	0.55	0.45	0.45	0.45	0.45	0.45	0.45	0.55	0.55	0.55	0.55	0.55	0.55
Sample Variance	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3
Kurtosis	-3.33	-3.33	-3.33	-3.33	5.00	5.00	5.00	5.00	5.00	5.00	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33
Skewness	-0.61	-0.61	-0.61	-0.61	2.24	2.24	2.24	2.24	2.24	2.24	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61
Range	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Sum	8	8	8	8	6	6	6	6	6	6	8	8	8	8	8	8
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 28

Web Development and Administration Scale Content Validity Run 1

Competency	C34										C35						
Performance Statement	PS1	PS2	PS3		PS4	PS5		PS6		PS7	PS1		PS2		PS3		PS4
Variable ID	V357	V358	V359	V360	V361	V362	V363	V364	V365	V366	V367	V368	V369	V370	V371	V372	V373
rater3	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1
rater4	3	1	2	2	1	1	1	1	1	1	2	1	3	1	1	1	3
rater2	1	1	1	2	1	2	2	1	1	2	2	1	1	1	1	1	1
rater1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
rater5	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.8	1.6	1.8	2	1.4	1.8	1.6	1.4	1.4	1.6	1.8	1.4	1.6	1.4	1.4	1.4	1.6
Standard Error	0.49	0.40	0.37	0.32	0.24	0.20	0.24	0.24	0.24	0.24	0.20	0.24	0.40	0.24	0.24	0.24	0.40
Median	1	1	2	2	1	2	2	1	1	2	2	1	1	1	1	1	1
Mode	1	1	2	2	1	2	2	1	1	2	2	1	1	1	1	1	1
Standard Deviation	1.10	0.89	0.84	0.71	0.55	0.45	0.55	0.55	0.55	0.55	0.45	0.55	0.89	0.55	0.55	0.55	0.89
Sample Variance	1.2	0.8	0.7	0.5	0.3	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.8	0.3	0.3	0.3	0.8
Kurtosis	-3.33	0.31	-0.61	2.00	-3.33	5.00	-3.33	-3.33	-3.33	-3.33	5.00	-3.33	0.31	-3.33	-3.33	-3.33	0.31
Skewness	0.61	1.26	0.51	0.00	0.61	-2.24	-0.61	0.61	0.61	-0.61	-2.24	0.61	1.26	0.61	0.61	0.61	1.26
Range	2	2	2	2	1	1	1	1	1	1	1	1	2	1	1	1	2
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	3	3	3	3	2	2	2	2	2	2	2	2	3	2	2	2	3
Sum	9	8	9	10	7	9	8	7	7	8	9	7	8	7	7	7	8
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 28 (Cont.)

Web Development and Administration Scale Content Validity Run 1

Competency	C35					C36											C37	
Performance Statement	PS5	PS6	PS7	PS8	PS9	PS1	PS2	PS3			PS4			PS5		PS6	PS1	PS2
Variable ID	V374	V375	V376	V377	V378	V379	V380	V381	V382	V383	V384	V385	V386	V387	V388	V389	V390	V391
rater3	2	1	2	2	2	2	2	2	2	1	2	3	2	2	2	2	2	2
rater4	3	3	1	2	2	2	1	1	3	3	1	1	1	1	2	1	2	3
rater2	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	2	1
rater1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2
Mean	1.8	1.6	1.4	2	1.6	1.6	1.4	1.4	1.8	1.6	1.6	1.6	1.4	1.4	1.6	1.6	1.8	1.8
Standard Error	0.37	0.40	0.24	0.00	0.24	0.24	0.24	0.24	0.37	0.40	0.24	0.40	0.24	0.24	0.24	0.40	0.20	0.37
Median	2	1	1	2	2	2	1	1	2	1	2	1	1	1	2	1	2	2
Mode	2	1	1	2	2	2	1	1	2	1	2	1	1	1	2	1	2	2
Standard Deviation	0.84	0.89	0.55	0.00	0.55	0.55	0.55	0.55	0.84	0.89	0.55	0.89	0.55	0.55	0.55	0.89	0.45	0.84
Sample Variance	0.7	0.8	0.3	0	0.3	0.3	0.3	0.3	0.7	0.8	0.3	0.8	0.3	0.3	0.3	0.8	0.2	0.7
Kurtosis	-0.61	0.31	-3.33	0.00	-3.33	-3.33	-3.33	-3.33	-0.61	0.31	-3.33	0.31	-3.33	-3.33	-3.33	0.31	5.00	-0.61
Skewness	0.51	1.26	0.61	0.00	-0.61	-0.61	0.61	0.61	0.51	1.26	-0.61	1.26	0.61	0.61	-0.61	1.26	-2.24	0.51
Range	2	2	1	0	1	1	1	1	2	2	1	2	1	1	1	2	1	2
Minimum	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	3	3	2	2	2	2	2	2	3	3	2	3	2	2	2	3	2	3
Sum	9	8	7	10	8	8	7	7	9	8	8	8	7	7	8	8	9	9
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 28 (Cont.)

Web Development and Administration Scale Content Validity Run 1

Competency	C37								C38							C39	
Performance Statement	PS3	PS4	PS5	PS6		PS7	PS8		PS1		PS2		PS3		PS4	PS1	
Variable ID	V392	V393	V394	V395	V396	V397	V398	V399	V400	V401	V402	V403	V404	V405	V406	V407	V408
rater3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
rater4	1	1	1	1	2	1	1	1	2	2	3	3	3	3	3	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.4	1.4	1.4	1.4	1.6	1.4	1.4	1.4	1.6	1.6	1.8	1.8	1.8	1.8	1.8	1.4	1.4
Standard Error	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.37	0.37	0.37	0.37	0.37	0.24	0.24
Median	1	1	1	1	2	1	1	1	2	2	2	2	2	2	2	1	1
Mode	1	1	1	1	2	1	1	1	2	2	2	2	2	2	2	1	1
Standard Deviation	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.84	0.84	0.84	0.84	0.84	0.55	0.55
Sample Variance	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.7	0.7	0.7	0.7	0.7	0.3	0.3
Kurtosis	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-0.61	-0.61	-0.61	-0.61	-0.61	-3.33	-3.33
Skewness	0.61	0.61	0.61	0.61	-0.61	0.61	0.61	0.61	-0.61	-0.61	0.51	0.51	0.51	0.51	0.51	0.61	0.61
Range	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	2	2
Sum	7	7	7	7	8	7	7	7	8	8	9	9	9	9	9	7	7
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 28 (Cont.)

Web Development and Administration Scale Content Validity Run 1

Competency	C39												C40			
Performance Statement	PS2	PS3	PS4	PS5	PS6		PS7		PS8		PS9		PS1	PS2	PS3	
Variable ID	V409	V410	V411	V412	V413	V414	V415	V416	V417	V418	V419	V420	V421	V422	V423	V424
rater3	2	2	2	2	2	2	2	2	1	2	1	1	2	2	2	2
rater4	2	1	2	3	3	3	3	3	3	3	3	3	1	1	1	1
rater2	1	1	1	1	1	1	1	1	2	1	1	2	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.6	1.4	1.6	2	1.8	1.8	1.8	1.8	1.8	1.8	1.6	1.8	1.4	1.4	1.4	1.4
Standard Error	0.24	0.24	0.24	0.45	0.37	0.37	0.37	0.37	0.37	0.37	0.40	0.37	0.24	0.24	0.24	0.24
Median	2	1	2	2	2	2	2	2	2	2	1	2	1	1	1	1
Mode	2	1	2	3	2	2	2	2	1	2	1	1	1	1	1	1
Standard Deviation	0.55	0.55	0.55	1.00	0.84	0.84	0.84	0.84	0.84	0.84	0.89	0.84	0.55	0.55	0.55	0.55
Sample Variance	0.3	0.3	0.3	1	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.3	0.3	0.3	0.3
Kurtosis	-3.33	-3.33	-3.33	-3.00	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	0.31	-0.61	-3.33	-3.33	-3.33	-3.33
Skewness	-0.61	0.61	-0.61	0.00	0.51	0.51	0.51	0.51	0.51	0.51	1.26	0.51	0.61	0.61	0.61	0.61
Range	1	1	1	2	2	2	2	2	2	2	2	2	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	3	3	3	3	3	3	3	3	3	2	2	2	2
Sum	8	7	8	10	9	9	9	9	9	9	8	9	7	7	7	7
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 28 (Cont.)

Web Development and Administration Scale Content Validity Run 1

Competency	C40					C41									
Performance Statement	PS4	PS5		PS6		PS1		PS2		PS3	PS4	PS5		PS6	
Variable ID	V425	V426	V427	V428	V429	V430	V431	V432	V433	V434	V435	V436	V437	V438	V439
rater3	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2
rater4	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.4	1.4	1.2	1.4	1.4	1.4	1.4	1.8	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Standard Error	0.24	0.24	0.20	0.24	0.24	0.24	0.24	0.37	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Median	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1
Standard Deviation	0.55	0.55	0.45	0.55	0.55	0.55	0.55	0.84	0.55	0.55	0.55	0.55	0.55	0.55	0.55
Sample Variance	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.7	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Kurtosis	-3.33	-3.33	5.00	-3.33	-3.33	-3.33	-3.33	-0.61	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33
Skewness	0.61	0.61	2.24	0.61	0.61	0.61	0.61	0.51	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Range	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2
Sum	7	7	6	7	7	7	7	9	7	7	7	7	7	7	7
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 29

Professional Foundations Scale Content Validity Run 2

Competency	C1								C2	C4		C5			
Performance Statement	PS1			PS2		PS3	PS6	PS8	PS1	PS1	PS3	PS1		PS3	PS4
Variable ID	V10	V12	V14	V16	V18	V20	V22	V24	V26	V28	V30	V32	V34	V36	V38
rater3	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1.2	1	1.4	1	1	1	1	1.4	1.2
Standard Error	0	0	0	0	0	0	0.2	0	0.24	0	0	0	0	0.24	0.2
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0.45	0	0.55	0	0	0	0	0.55	0.45
Sample Variance	0	0	0	0	0	0	0.2	0	0.3	0	0	0	0	0.3	0.2
Kurtosis	0	0	0	0	0	0	5	0	-3.33	0	0	0	0	-3.33	5
Skewness	0	0	0	0	0	0	2.24	0	0.61	0	0	0	0	0.61	2.24
Range	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	2	1	2	1	1	1	1	2	2
Sum	5	5	5	5	5	5	6	5	7	5	5	5	5	7	6
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 30

Planning and Analysis Scale Content Validity Run 2

Competency	C6						C7								C8		C10		C11	C12	
Performance Statement	PS1	PS2		PS4	PS5		PS1	PS2		PS3		PS4		PS5	PS1		PS1	PS5	PS1	PS1	PS3
Variable ID	V40	V42	V44	V46	V48	V50	V52	V54	V56	V58	V60	V62	V64	V66	V68	V70	V72	V74	V76	V78	V80
rater3	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1
rater2	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	2	1	1	1
Mean	1	1	1	1	1	1.6	1	1.2	1	1	1	1.2	1.2	1	1	1	1	1.2	1.2	1	1
Standard Error	0	0	0	0	0	0.4	0	0.2	0	0	0	0.2	0.2	0	0	0	0	0.2	0.2	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0.89	0	0.45	0	0	0	0.45	0.45	0	0	0	0	0.45	0.45	0	0
Sample Variance	0	0	0	0	0	0.8	0	0.2	0	0	0	0.2	0.2	0	0	0	0	0.2	0.2	0	0
Kurtosis	0	0	0	0	0	0.31	0	5.00	0	0	0	5.00	5.00	0	0	0	0	5.00	5.00	0	0
Skewness	0	0	0	0	0	1.26	0	2.24	0	0	0	2.24	2.24	0	0	0	0	2.24	2.24	0	0
Range	0	0	0	0	0	2	0	1	0	0	0	1	1	0	0	0	0	1	1	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	3	1	2	1	1	1	2	2	1	1	1	1	2	2	1	1
Sum	5	5	5	5	5	8	5	6	5	5	5	6	6	5	5	5	5	6	6	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 31

Design and Development Scale Content Validity Run 2

Competency	C13		C15	C17	C18
Performance Statement	PS1	PS3	PS1	PS1	PS1
Variable ID	V82	V84	V86	V88	V90
rater3	1	1	1	1	1
rater4	2	1	1	1	1
rater2	1	1	1	1	1
rater1	1	1	1	1	1
rater5	2	1	1	1	2
Mean	1.4	1	1	1	1.2
Standard Error	0.2	0	0	0	0.2
Median	1	1	1	1	1
Mode	1	1	1	1	1
Standard Deviation	0.55	0.00	0.00	0.00	0.45
Sample Variance	0.30	0.00	0.00	0.00	0.20
Kurtosis	-3.33	0.00	0.00	0.00	5.00
Skewness	0.61	0.00	0.00	0.00	2.24
Range	1	0	0	0	1
Minimum	1	1	1	1	1
Maximum	2	1	1	1	2
Sum	7	5	5	5	6
Count	5	5	5	5	5

Table 32

Implementation and Management Scale Content Validity Run 2

Competency	C19														C20	
Performance Statement	PS1	PS2	PS3	PS4	PS5		PS6	PS7		PS8		PS9		PS10	PS1	
Variable ID	V186	V187	V188	V189	V190	V191	V192	V193	V194	V195	V196	V197	V198	V199	V200	V201
rater3	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2
rater4	2	1	1	2	2	2	2	2	2	2	2	2	3	1	2	3
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2
Mean	1.6	1.4	1.2	1.6	1.6	1.6	1.6	1.6	1.6	1.8	1.6	1.6	1.8	1.4	1.6	1.8
Standard Error	0.24	0.24	0.20	0.24	0.24	0.24	0.24	0.24	0.24	0.37	0.24	0.24	0.37	0.24	0.24	0.37
Median	2	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2
Mode	2	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2
Standard Deviation	0.55	0.55	0.45	0.55	0.55	0.55	0.55	0.55	0.55	0.84	0.55	0.55	0.84	0.55	0.55	0.84
Sample Variance	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.7	0.3	0.3	0.7	0.3	0.3	0.7
Kurtosis	-3.33	-3.33	5.00	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-0.61	-3.33	-3.33	-0.61	-3.33	-3.33	-0.61
Skewness	-0.61	0.61	2.24	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	0.51	-0.61	-0.61	0.51	0.61	-0.61	0.51
Range	1	1	1	1	1	1	1	1	1	2	1	1	2	1	1	2
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	2	2	2	3	2	2	3	2	2	3
Sum	8	7	6	8	8	8	8	8	8	9	8	8	9	7	8	9
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 32 (Cont.)

Implementation and Management Scale Content Validity Run 2

Competency	C20								C21							
Performance Statement	PS2	PS3	PS4		PS5	PS6		PS7	PS1	PS2		PS3	PS4	PS5		
Variable ID	V202	V203	V204	V205	V206	V207	V208	V209	V210	V211	V212	V213	V214	V215	V216	V217
rater3	2	2	1	2	2	2	2	1	2	2	2	2	1	1	1	1
rater4	2	2	1	3	2	2	2	2	2	2	2	2	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.6	1.6	1.2	1.8	1.6	1.6	1.6	1.4	1.6	1.6	1.6	1.6	1.2	1.2	1.2	1.2
Standard Error	0.24	0.24	0.20	0.37	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.20	0.20	0.20	0.20
Median	2	2	1	2	2	2	2	1	2	2	2	2	1	1	1	1
Mode	2	2	1	2	2	2	2	1	2	2	2	2	1	1	1	1
Standard Deviation	0.55	0.55	0.45	0.84	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.45	0.45	0.45	0.45
Sample Variance	0.3	0.3	0.2	0.7	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
Kurtosis	-3.33	-3.33	5.00	-0.61	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	5.00	5.00	5.00	5.00
Skewness	-0.61	-0.61	2.24	0.51	-0.61	-0.61	-0.61	0.61	-0.61	-0.61	-0.61	-0.61	2.24	2.24	2.24	2.24
Range	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2
Sum	8	8	6	9	8	8	8	7	8	8	8	8	6	6	6	6
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 32 (Cont.)

Implementation and Management Scale Content Validity Run 2

Competency	C21				C22						C23			
Performance Statement	PS6	PS7	PS8		PS1		PS2		PS3		PS1		PS2	
Variable ID	V218	V219	V220	V221	V222	V223	V224	V225	V226	V227	V228	V229	V230	V231
rater3	2	1	2	2	2	2	2	2	2	2	2	2	2	2
rater4	1	1	1	2	2	2	2	2	2	2	2	2	2	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean	1.4	1.2	1.4	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.4
Standard Error	0.24	0.20	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Median	1	1	1	2	2	2	2	2	2	2	2	2	2	1
Mode	1	1	1	2	2	2	2	2	2	2	2	2	2	1
Standard Deviation	0.55	0.45	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
Sample Variance	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Kurtosis	-3.33	5.00	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33
Skewness	0.61	2.24	0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	0.61
Range	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Sum	7	6	7	8	8	8	8	8	8	8	8	8	8	7
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 32 (Cont.)

Implementation and Management Scale Content Validity Run 2

Competency	C23								
Performance Statement	PS3		PS4			PS5			PS6
Variable ID	V232	V233	V234	V235	V236	V237	V238	V239	V240
rater3	2	1	1	1	1	1	1	1	1
rater4	2	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1
rater5	2	2	2	2	2	2	2	2	2
Mean	1.6	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Standard Error	0.24	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Median	2	1	1	1	1	1	1	1	1
Mode	2	1	1	1	1	1	1	1	1
Standard Deviation	0.55	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Sample Variance	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Kurtosis	-3.33	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Skewness	-0.61	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24
Range	1	1	1	1	1	1	1	1	1
Minimum	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	2	2	2
Sum	8	6	6	6	6	6	6	6	6
Count	5	5	5	5	5	5	5	5	5

Table 33

Digital Media Scale Content Validity Run 2

Competency	C24				C25				C26	
Performance Statement	PS1	PS3	PS5	PS8	PS1	PS3		PS6	PS1	PS3
Variable ID	V154	V156	V158	V160	V162	V164	V166	V168	V170	V172
rater3	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	2	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	2	1
Mean	1	1	1	1	1.2	1	1	1	1.2	1
Standard Error	0	0	0	0	0.2	0	0	0	0.2	0
Median	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0.45	0	0	0	0.45	0
Sample Variance	0	0	0	0	0.2	0	0	0	0.2	0
Kurtosis	0	0	0	0	5.00	0	0	0	5.00	0
Skewness	0	0	0	0	2.24	0	0	0	2.24	0
Range	0	0	0	0	1	0	0	0	1	0
Minimum	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	2	1	1	1	2	1
Sum	5	5	5	5	6	5	5	5	6	5
Count	5	5	5	5	5	5	5	5	5	5

Table 33 (Cont.)

Digital Media Scale Content Validity Run 2

Competency	C27								C28				
Performance Statement	PS1			PS2	PS4		PS5	PS6	PS1	PS3	PS4	PS5	
Variable ID	V174	V176	V178	V180	V182	V184	V186	V188	V190	V192	V194	V196	V198
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 34

Technical Writing Scale content Validity Run 2

Competency	C29										C30						
Performance Statement	PS1	PS2		PS3	PS4		PS5		PS6	PS7	PS1	PS2		PS3	PS4	PS5	
Variable ID	V200	V202	V204	V206	V208	V210	V212	V214	V216	V218	V220	V222	V224	V226	V228	V230	V232
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	3	1	3	1	1	3	2	1	1	1	1	1	1	1	1
Mean	1	1	1.4	1	1.4	1	1	1.4	1.2	1	1	1	1	1	1	1	1
Standard Error	0	0	0.4	0	0.4	0	0	0.4	0.2	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0.89	0	0.89	0	0	0.89	0.45	0	0	0	0	0	0	0	0
Sample Variance	0	0	0.8	0	0.8	0	0	0.8	0.2	0	0	0	0	0	0	0	0
Kurtosis	0	0	5	0	5	0	0	5	5	0	0	0	0	0	0	0	0
Skewness	0	0	2.24	0	2.24	0	0	2.24	2.24	0	0	0	0	0	0	0	0
Range	0	0	2	0	2	0	0	2	1	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	3	1	3	1	1	3	2	1	1	1	1	1	1	1	1
Sum	5	5	7	5	7	5	5	7	6	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 34 (Cont.)

Technical Writing Scale Content Validity Run 2

Competency	C31										C32						
Performance Statement	PS1			PS2		PS3		PS4	PS5	PS6	PS1			PS2	PS3		PS4
Variable ID	V234	V236	V238	V240	V242	V244	V246	V248	V250	V252	V254	V256	V258	V260	V262	V264	V266
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2
rater2	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	2	2	1	3	1	1	1	1	3	1	1	1	1	1	1	1
Mean	1	1.2	1.2	1	1.4	1	1	1	1.2	1.4	1	1	1.2	1	1	1.2	1.2
Standard Error	0	0.2	0.2	0	0.4	0	0	0	0.2	0.4	0	0	0.2	0	0	0.2	0.2
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0.45	0.45	0	0.89	0	0	0	0.45	0.89	0	0	0.45	0	0	0.45	0.45
Sample Variance	0	0.2	0.2	0	0.8	0	0	0	0.2	0.8	0	0	0.2	0	0	0.2	0.2
Kurtosis	0	5	5	0	5	0	0	0	5	5	0	0	5	0	0	5	5
Skewness	0	2.24	2.24	0	2.24	0	0	0	2.24	2.24	0	0	2.24	0	0	2.24	2.24
Range	0	1	1	0	2	0	0	0	1	2	0	0	1	0	0	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	2	2	1	3	1	1	1	2	3	1	1	2	1	1	2	2
Sum	5	6	6	5	7	5	5	5	6	7	5	5	6	5	5	6	6
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 34 (Cont.)

Technical Writing Scale Content Validity Run 2

Competency	C33					
Performance Statement	PS1	PS2	PS3	PS4		PS5
Variable ID	V268	V270	V272	V274	V276	V278
rater3	1	1	1	1	1	1
rater4	1	1	1	1	1	1
rater2	1	1	1	1	1	1
rater1	1	1	1	1	1	1
rater5	1	1	1	1	1	1
Mean	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0
Median	1	1	1	1	1	1
Mode	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0
Skewness	0	0	0	0	0	0
Range	0	0	0	0	0	0
Minimum	1	1	1	1	1	1
Maximum	1	1	1	1	1	1
Sum	5	5	5	5	5	5
Count	5	5	5	5	5	5

Table 35

Web Development and Administration Scale Content Validity Run 2

Competency	C34										C35					
Performance Statement	PS1	PS2	PS3		PS4	PS5	PS6		PS7		PS1		PS2		PS3	
Variable ID	V280	V282	V284	V286	V288	V290	V292	V294	V296	V298	V300	V302	V304	V306	V308	V310
rater3	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	2	2	2	1	1	1	2	1	2	1	1	3	2	1	1
Mean	1.2	1.2	1.2	1.2	1	1	1	1.2	1	1.2	1	1	1.6	1.2	1	1
Standard Error	0.2	0.2	0.2	0.2	0	0	0	0.2	0	0.2	0	0	0.4	0.2	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0.45	0.45	0.45	0.45	0	0	0	0.45	0	0.45	0	0	0.89	0.45	0	0
Sample Variance	0.2	0.2	0.2	0.2	0	0	0	0.2	0	0.2	0	0	0.8	0.2	0	0
Kurtosis	5.00	5.00	5.00	5.00	0	0	0	5	0	5	0	0	0.31	5.00	0	0
Skewness	2.24	2.24	2.24	2.24	0	0	0	2.24	0	2.24	0	0	1.26	2.24	0	0
Range	1	1	1	1	0	0	0	1	0	1	0	0	2	1	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	1	1	1	2	1	2	1	1	3	2	1	1
Sum	6	6	6	6	5	5	5	6	5	6	5	5	8	6	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 35 (Cont.)

Web Development and Administration Scale Content Validity Run 2

Competency	C35							C36					C37				
Performance Statement	PS4	PS5	PS6	PS7	PS8	PS9		PS1	PS2		PS3	PS4	PS1	PS2	PS3	PS4	
Variable ID	V312	V314	V316	V318	V320	V322	V324	V326	V328	V330	V332	V334	V336	V338	V340	V342	V344
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1.2	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.2	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0.45	0.45	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.2	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	5.00	5.00	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	2.24	2.24	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	6	6	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 35 (Cont.)

Web Development and Administration Scale Content Validity Run 2

Competency	C37			C38							C39						
Performance Statement	PS5	PS6		PS1		PS2	PS3		PS4		PS1	PS2	PS3	PS4		PS5	
Variable ID	V346	V348	V350	V352	V354	V356	V358	V360	V362	V364	V366	V368	V370	V372	V374	V376	V378
rater3	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	3	3	3	3	3	3	3	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	2	2	1	1	1	1	1	2	1	1	1	2	1	1	1	1
Mean	1	1.2	1.2	1.4	1.4	1.6	1.4	1.4	1.6	1.4	1	1	1.2	1	1	1	1.2
Standard Error	0	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0	0	0.2	0	0	0	0.2
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0.45	0.45	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0	0	0.45	0	0	0	0.45
Sample Variance	0	0.2	0.2	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0	0	0.2	0	0	0	0.2
Kurtosis	0	5.00	5.00	5.00	5.00	0.31	5.00	5.00	0.31	5.00	0	0	5.00	0	0	0	5.00
Skewness	0	2.24	2.24	2.24	2.24	1.26	2.24	2.24	1.26	2.24	0	0	2.24	0	0	0	2.24
Range	0	1	1	2	2	2	2	2	2	2	0	0	1	0	0	0	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	2	2	3	3	3	3	3	3	3	1	1	2	1	1	1	2
Sum	5	6	6	7	7	8	7	7	8	7	5	5	6	5	5	5	6
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 35 (Cont.)

Web Development and Administration Scale Content Validity Run 2

Competency	C39					C40
Performance Statement	PS6			PS7		PS1
Variable ID	V380	V382	V384	V386	V388	V390
rater3	1	1	1	1	1	1
rater4	1	1	1	1	1	1
rater2	3	3	3	1	3	1
rater1	1	1	1	1	1	1
rater5	2	2	1	1	1	1
Mean	1.6	1.6	1.4	1	1.4	1
Standard Error	0.4	0.4	0.4	0	0.4	0
Median	1	1	1	1	1	1
Mode	1	1	1	1	1	1
Standard Deviation	0.89	0.89	0.89	0	0.89	0
Sample Variance	0.8	0.8	0.8	0	0.8	0
Kurtosis	0.31	0.31	5.00	0	5.00	0
Skewness	1.26	1.26	2.24	0	2.24	0
Range	2	2	2	0	2	0
Minimum	1	1	1	1	1	1
Maximum	3	3	3	1	3	1
Sum	8	8	7	5	7	5
Count	5	5	5	5	5	5

Table 36

Professional Foundations Scale Content Validity Run 3

Competency	C5			
Performance Statement	PS1	PS4	PS5	
Variable ID	V10	V12	V14	V16
rater2	1	1	1	1
rater1	1	1	1	1
rater3	1	2	1	2
rater4	1	1	1	1
rater5	1	1	1	1
Mean	1	1.2	1	1.2
Standard Error	0	0.2	0	0.2
Median	1	1	1	1
Mode	1	1	1	1
Standard Deviation	0	0.45	0	0.45
Sample Variance	0	0.2	0	0.2
Kurtosis	0	5.00	0	5.00
Skewness	0	2.24	0	2.24
Range	0	1	0	1
Minimum	1	1	1	1
Maximum	1	2	1	2
Sum	5	6	5	6
Count	5	5	5	5

Table 37

Planning and Analysis Scale Content Validity Run 3

Competency	C6	C7
Performance Statement	PS1	PS1
Variable ID	V10	V12
rater2	1	1
rater1	1	1
rater3	1	1
rater4	1	1
rater5	1	1
Mean	1	1
Standard Error	0	0
Median	1	1
Mode	1	1
Standard Deviation	0	0
Sample Variance	0	0
Kurtosis	0	0
Skewness	0	0
Range	0	0
Minimum	1	1
Maximum	1	1
Sum	5	5
Count	5	5

Table 38

Design and Development Scale Content Validity Run 3

Competency	C14	
Performance Statement	PS1	PS4
Variable ID	V22	V24
rater2	1	1
rater1	1	1
rater3	1	1
rater4	1	1
rater5	2	1
Mean	1.2	1
Standard Error	0.2	0
Median	1	1
Mode	1	1
Standard Deviation	0.45	0.00
Sample Variance	0.2	0
Kurtosis	5.00	0.00
Skewness	2.24	0.00
Range	1	0
Minimum	1	1
Maximum	2	1
Sum	6	5
Count	5	5

Table 39

Implementation and Management Scale Content Validity Run 3

Competency	C19		C20	C21
Performance Statement	PS1	PS7	PS1	PS1
Variable ID	V26	V29	V32	V35
rater2	1	1	1	1
rater1	2	1	1	1
rater3	2	2	1	1
rater4	2	2	2	2
rater5	2	2	2	2
Mean	1.8	1.6	1.4	1.4
Standard Error	0.20	0.24	0.24	0.24
Median	2	2	1	1
Mode	2	2	1	1
Standard Deviation	0.45	0.55	0.55	0.55
Sample Variance	0.2	0.3	0.3	0.3
Kurtosis	5.00	-3.33	-3.33	-3.33
Skewness	-2.24	-0.61	0.61	0.61
Range	1	1	1	1
Minimum	1	1	1	1
Maximum	2	2	2	2
Sum	9	8	7	7
Count	5	5	5	5

Table 40

Web Development and Administration Scale Content Validity Run 3

Competency	C37	C38							C39				
Performance Statement	PS1	PS1		PS2	PS3		PS4		PS1	PS7	PS8	PS9	
Variable ID	V38	V40	V43	V46	V49	V52	V55	V58	V61	V64	V67	V70	V73
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	2	1	1	2	2	2	2	2	1	3	3	3	3
rater3	1	1	1	2	2	2	1	1	1	1	1	1	2
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1.2	1	1	1.4	1.4	1.4	1.2	1.2	1	1.4	1.4	1.4	1.6
Standard Error	0.2	0	0	0.2	0.2	0.2	0.2	0.2	0	0.4	0.4	0.4	0.4
Median	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0.45	0.00	0.00	0.55	0.55	0.55	0.45	0.45	0.00	0.89	0.89	0.89	0.89
Sample Variance	0.2	0	0	0.3	0.3	0.3	0.2	0.2	0	0.8	0.8	0.8	0.8
Kurtosis	5.00	0.00	0.00	-3.33	-3.33	-3.33	5.00	5.00	0.00	5.00	5.00	5.00	0.31
Skewness	2.24	0.00	0.00	0.61	0.61	0.61	2.24	2.24	0.00	2.24	2.24	2.24	1.26
Range	1	0	0	1	1	1	1	1	0	2	2	2	2
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	1	1	2	2	2	2	2	1	3	3	3	3
Sum	6	5	5	7	7	7	6	6	5	7	7	7	8
Count	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 41

Professional Foundations Scale Face Validity Run 1

Competency	C1																	
Performance Statement		PS1			PS2				PS3			PS4			PS5		PS6	
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Variable ID	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22	V23	V24	V25	V26	V27
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 41 (Cont.)

Professional Foundations Scale Face Validity Run 1

Competency	C1					C2						C3					
Performance Statement	PS7		PS8		PS9	PS1			PS2	PS3		PS1	PS2		PS3		
Scale #	19	20	21	22	23	1	2	3	4	5	6	1	2	3	4	5	6
Variable ID	V28	V29	V30	V31	V32	V33	V34	V35	V36	V37	V38	V39	V40	V41	V42	V43	V44
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 41 (Cont.)

Professional Foundations Scale Face Validity Run 1

Competency	C3				C4										C5			
Performance Statement	PS4		PS5		PS1				PS2		PS3		PS4		PS1		PS2	
Scale #	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4
Variable ID	V45	V46	V47	V48	V49	V50	V51	V52	V53	V54	V55	V56	V57	V58	V59	V60	V61	V62
rater3	1	1	1	1	1	1	1	1	2	2	1	1	2	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	2	2
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1.2	1.2	1	1	1.4	1.2	1	1	1.2	1.2
Standard Error	0	0	0	0	0	0	0	0	0.2	0.2	0	0	0.2	0.2	0	0	0.2	0.2
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0.45	0.45	0	0	0.55	0.45	0	0	0.45	0.45
Sample Variance	0	0	0	0	0	0	0	0	0.2	0.2	0	0	0.3	0.2	0	0	0.2	0.2
Kurtosis	0	0	0	0	0	0	0	0	5.00	5.00	0	0	-3.33	5.00	0	0	5.00	5.00
Skewness	0	0	0	0	0	0	0	0	2.24	2.24	0	0	0.61	2.24	0	0	2.24	2.24
Range	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	2	2	1	1	2	2	1	1	2	2
Sum	5	5	5	5	5	5	5	5	6	6	5	5	7	6	5	5	6	6
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 41 (Cont.)

Professional Foundations Scale Face Validity Run 1

Competency	C5									
Performance Statement	PS3		PS4				PS5			
Scale #	5	6	7	8	9	10	11	12	13	14
Variable ID	V63	V64	V65	V66	V67	V68	V69	V70	V71	V72
rater3	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1
rater5	2	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1
Mean	1.2	1	1	1	1	1	1	1	1	1
Standard Error	0.2	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0.45	0	0	0	0	0	0	0	0	0
Sample Variance	0.2	0	0	0	0	0	0	0	0	0
Kurtosis	5.00	0	0	0	0	0	0	0	0	0
Skewness	2.24	0	0	0	0	0	0	0	0	0
Range	1	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1
Maximum	2	1	1	1	1	1	1	1	1	1
Sum	6	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5

Table 42

Planning and Analysis Scale Face Validity Run 1

Competency	C6											C7				
Performance Statement																
	PS1		PS2		PS3		PS4		PS5		PS6		PS1		PS2	
Scale #	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5
Variable ID	V73	V74	V75	V76	V77	V78	V79	V80	V81	V82	V83	V84	V85	V86	V87	V88
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 42 (Cont.)

Planning and Analysis Scale Face Validity Run 1

Competency	C7					C8										
Performance Statement																
	PS3		PS4		PS5	PS1					PS2				PS3	
Scale #	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	11
Variable ID	V89	V90	V91	V92	V93	V94	V95	V96	V97	V98	V99	V100	V101	V102	V103	V104
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1.2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1.2
Standard Error	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.2
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0.45	0.45
Sample Variance	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.2
Kurtosis	5.00	0	0	0	0	0	0	0	0	0	0	0	0	0	5.00	5.00
Skewness	2.24	0	0	0	0	0	0	0	0	0	0	0	0	0	2.24	2.24
Range	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2
Sum	6	5	5	5	5	5	5	5	5	5	5	5	5	5	6	6
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 42 (Cont.)

Planning and Analysis Scale Face Validity Run 1

Competency	C9						C10										
Performance Statement		PS1			PS2				PS1			PS2		PS3		PS4	
Scale #	1	2	3	4	5	6	1	2	3	4	5	6	7	8	9	10	11
Variable ID	V105	V106	V107	V108	V109	V110	V111	V112	V113	V114	V115	V116	V117	V118	V119	V120	V121
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.45	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.00	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.24	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 42 (Cont.)

Planning and Analysis Scale Face Validity Run 1

Competency	C11					C12			
Performance Statement									
	PS1		PS2	PS3		PS1	PS2	PS3	PS4
Scale #	1	2	3	4	5	1	2	3	4
Variable ID	V122	V123	V124	V125	V126	V127	V128	V129	V130
rater3	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5

Table 43

Design and Development Scale Face Validity Run 1

Competency	C13								C14						
Performance Statement	PS1			PS2		PS3		PS4	PS1		PS2			PS3	
Scale #	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7
Variable ID	V131	V132	V133	V134	V135	V136	V137	V138	V139	V140	V141	V142	V143	V144	V145
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1.2	1.2	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0.2	0.2	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0.45	0.45	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0.2	0.2	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	5.00	5.00	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	2.24	2.24	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	6	6	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 43 (Cont.)

Design and Development Scale Face Validity Run 1

Competency	C14								C15								
Performance Statement	PS4		PS5		PS6		PS7		PS1		PS2		PS3		PS4		PS5
Scale #	8	9	10	11	12	13	14	15	1	2	3	4	5	6	7	8	9
Variable ID	V146	V147	V148	V149	V150	V151	V152	V153	V154	V155	V156	V157	V158	V159	V160	V161	V162
rater3	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1.2	1	1	1	1	1.2	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0.2	0	0	0	0	0.2	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0.45	0	0	0	0	0.45	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0.2	0	0	0	0	0.2	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	5.00	0	0	0	0	5.00	0	0	0	0	0	0
Skewness	0	0	0	0	0	2.24	0	0	0	0	2.24	0	0	0	0	0	0
Range	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	2	1	1	1	1	2	1	1	1	1	1	1
Sum	5	5	5	5	5	6	5	5	5	5	6	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 43 (Cont.)

Design and Development Scale Face Validity Run 1

Competency	C16						C17			C18						
Performance Statement	PS1				PS2	PS3	PS1	PS2	PS3	PS1	PS2		PS3		PS4	
Scale #	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6	7
Variable ID	V163	V164	V165	V166	V167	V168	V169	V170	V171	V172	V173	V174	V175	V176	V177	V178
rater3	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1.2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	5.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	2.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 43 (Cont.)

Design and Development Scale Face Validity Run 1

Competency	C18								
Performance Statement	PS5		PS6	PS7		PS8		PS9	
Scale #	8	9	10	11	12	13	14	15	16
Variable ID	V179	V180	V181	V182	V183	V184	V185	V186	V187
rater3	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5

Table 44

Implementation and Management Scale Face Validity Run 1

Competency	C19														
Performance Statement	PS1	PS2	PS3	PS4	PS5		PS6	PS7		PS8		PS9		PS10	
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Variable ID	V188	V189	V190	V191	V192	V193	V194	V195	V196	V197	V198	V199	V200	V201	V202
rater3	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1.2	1	1	1	1.2	1	1	1	1	1	1	1
Standard Error	0	0	0	0.2	0	0	0	0.2	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0.45	0	0	0	0.45	0	0	0	0	0	0	0
Sample Variance	0	0	0	0.2	0	0	0	0.2	0	0	0	0	0	0	0
Kurtosis	0	0	0	5.00	0	0	0	5.00	0	0	0	0	0	0	0
Skewness	0	0	0	2.24	0	0	0	2.24	0	0	0	0	0	0	0
Range	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	2	1	1	1	2	1	1	1	1	1	1	1
Sum	5	5	5	6	5	5	5	6	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 44 (Cont.)

Implementation and Management Scale Face Validity Run 1

Competency	C20									C21				
Performance Statement	PS1		PS2	PS3	PS4		PS5	PS6		PS1	PS2		PS3	PS4
Scale #	1	2	3	4	5	6	7	8	9	1	2	3	4	5
Variable ID	V203	V204	V205	V206	V207	V208	V209	V210	V211	V212	V213	V214	V215	V216
rater3	1	1	1	1	1	1	1	1	1	1	1	1	2	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0.45	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	5.00	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	2.24	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	2	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	6	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 44 (Cont.)

Implementation and Management Scale Face Validity Run 1

Competency	C21							C22						C23		
Performance Statement	PS5			PS6	PS7	PS8		PS1		PS2		PS3		PS1		
Scale #	6	7	8	9	10	11	12	1	2	3	4	5	6	1	2	3
Variable ID	V217	V218	V219	V220	V221	V222	V223	V224	V225	V226	V227	V228	V229	V230	V231	V232
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1.2	1	1.2	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0.2	0	0.2	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0.45	0	0.45	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0.2	0	0.2	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	5.00	0	5.00	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	2.24	0	2.24	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	6	5	6	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 44 (Cont.)

Implementation and Management Scale Face Validity Run 1

Competency	C23									
Performance Statement	PS2		PS3		PS4		PS5			
Scale #	4	5	6	7	8	9	10	11	12	13
Variable ID	V233	V234	V235	V236	V237	V238	V239	V240	V241	V242
rater3	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5

Table 45

Digital Media Scale Face Validity Run 1

Competency	C24														C25	
Performance Statement	PS1	PS2		PS3		PS4	PS5	PS6		PS7			PS8		PS1	
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	1	2
Variable ID	V243	V244	V245	V246	V247	V248	V249	V250	V251	V252	V253	V254	V255	V256	V257	V258
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 45 (Cont.)

Digital Media Scale Face Validity Run 1

Competency	C25													C26			
Performance Statement	PS2			PS3			PS4			PS5			PS6	PS1			
Scale #	3	4	5	6	7	8	9	10	11	12	13	14	15	1	2	3	4
Variable ID	V259	V260	V261	V262	V263	V264	V265	V266	V267	V268	V269	V270	V271	V272	V273	V274	V275
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 45 (Cont.)

Digital Media Scale Face Validity Run 1

Competency	C26							C27									
Performance Statement		PS2			PS3		PS4			PS1					PS2		
Scale #	5	6	7	8	9	10	11	1	2	3	4	5	6	7	8	9	10
Variable ID	V276	V277	V278	V279	V280	V281	V282	V283	V284	V285	V286	V287	V288	V289	V290	V291	V292
rater3	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1.2	1	1	1	1	1.2	1.2	1	1	1	1	1	1	1	1
Standard Error	0	0	0.2	0	0	0	0	0.2	0.2	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0.45	0	0	0	0	0.45	0.45	0	0	0	0	0	0	0	0
Sample Variance	0	0	0.2	0	0	0	0	0.2	0.2	0	0	0	0	0	0	0	0
Kurtosis	0	0	5.00	0	0	0	0	5.00	5.00	0	0	0	0	0	0	0	0
Skewness	0	0	2.24	0	0	0	0	2.24	2.24	0	0	0	0	0	0	0	0
Range	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1
Sum	5	5	6	5	5	5	5	6	6	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 45 (Cont.)

Digital Media Scale Face Validity Run 1

Competency	C28												
Performance Statement		PS1				PS2				PS3			PS4
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13
Variable ID	V293	V294	V295	V296	V297	V298	V299	V300	V301	V302	V303	V304	V305
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 46

Technical Writing Scale Face Validity Run 1

Competency	C29												C30			
Performance Statement	PS1		PS2		PS3	PS4		PS5		PS6	PS7		PS1		PS2	
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
Variable ID	V306	V307	V308	V309	V310	V311	V312	V313	V314	V315	V316	V317	V318	V319	V320	V321
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.45	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.00	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.24	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 46 (Cont.)

Technical Writing Scale Face Validity Run 1

Competency	C30						C31								
Performance Statement	PS3	PS4	PS5		PS6		PS1			PS2			PS3		PS4
Scale #	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9
Variable ID	V322	V323	V324	V325	V326	V327	V328	V329	V330	V331	V332	V333	V334	V335	V336
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 46 (Cont.)

Technical Writing Scale Face Validity Run 1

Competency	C31		C32												
Performance Statement	PS5	PS6		PS1		PS2	PS3		PS4		PS5			PS6	
Scale #	10	11	1	2	3	4	5	6	7	8	9	10	11	12	13
Variable ID	V337	V338	V339	V340	V341	V342	V343	V344	V345	V346	V347	V348	V349	V350	V351
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 46 (Cont.)

Technical Writing Scale Face Validity Run 1

Competency	C33					
Performance Statement	PS1	PS2	PS3	PS4		PS5
Scale #	1	2	3	4	5	6
Variable ID	V352	V353	V354	V355	V356	V357
rater3	1	1	1	1	1	1
rater4	1	1	1	1	1	1
rater5	1	1	1	2	1	1
rater1	1	1	1	1	1	1
rater2	1	1	1	1	1	1
Mean	1	1	1	1.2	1	1
Standard Error	0	0	0	0.2	0	0
Median	1	1	1	1	1	1
Mode	1	1	1	1	1	1
Standard Deviation	0	0	0	0.45	0	0
Sample Variance	0	0	0	0.2	0	0
Kurtosis	0	0	0	5.00	0	0
Skewness	0	0	0	2.24	0	0
Range	0	0	0	1	0	0
Minimum	1	1	1	1	1	1
Maximum	1	1	1	2	1	1
Sum	5	5	5	6	5	5
Count	5	5	5	5	5	5

Table 47

Web Development and Administration Scale Face Validity Run 1

Competency	C34													C35		
Performance Statement	PS1	PS2	PS3		PS4	PS5		PS6		PS7				PS1		PS2
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13	1	2	3
Variable ID	V358	V359	V360	V361	V362	V363	V364	V365	V366	V367	V368	V369	V370	V371	V372	V373
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 47 (Cont.)

Web Development and Administration Scale Face Validity Run 1

Competency	C35										C36				
Performance Statement		PS3		PS4	PS5	PS6	PS7	PS8	PS9		PS1	PS2		PS3	
Scale #	4	5	6	7	8	9	10	11	12	13	1	2	3	4	5
Variable ID	V374	V375	V376	V377	V378	V379	V380	V381	V382	V383	V384	V385	V386	V387	V388
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 47 (Cont.)

Web Development and Administration Scale Face Validity Run 1

Competency	C36				C37											
Performance Statement	PS4			PS5	PS1	PS2	PS3	PS4	PS5	PS6				PS7	PS8	
Scale #	6	7	8	9	1	2	3	4	5	6	7	8	9	10	11	12
Variable ID	V389	V390	V391	V392	V393	V394	V395	V396	V397	V398	V399	V400	V401	V402	V403	V404
rater3	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0.45	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	5.00	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	2.24	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	6	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 47 (Cont.)

Web Development and Administration Scale Face Validity Run 1

Competency	C38								C39							
Performance Statement	PS1		PS2		PS3		PS4		PS1		PS2	PS3	PS4	PS5	PS6	
Scale #	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Variable ID	V405	V406	V407	V408	V409	V410	V411	V412	V413	V414	V415	V416	V417	V418	V419	V420
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 47 (Cont.)

Web Development and Administration Scale Face Validity Run 1

Competency	C39						C40								
Performance Statement	PS7		PS8		PS9		PS1	PS2	PS3		PS4	PS5		PS6	
Scale #	9	10	11	12	13	14	1	2	3	4	5	6	7	8	9
Variable ID	V421	V422	V423	V424	V425	V426	V427	V428	V429	V430	V431	V432	V433	V434	V435
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 47 (Cont.)

Web Development and Administration Scale Face Validity Run 1

Competency	C41									
Performance Statement	PS1		PS2		PS3	PS4	PS5		PS6	
Scale #	1	2	3	4	5	6	7	8	9	10
Variable ID	V436	V437	V438	V439	V440	V441	V442	V443	V444	V445
rater3	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5

Table 48

Professional Foundations Scale Face Validity Run 2

Competency	C1			C4				C5			
Performance Statement		PS1		PS1	PS2	PS4		PS1	PS2	PS3	PS5
Scale #	1	2	3	1	6	9	10	1	4	6	11
Variable ID	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20
rater3	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	2	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1.2	1	1	1	1	1
Standard Error	0	0	0	0	0	0.2	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0.45	0	0	0	0	0
Sample Variance	0	0	0	0	0	0.2	0	0	0	0	0
Kurtosis	0	0	0	0	0	5.00	0	0	0	0	0
Skewness	0	0	0	0	0	2.24	0	0	0	0	0
Range	0	0	0	0	0	1	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	2	1	1	1	1	1
Sum	5	5	5	5	5	6	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5

Table 49

Planning and Analysis Scale Face Validity Run 2

Competency	C7	C8		C9	C10
Performance Statement	PS1	PS1	PS3	PS1	PS1
Scale #	1	1	11	1	1
Variable ID	V21	V22	V23	V24	V25
rater3	1	1	1	1	1
rater4	1	1	1	1	1
rater5	1	1	1	1	2
rater1	1	1	1	1	1
rater2	1	1	1	1	1
Mean	1	1	1	1	1.2
Standard Error	0	0	0	0	0.2
Median	1	1	1	1	1
Mode	1	1	1	1	1
Standard Deviation	0	0	0	0	0.45
Sample Variance	0	0	0	0	0.2
Kurtosis	0	0	0	0	5.00
Skewness	0	0	0	0	2.24
Range	0	0	0	0	1
Minimum	1	1	1	1	1
Maximum	1	1	1	1	2
Sum	5	5	5	5	6
Count	5	5	5	5	5

Table 50

Design and Development Scale Face Validity Run 2

Competency	C13		C14	C15		C16	
Performance Statement	PS1	PS2	PS1	PS1	PS3	PS1	PS3
Scale #	1	5	1	1	5	1	7
Variable ID	V26	V27	V28	V29	V30	V31	V32
rater3	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1
rater5	1	1	2	2	1	1	1
rater1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1
Mean	1	1	1.2	1.2	1	1	1
Standard Error	0	0	0.2	0.2	0	0	0
Median	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1
Standard Deviation	0	0	0.45	0.45	0	0	0
Sample Variance	0	0	0.2	0.2	0	0	0
Kurtosis	0	0	5.00	5.00	0	0	0
Skewness	0	0	2.24	2.24	0	0	0
Range	0	0	1	1	0	0	0
Minimum	1	1	1	1	1	1	1
Maximum	1	1	2	2	1	1	1
Sum	5	5	6	6	5	5	5
Count	5	5	5	5	5	5	5

Table 51

Implementation and Management Scale Face Validity Run 2

Competency	C19					C20	C21		
Performance Statement	PS1	PS4	PS7	PS9	PS10	PS1	PS1	PS5	PS7
Scale #	1	4	8	13	14	1	1	8	10
Variable ID	V33	V34	V35	V36	V37	V38	V39	V40	V41
rater3	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	2	1	1
rater1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1.2	1	1
Standard Error	0	0	0	0	0	0	0.2	0	0
Median	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0.45	0	0
Sample Variance	0	0	0	0	0	0	0.2	0	0
Kurtosis	0	0	0	0	0	0	5.00	0	0
Skewness	0	0	0	0	0	0	2.24	0	0
Range	0	0	0	0	0	0	1	0	0
Minimum	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	2	1	1
Sum	5	5	5	5	5	5	6	5	5
Count	5	5	5	5	5	5	5	5	5

Table 52

Digital Media Scale Face Validity Run 2

Competency	C26		C27	
Performance Statement	PS1	PS4	PS1	
Scale #	1	10	1	2
RaterID	V42	V43	V44	V45
rater3	1	1	1	1
rater4	1	1	1	1
rater5	1	1	1	1
rater1	1	1	1	1
rater2	1	1	1	1
Mean	1	1	1	1
Standard Error	0	0	0	0
Median	1	1	1	1
Mode	1	1	1	1
Standard Deviation	0	0	0	0
Sample Variance	0	0	0	0
Kurtosis	0	0	0	0
Skewness	0	0	0	0
Range	0	0	0	0
Minimum	1	1	1	1
Maximum	1	1	1	1
Sum	5	5	5	5
Count	5	5	5	5

Table 53

Technical Writing Scale Face Validity Run 2

Competency	C30	C33
Performance Statement	PS1	PS1
Scale #	1	1
Variable ID	V46	V47
rater3	1	1
rater4	1	1
rater5	2	2
rater1	1	1
rater2	1	1
Mean	1.2	1.2
Standard Error	0.2	0.2
Median	1	1
Mode	1	1
Standard Deviation	0.45	0.45
Sample Variance	0.2	0.2
Kurtosis	5.00	5.00
Skewness	2.24	2.24
Range	1	1
Minimum	1	1
Maximum	2	2
Sum	6	6
Count	5	5

Table 54

Web Development and Administration Scale Face Validity Run 2

Competency	C34	C37		C38								C39							
Performance Statement	PS1	PS1		PS1		PS2		PS3		PS4		PS1	PS6	PS7		PS8		PS9	
Scale #	1	1	9	1	2	3	4	5	6	7	8	1	8	9	10	11	12	13	14
Variable ID	V48	V49	V50	V51	V52	V53	V54	V55	V56	V57	V58	V59	V60	V61	V62	V63	V64	V65	V66
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.45	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.00	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.24	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 55

Professional Foundations Interrater Reliability Run 1

Competency	C1																	
Performance Statement		PS1			PS2				PS3			PS4			PS5		PS6	
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Variable ID	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22	V23	V24	V25	V26	V27
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1.2	1.2	1.2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0.2	0.2	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0.45	0.45	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0.2	0.2	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	5.00	5.00	5.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	2.24	2.24	2.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 55 (Cont.)

Professional Foundations Interrater Reliability Run 1

Competency	C1					C2						C3					
Performance Statement	PS7		PS8		PS9	PS1			PS2	PS3		PS1	PS2		PS3		
Scale #	19	20	21	22	23	1	2	3	4	5	6	1	2	3	4	5	6
Variable ID	V28	V29	V30	V31	V32	V33	V34	V35	V36	V37	V38	V39	V40	V41	V42	V43	V44
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 55 (Cont.)

Professional Foundations Interrater Reliability Run 1

Competency	C3				C4										C5	
Performance Statement	PS4		PS5		PS1				PS2		PS3		PS4		PS1	
Scale #	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2
Variable ID	V45	V46	V47	V48	V49	V50	V51	V52	V53	V54	V55	V56	V57	V58	V59	V60
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0.45	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	5.00	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	2.24	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	6	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 55 (Cont.)

Professional Foundations Interrater Reliability Run 1

Competency	C5											
Performance Statement	PS2		PS3		PS4				PS5			
Scale #	3	4	5	6	7	8	9	10	11	12	13	14
Variable ID	V61	V62	V63	V64	V65	V66	V67	V68	V69	V70	V71	V72
rater3	1	1	1	1	1	1	1	1	2	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1.2	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0.2	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0.45	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0.2	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	5.00	0	0	0
Skewness	0	0	0	0	0	0	0	0	2.24	0	0	0
Range	0	0	0	0	0	0	0	0	1	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	2	1	1	1
Sum	5	5	5	5	5	5	5	5	6	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5

Table 56

Planning and Analysis Interrater Reliability Run 1

Competency	C6											C7				
Performance Statement	PS1		PS2		PS3		PS4		PS5		PS6		PS1		PS2	
Scale #	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5
Variable ID	V73	V74	V75	V76	V77	V78	V79	V80	V81	V82	V83	V84	V85	V86	V87	V88
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 56 (Cont.)

Planning and Analysis Interrater Reliability Run 1

Competency	C7					C8										
Performance Statement	PS3		PS4		PS5	PS1					PS2				PS3	
Scale #	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	11
Variable ID	V89	V90	V91	V92	V93	V94	V95	V96	V97	V98	V99	V100	V101	V102	V103	V104
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1.4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	5.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	2.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	7	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 56 (Cont.)

Planning and Analysis Interrater Reliability Run 1

Competency	C9						C10										
Performance Statement		PS1			PS2			PS1			PS2		PS3			PS4	
Scale #	1	2	3	4	5	6	1	2	3	4	5	6	7	8	9	10	11
Variable ID	V105	V106	V107	V108	V109	V110	V111	V112	V113	V114	V115	V116	V117	V118	V119	V120	V121
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1.2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	5.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	2.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 56 (Cont.)

Planning and Analysis Interrater Reliability Run 1

Competency	C11					C12			
Performance Statement	PS1		PS2	PS3		PS1	PS2	PS3	PS4
Scale #	1	2	3	4	5	1	2	3	4
Variable ID	V122	V123	V124	V125	V126	V127	V128	V129	V130
rater3	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5

Table 57

Design and Development Interrater Reliability Run 1

Competency	C13								C14								
Performance Statement		PS1			PS2		PS3	PS4	PS1		PS2			PS3			PS4
Scale #	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	9
Variable ID	V131	V132	V133	V134	V135	V136	V137	V138	V139	V140	V141	V142	V143	V144	V145	V146	V147
rater3	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1.2	1	1	1.2	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0.2	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0.45	0	0	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0.2	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	5.00	0	0	5.00	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	2.24	0	0	2.24	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	6	5	5	6	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 57 (Cont.)

Design and Development Interrater Reliability Run 1

Competency	C14						C15								
Performance Statement	PS5		PS6		PS7		PS1		PS2		PS3		PS4		PS5
Scale #	10	11	12	13	14	15	1	2	3	4	5	6	7	8	9
Variable ID	V148	V149	V150	V151	V152	V153	V154	V155	V156	V157	V158	V159	V160	V161	V162
rater3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1.2	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0.45	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	5.00	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	2.24	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	6	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 57 (Cont.)

Design and Development Interrater Reliability Run 1

Competency	C16						C17			C18				
Performance Statement														
	PS1				PS2	PS3	PS1	PS2	PS3	PS1	PS2		PS3	
Scale #	1	2	3	4	5	6	1	2	3	1	2	3	4	5
Variable ID	V163	V164	V165	V166	V167	V168	V169	V170	V171	V172	V173	V174	V175	V176
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 57 (Cont.)

Design and Development Interrater Reliability Run 1

Competency	C18										
Performance Statement											
	PS4		PS5		PS6	PS7		PS8		PS9	
Scale #	6	7	8	9	10	11	12	13	14	15	16
Variable ID	V177	V178	V179	V180	V181	V182	V183	V184	V185	V186	V187
rater3	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5

Table 58

Implementation and Management Scale Interrater Reliability Run 1

Competency	C19															
Performance Statement	PS1	PS2	PS3	PS4	PS5		PS6	PS7		PS8		PS9			PS10	
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Variable ID	V188	V189	V190	V191	V192	V193	V194	V195	V196	V197	V198	V199	V200	V201	V202	V203
rater3	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1
Mean	1	1	1.2	1	1	1	1	1	1	1	1	1	1.2	1.2	1	1
Standard Error	0	0	0.2	0	0	0	0	0	0	0	0	0	0.2	0.2	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0.45	0	0	0	0	0	0	0	0	0	0.45	0.45	0	0
Sample Variance	0	0	0.2	0	0	0	0	0	0	0	0	0	0.2	0.2	0	0
Kurtosis	0	0	5.00	0	0	0	0	0	0	0	0	0	5.00	5.00	0	0
Skewness	0	0	2.24	0	0	0	0	0	0	0	0	0	2.24	2.24	0	0
Range	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	2	1	1	1	1	1	1	1	1	1	2	2	1	1
Sum	5	5	6	5	5	5	5	5	5	5	5	5	6	6	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 58 (Cont.)

Implementation and Management Scale Interrater Reliability Run 1

Competency	C20									C21				
Performance Statement	PS1		PS2	PS3	PS4		PS5	PS6		PS1	PS2		PS3	PS4
Scale #	1	2	3	4	5	6	7	8	9	1	2	3	4	5
Variable ID	V204	V205	V206	V207	V208	V209	V210	V211	V212	V213	V214	V215	V216	V217
rater3	1	1	1	2	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1.2	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0.45	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	5.00	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	2.24	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	2	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	6	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 58 (Cont.)

Implementation and Management Scale Interrater Reliability Run 1

Competency	C21							C22						C23		
Performance Statement	PS5			PS6	PS7	PS8		PS1		PS2		PS3		PS1		
Scale #	6	7	8	9	10	11	12	1	2	3	4	5	6	1	2	3
Variable ID	V218	V219	V220	V221	V222	V223	V224	V225	V226	V227	V228	V229	V230	V231	V232	V233
rater3	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1.2	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0.45	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	5.00	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	2.24	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	6	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 58 (Cont.)

Implementation and Management Scale Interrater Reliability Run 1

Competency	C23									
Performance Statement	PS2		PS3		PS4		PS5			
Scale #	4	5	6	7	8	9	10	11	12	13
Variable ID	V234	V235	V236	V237	V238	V239	V240	V241	V242	V243
rater3	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5

Table 59

Digital Media Scale Interrater reliability Run 1

Competency	C24														C25	
Performance Statement	PS1	PS2		PS3		PS4	PS5	PS6		PS7			PS8		PS1	
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	1	2
RaterID	V244	V245	V246	V247	V248	V249	V250	V251	V252	V253	V254	V255	V256	V257	V258	V259
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 59 (Cont.)

Digital Media Scale Interrater reliability Run 1

Competency	C25													C26			
Performance Statement	PS2			PS3			PS4			PS5			PS6	PS1			
Scale #	3	4	5	6	7	8	9	10	11	12	13	14	15	1	2	3	4
RaterID	V260	V261	V262	V263	V264	V265	V266	V267	V268	V269	V270	V271	V272	V273	V274	V275	V276
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 59 (Cont.)

Digital Media Scale Interrater reliability Run 1

Competency	C26							C27									
Performance Statement		PS2		PS3		PS4				PS1					PS2		
Scale #	5	6	7	8	9	10	11	1	2	3	4	5	6	7	8	9	10
RaterID	V277	V278	V279	V280	V281	V282	V283	V284	V285	V286	V287	V288	V289	V290	V291	V292	V293
rater3	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1.2	1	1	1.2	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0.2	0	0	0.2	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0.45	0	0	0.45	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0.2	0	0	0.2	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	5.00	0	0	5.00	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	2.24	0	0	2.24	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	2	1	1	2	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	6	5	5	6	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 59 (Cont.)

Digital Media Scale Interrater reliability Run 1

Competency	C28												
Performance Statement	PS1			PS2				PS3			PS4		
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13
RaterID	V294	V295	V296	V297	V298	V299	V300	V301	V302	V303	V304	V305	V306
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 60

Technical Writing Scale Interrater Reliability Run 1

Competency	C29												C30			
Performance Statement	PS1		PS2		PS3	PS4		PS5		PS6	PS7		PS1		PS2	
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
Variable ID	V307	V308	V309	V310	V311	V312	V313	V314	V315	V316	V317	V318	V319	V320	V321	V322
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 60 (Cont.)

Technical Writing Scale Interrater Reliability Run 1

Competency	C30						C31								
Performance Statement	PS3	PS4	PS5		PS6		PS1			PS2			PS3		PS4
Scale #	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9
RaterID	V323	V324	V325	V326	V327	V328	V329	V330	V331	V332	V333	V334	V335	V336	V337
rater3	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1.2	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0.45	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	5.00	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	2.24	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	6	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 60 (Cont.)

Technical Writing Scale Interrater Reliability Run 1

Competency	C31		C32												
Performance Statement	PS5	PS6		PS1		PS2	PS3		PS4		PS5			PS6	
Scale #	10	11	1	2	3	4	5	6	7	8	9	10	11	12	13
RaterID	V338	V339	V340	V341	V342	V343	V344	V345	V346	V347	V348	V349	V350	V351	V352
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 60 (Cont.)

Technical Writing Scale Interrater Reliability Run 1

Competency	C33					
Performance Statement	PS1	PS2	PS3	PS4		PS5
Scale #	1	2	3	4	5	6
RaterID	V353	V354	V355	V356	V357	V358
rater3	1	1	1	1	1	1
rater4	1	1	1	1	1	1
rater5	1	1	1	1	1	1
rater1	1	1	1	1	1	1
rater2	1	1	1	1	1	1
Mean	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0
Median	1	1	1	1	1	1
Mode	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0
Skewness	0	0	0	0	0	0
Range	0	0	0	0	0	0
Minimum	1	1	1	1	1	1
Maximum	1	1	1	1	1	1
Sum	5	5	5	5	5	5
Count	5	5	5	5	5	5

Table 61

Web Development and Administration Scale Interrater Reliability Run 1

Competency	C34													C35		
Performance Statement	PS1	PS2	PS3		PS4	PS5		PS6		PS7				PS1		PS2
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13	1	2	3
Variable ID	V359	V360	V361	V362	V363	V364	V365	V366	V367	V368	V369	V370	V371	V372	V373	V374
rater3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1.2	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0.45	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	5.00	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	2.24	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	6	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 61 (Cont.)

Web Development and Administration Scale Interrater Reliability Run 1

Competency	C35										C36				
Performance Statement		PS3		PS4	PS5	PS6	PS7	PS8	PS9		PS1	PS2		PS3	
Scale #	4	5	6	7	8	9	10	11	12	13	1	2	3	4	5
RaterID	V375	V376	V377	V378	V379	V380	V381	V382	V383	V384	V385	V386	V387	V388	V389
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 61 (Cont.)

Web Development and Administration Scale Interrater Reliability Run 1

Competency	C36				C37											
Performance Statement	PS4			PS5	PS1	PS2	PS3	PS4	PS5	PS6				PS7	PS8	
Scale #	6	7	8	9	1	2	3	4	5	6	7	8	9	10	11	12
RaterID	V390	V391	V392	V393	V394	V395	V396	V397	V398	V399	V400	V401	V402	V403	V404	V405
rater3	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1.2	1	1	1	1	1	1	1.2	1	1	1
Standard Error	0	0	0	0	0	0.2	0	0	0	0	0	0	0.2	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0.45	0	0	0	0	0	0	0.45	0	0	0
Sample Variance	0	0	0	0	0	0.2	0	0	0	0	0	0	0.2	0	0	0
Kurtosis	0	0	0	0	0	5.00	0	0	0	0	0	0	5.00	0	0	0
Skewness	0	0	0	0	0	2.24	0	0	0	0	0	0	2.24	0	0	0
Range	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1
Sum	5	5	5	5	5	6	5	5	5	5	5	5	6	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 61 (Cont.)

Web Development and Administration Scale Interrater Reliability Run 1

Competency	C38								C39							
Performance Statement	PS1		PS2		PS3		PS4		PS1		PS2	PS3	PS4	PS5	PS6	
Scale #	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
RaterID	V406	V407	V408	V409	V410	V411	V412	V413	V414	V415	V416	V417	V418	V419	V420	V421
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	2
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	2	1	1	1	2	2	1	1	1	1	1	1	1	1
Mean	1.2	1.2	1.4	1.2	1.2	1.2	1.4	1.4	1	1	1.2	1	1	1	1	1.2
Standard Error	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0	0	0.2	0	0	0	0	0.2
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0.45	0.45	0.55	0.45	0.45	0.45	0.55	0.55	0	0	0.45	0	0	0	0	0.45
Sample Variance	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.3	0	0	0.2	0	0	0	0	0.2
Kurtosis	5.00	5.00	-3.33	5.00	5.00	5.00	-3.33	-3.33	0	0	5.00	0	0	0	0	5.00
Skewness	2.24	2.24	0.61	2.24	2.24	2.24	0.61	0.61	0	0	2.24	0	0	0	0	2.24
Range	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	2
Sum	6	6	7	6	6	6	7	7	5	5	6	5	5	5	5	6
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 61 (Cont.)

Web Development and Administration Scale Interrater Reliability Run 1

Competency	C39						C40								
Performance Statement	PS7		PS8		PS9		PS1	PS2	PS3		PS4	PS5		PS6	
Scale #	9	10	11	12	13	14	1	2	3	4	5	6	7	8	9
RaterID	V422	V423	V424	V425	V426	V427	V428	V429	V430	V431	V432	V433	V434	V435	V436
rater3	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
rater4	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean	1.2	1.2	1.2	1.4	1.2	1.2	1	1	1	1	1	1	1	1	1
Standard Error	0.2	0.2	0.2	0.2	0.2	0.2	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0.45	0.45	0.45	0.55	0.45	0.45	0	0	0	0	0	0	0	0	0
Sample Variance	0.2	0.2	0.2	0.3	0.2	0.2	0	0	0	0	0	0	0	0	0
Kurtosis	5.00	5.00	5.00	-3.33	5.00	5.00	0	0	0	0	0	0	0	0	0
Skewness	2.24	2.24	2.24	0.61	2.24	2.24	0	0	0	0	0	0	0	0	0
Range	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1
Sum	6	6	6	7	6	6	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 61 (Cont.)

Web Development and Administration Scale Interrater Reliability Run 1

Competency	C41									
Performance Statement	PS1		PS2		PS3	PS4	PS5		PS6	
Scale #	1	2	3	4	5	6	7	8	9	10
RaterID	V437	V438	V439	V440	V441	V442	V443	V444	V445	V446
rater3	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5

Table 62

Professional Foundations Scale Interrater Reliability Run 2

Competency	C1			C4				C5			
Performance Statement		PS1		PS1	PS2	PS4		PS1	PS2	PS3	PS5
Scale #	1	2	3	1	6	9	10	1	4	6	11
Variable ID	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20
rater3	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	2	1	1	1	1	1
Mean	1	1	1	1	1	1.2	1	1	1	1	1
Standard Error	0	0	0	0	0	0.2	0	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0.45	0	0	0	0	0
Sample Variance	0	0	0	0	0	0.2	0	0	0	0	0
Kurtosis	0	0	0	0	0	5.00	0	0	0	0	0
Skewness	0	0	0	0	0	2.24	0	0	0	0	0
Range	0	0	0	0	0	1	0	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	2	1	1	1	1	1
Sum	5	5	5	5	5	6	5	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5

Table 63

Planning and Analysis Scale Interrater Reliability Run 2

Competency	C7	C8		C9	C10	C13	
Performance Statement	PS1	PS1	PS3	PS1	PS1	PS1	PS3
Scale #	1	1	11	1	1	1	5
Variable ID	V21	V22	V23	V24	V25	V26	V27
rater3	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1
rater2	1	1	1	1	2	1	1
Mean	1	1	1	1	1.2	1	1
Standard Error	0	0	0	0	0.2	0	0
Median	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0.45	0	0
Sample Variance	0	0	0	0	0.2	0	0
Kurtosis	0	0	0	0	5.00	0	0
Skewness	0	0	0	0	2.24	0	0
Range	0	0	0	0	1	0	0
Minimum	1	1	1	1	1	1	1
Maximum	1	1	1	1	2	1	1
Sum	5	5	5	5	6	5	5
Count	5	5	5	5	5	5	5

Table 64

Design and Development Scale Interrater Reliability Run 2

Competency	C13		C14	C15		C16	
Performance Statement	PS1	PS2	PS1	PS1	PS3	PS1	PS3
Scale #	1	5	1	1	5	1	7
Variable ID	V26	V27	V28	V29	V30	V31	V32
rater3	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1
rater2	1	1	2	2	2	1	3
Mean	1	1	1.2	1.2	1.2	1	1.4
Standard Error	0	0	0.2	0.2	0.2	0	0.4
Median	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1
Standard Deviation	0	0	0.45	0.45	0.45	0	0.89
Sample Variance	0	0	0.2	0.2	0.2	0	0.8
Kurtosis	0	0	5.00	5.00	5.00	0	5.00
Skewness	0	0	2.24	2.24	2.24	0	2.24
Range	0	0	1	1	1	0	2
Minimum	1	1	1	1	1	1	1
Maximum	1	1	2	2	2	1	3
Sum	5	5	6	6	6	5	7
Count	5	5	5	5	5	5	5

Table 65

Implementation and Management Scale Interrater Reliability Run 2

Competency	C19					C20	C21		
Performance Statement	PS1	PS4	PS7	PS9	PS10	PS1	PS1	PS5	PS7
Scale #	1	4	8	13	14	1	1	8	10
Variable ID	V33	V34	V35	V36	V37	V38	V39	V40	V41
rater3	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	2	1	1	2	1	1
Mean	1	1	1	1.2	1	1	1.2	1	1
Standard Error	0	0	0	0.2	0	0	0.2	0	0
Median	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0.45	0	0	0.45	0	0
Sample Variance	0	0	0	0.2	0	0	0.2	0	0
Kurtosis	0	0	0	5.00	0	0	5.00	0	0
Skewness	0	0	0	2.24	0	0	2.24	0	0
Range	0	0	0	1	0	0	1	0	0
Minimum	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	2	1	1	2	1	1
Sum	5	5	5	6	5	5	6	5	5
Count	5	5	5	5	5	5	5	5	5

Table 66

Digital Media Scale Interrater Reliability Run 2

Competency	C26		C27	
Performance Statement	PS1	PS4	PS1	
Scale #	1	10	1	2
RaterID	V42	V43	V44	V45
rater3	1	1	1	1
rater4	1	1	1	1
rater5	1	1	1	1
rater1	1	1	1	1
rater2	1	1	1	1
Mean	1	1	1	1
Standard Error	0	0	0	0
Median	1	1	1	1
Mode	1	1	1	1
Standard Deviation	0	0	0	0
Sample Variance	0	0	0	0
Kurtosis	0	0	0	0
Skewness	0	0	0	0
Range	0	0	0	0
Minimum	1	1	1	1
Maximum	1	1	1	1
Sum	5	5	5	5
Count	5	5	5	5

Table 67

Technical Writing Scale Interrater Reliability Run 2

Competency	C30	C33
Performance Statement	PS1	PS1
Scale #	1	1
Variable ID	V46	V47
rater3	1	1
rater4	1	1
rater5	1	1
rater1	1	1
rater2	1	1
Mean	1	1
Standard Error	0	0
Median	1	1
Mode	1	1
Standard Deviation	0	0
Sample Variance	0	0
Kurtosis	0	0
Skewness	0	0
Range	0	0
Minimum	1	1
Maximum	1	1
Sum	5	5
Count	5	5

Table 68

Web Development and Administration Scale Interrater Reliability Run 2

Competency	C34	C37		C38								C39							
Performance Statement	PS1	PS1	PS6	PS1		PS2		PS3		PS4		PS1		PS7		PS8		PS9	
Scale #	1	1	9	1	2	3	4	5	6	7	8	1	2	9	10	11	12	13	14
Variable ID	V48	V49	V50	V51	V52	V53	V54	V55	V56	V57	V58	V59	V60	V61	V62	V63	V64	V65	V66
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	1	1	1	1
Mean	1	1	1	1	1	1	1	1	1	1.2	1	1	1	1	1.2	1	1	1	1
Standard Error	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0.2	0	0	0	0
Median	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard Deviation	0	0	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0	0	0	0
Sample Variance	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0.2	0	0	0	0
Kurtosis	0	0	0	0	0	0	0	0	0	5.00	0	0	0	0	5.00	0	0	0	0
Skewness	0	0	0	0	0	0	0	0	0	2.24	0	0	0	0	2.24	0	0	0	0
Range	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	1	1	1	1
Sum	5	5	5	5	5	5	5	5	5	6	5	5	5	5	6	5	5	5	5
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 69

Professional Foundations Scale Skill Level Run 1

Competency	C1																	
Performance Statement		PS1			PS2			PS3				PS4		PS5			PS6	
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Variable ID	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22	V23	V24	V25	V26	V27
rater3	1	1	1	2	2	3	3	4	3	2	2	2	1	2	2	3	4	4
rater4	1	1	1	1	1	3	3	3	2	2	2	2	3	3	1	2	2	2
rater5	1	1	1	1	1	2	2	3	3	1	2	1	1	1	1	3	1	1
rater2	3	2	1	3	2	2	1	2	2	2	2	2	3	3	2	2	2	2
rater1	2	3	3	1	2	2	3	2	3	2	2	2	2	2	2	3	2	1
Mean	1.60	1.60	1.40	1.60	1.60	2.40	2.40	2.80	2.60	1.80	2.00	1.80	2.00	2.20	1.60	2.60	2.20	2.00
Standard Error	0.40	0.40	0.40	0.40	0.24	0.24	0.40	0.37	0.24	0.20	0.00	0.20	0.45	0.37	0.24	0.24	0.49	0.55
Median	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	2.00
Mode	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	3.00	2.00	2.00	2.00	1.00	2.00	2.00	3.00	2.00	2.00
Standard Deviation	0.89	0.89	0.89	0.89	0.55	0.55	0.89	0.84	0.55	0.45	0.00	0.45	1.00	0.84	0.55	0.55	1.10	1.22
Sample Variance	0.80	0.80	0.80	0.80	0.30	0.30	0.80	0.70	0.30	0.20	0.00	0.20	1.00	0.70	0.30	0.30	1.20	1.50
Kurtosis	0.31	0.31	5.00	0.31	-3.33	-3.33	0.31	-0.61	-3.33	5.00	0.00	5.00	-3.00	-0.61	-3.33	-3.33	2.92	2.00
Skewness	1.26	1.26	2.24	1.26	-0.61	0.61	-1.26	0.51	-0.61	-2.24	0.00	-2.24	0.00	-0.51	-0.61	-0.61	1.29	1.36
Range	2	2	2	2	1	1	2	2	1	1	0	1	2	2	1	1	3	3
Minimum	1	1	1	1	1	2	1	2	2	1	2	1	1	1	1	2	1	1
Maximum	3	3	3	3	2	3	3	4	3	2	2	2	3	3	2	3	4	4
Sum	8	8	7	8	8	12	12	14	13	9	10	9	10	11	8	13	11	10
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 69 (Cont.)

Professional Foundations Scale Skill Level Run 1

Competency	C1					C2						C3							
Performance Statement	PS7		PS8		PS9	PS1			PS2	PS3		PS1	PS2		PS3			PS4	
Scale #	19	20	21	22	23	1	2	3	4	5	6	1	2	3	4	5	6	7	8
Variable ID	V28	V29	V30	V31	V32	V33	V34	V35	V36	V37	V38	V39	V40	V41	V42	V43	V44	V45	V46
rater3	2	2	2	1	1	5	4	4	3	3	3	2	3	2	1	4	5	4	4
rater4	2	3	2	3	3	3	3	3	3	2	3	3	3	3	2	4	4	4	4
rater5	1	1	1	1	1	5	5	5	5	4	4	4	5	5	2	4	3	1	3
rater2	3	3	3	3	3	2	2	2	2	3	3	3	2	2	3	3	3	3	3
rater1	1	2	2	1	1	1	3	1	1	3	3	5	1	5	1	3	4	1	3
Mean	1.80	2.20	2.00	1.80	1.80	3.20	3.40	3.00	2.80	3.00	3.20	3.40	2.80	3.40	1.80	3.60	3.80	2.60	3.40
Standard Error	0.37	0.37	0.32	0.49	0.49	0.80	0.51	0.71	0.66	0.32	0.20	0.51	0.66	0.68	0.37	0.24	0.37	0.68	0.24
Median	2.00	2.00	2.00	1.00	1.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	4.00	4.00	3.00	3.00
Mode	2.00	2.00	2.00	1.00	1.00	5.00	3.00	#N/A	3.00	3.00	3.00	3.00	3.00	2.00	1.00	4.00	4.00	4.00	3.00
Standard Deviation	0.84	0.84	0.71	1.10	1.10	1.79	1.14	1.58	1.48	0.71	0.45	1.14	1.48	1.52	0.84	0.55	0.84	1.52	0.55
Sample Variance	0.70	0.70	0.50	1.20	1.20	3.20	1.30	2.50	2.20	0.50	0.20	1.30	2.20	2.30	0.70	0.30	0.70	2.30	0.30
Kurtosis	-0.61	-0.61	2.00	-3.33	-3.33	-2.32	-0.18	-1.20	0.87	2.00	5.00	-0.18	0.87	-3.08	-0.61	-3.33	-0.61	-3.08	-3.33
Skewness	0.51	-0.51	0.00	0.61	0.61	-0.05	0.40	0.00	0.55	0.00	2.24	0.40	0.55	0.32	0.51	-0.61	0.51	-0.32	0.61
Range	2	2	2	2	2	4	3	4	4	2	1	3	4	3	2	1	2	3	1
Minimum	1	1	1	1	1	1	2	1	1	2	3	2	1	2	1	3	3	1	3
Maximum	3	3	3	3	3	5	5	5	5	4	4	5	5	5	3	4	5	4	4
Sum	9	11	10	9	9	16	17	15	14	15	16	17	14	17	9	18	19	13	17
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 69 (Cont.)

Professional Foundations Scale Skill Level Run 1

Competency	C3		C4										C5					
Performance Statement	PS5		PS1				PS2		PS3		PS4		PS1		PS2		PS3	
Scale #	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6
Variable ID	V47	V48	V49	V50	V51	V52	V53	V54	V55	V56	V57	V58	V59	V60	V61	V62	V63	V64
rater3	3	3	3	2	3	3	3	2	3	3	3	3	3	3	4	4	3	4
rater4	3	3	3	3	1	1	2	2	3	3	3	3	2	2	2	2	1	1
rater5	3	2	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1
rater2	3	3	3	2	2	3	3	3	2	2	3	3	1	1	1	2	3	3
rater1	1	2	2	3	3	3	3	3	3	3	4	4	2	2	2	4	2	2
Mean	2.60	2.60	2.40	2.20	2.00	2.20	2.40	2.20	2.60	2.60	2.80	2.80	1.80	1.80	2.00	2.60	2.00	2.20
Standard Error	0.40	0.24	0.40	0.37	0.45	0.49	0.40	0.37	0.24	0.24	0.49	0.49	0.37	0.37	0.55	0.60	0.45	0.58
Median	3.00	3.00	3.00	2.00	2.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00	2.00	2.00
Mode	3.00	3.00	3.00	2.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	4.00	3.00	1.00
Standard Deviation	0.89	0.55	0.89	0.84	1.00	1.10	0.89	0.84	0.55	0.55	1.10	1.10	0.84	0.84	1.22	1.34	1.00	1.30
Sample Variance	0.80	0.30	0.80	0.70	1.00	1.20	0.80	0.70	0.30	0.30	1.20	1.20	0.70	0.70	1.50	1.80	1.00	1.70
Kurtosis	5.00	-3.33	0.31	-0.61	-3.00	-3.33	0.31	-0.61	-3.33	-3.33	2.92	2.92	-0.61	-0.61	2.00	-2.41	-3.00	-1.49
Skewness	-2.24	-0.61	-1.26	-0.51	0.00	-0.61	-1.26	-0.51	-0.61	-0.61	-1.29	-1.29	0.51	0.51	1.36	0.17	0.00	0.54
Range	2	1	2	2	2	2	2	2	1	1	3	3	2	2	3	3	2	3
Minimum	1	2	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1
Maximum	3	3	3	3	3	3	3	3	3	3	4	4	3	3	4	4	3	4
Sum	13	13	12	11	10	11	12	11	13	13	14	14	9	9	10	13	10	11
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 69 (Cont.)

Professional Foundations Scale Skill Level Run 1

Competency	C5							
Performance Statement	PS4				PS5			
Scale #	7	8	9	10	11	12	13	14
Variable ID	V65	V66	V67	V68	V69	V70	V71	V72
rater3	4	4	3	3	2	1	1	1
rater4	1	1	2	2	1	1	1	2
rater5	1	1	1	1	1	1	1	1
rater2	2	2	1	1	1	2	3	3
rater1	2	3	2	3	3	2	2	2
Mean	2.00	2.20	1.80	2.00	1.60	1.40	1.60	1.80
Standard Error	0.55	0.58	0.37	0.45	0.40	0.24	0.40	0.37
Median	2.00	2.00	2.00	2.00	1.00	1.00	1.00	2.00
Mode	1.00	1.00	2.00	3.00	1.00	1.00	1.00	1.00
Standard Deviation	1.22	1.30	0.84	1.00	0.89	0.55	0.89	0.84
Sample Variance	1.50	1.70	0.70	1.00	0.80	0.30	0.80	0.70
Kurtosis	2.00	-1.49	-0.61	-3.00	0.31	-3.33	0.31	-0.61
Skewness	1.36	0.54	0.51	0.00	1.26	0.61	1.26	0.51
Range	3	3	2	2	2	1	2	2
Minimum	1	1	1	1	1	1	1	1
Maximum	4	4	3	3	3	2	3	3
Sum	10	11	9	10	8	7	8	9
Count	5	5	5	5	5	5	5	5

Table 70

Planning and Analysis Scale Skill Level Run 1

Competency	C6											C7						
Performance Statement	PS1		PS2		PS3		PS4		PS5		PS6	PS1			PS2		PS3	
Scale #	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5	6	7
Variable ID	V73	V74	V75	V76	V77	V78	V79	V80	V81	V82	V83	V84	V85	V86	V87	V88	V89	V90
rater3	3	3	3	3	3	1	3	3	3	3	4	3	2	3	3	3	3	3
rater4	2	3	3	3	2	2	2	2	2	2	4	1	2	2	2	2	2	2
rater5	2	2	2	2	2	2	2	1	2	2	3	1	1	1	1	1	1	3
rater1	2	2	3	3	3	3	1	1	1	2	2	2	1	2	1	2	3	2
rater2	2	3	4	4	3	3	4	4	3	3	3	3	3	2	2	3	2	3
Mean	2.20	2.60	3.00	3.00	2.60	2.20	2.40	2.20	2.20	2.40	3.20	2.00	1.80	2.00	1.80	2.20	2.20	2.60
Standard Error	0.20	0.24	0.32	0.32	0.24	0.37	0.51	0.58	0.37	0.24	0.37	0.45	0.37	0.32	0.37	0.37	0.37	0.24
Median	2.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00
Mode	2.00	3.00	3.00	3.00	3.00	2.00	2.00	1.00	3.00	2.00	4.00	3.00	2.00	2.00	2.00	3.00	3.00	3.00
Standard Deviation	0.45	0.55	0.71	0.71	0.55	0.84	1.14	1.30	0.84	0.55	0.84	1.00	0.84	0.71	0.84	0.84	0.84	0.55
Sample Variance	0.20	0.30	0.50	0.50	0.30	0.70	1.30	1.70	0.70	0.30	0.70	1.00	0.70	0.50	0.70	0.70	0.70	0.30
Kurtosis	5.00	-3.33	2.00	2.00	-3.33	-0.61	-0.18	-1.49	-0.61	-3.33	-0.61	-3.00	-0.61	2.00	-0.61	-0.61	-0.61	-3.33
Skewness	2.24	-0.61	0.00	0.00	-0.61	-0.51	0.40	0.54	-0.51	0.61	-0.51	0.00	0.51	0.00	0.51	-0.51	-0.51	-0.61
Range	1	1	2	2	1	2	3	3	2	1	2	2	2	2	2	2	2	1
Minimum	2	2	2	2	2	1	1	1	1	2	2	1	1	1	1	1	1	2
Maximum	3	3	4	4	3	3	4	4	3	3	4	3	3	3	3	3	3	3
Sum	11	13	15	15	13	11	12	11	11	12	16	10	9	10	9	11	11	13
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 70 (Cont.)

Planning and Analysis Scale Skill Level Run 1

Competency	C7			C8											C9		
Performance Statement	PS4		PS5	PS1				PS2				PS3			PS1		
Scale #	8	9	10	1	2	3	4	5	6	7	8	9	10	11	1	2	3
Variable ID	V91	V92	V93	V94	V95	V96	V97	V98	V99	V100	V101	V102	V103	V104	V105	V106	V107
rater3	3	3	2	3	1	3	3	3	3	3	3	2	3	1	3	2	3
rater4	2	1	2	2	2	2	1	1	1	1	1	1	2	2	2	3	2
rater5	3	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	2	2	3	2	1	2	2	2	2	2	2	3	3	2	2	2	2
rater2	3	3	3	4	4	3	5	4	3	3	3	3	3	3	3	2	2
Mean	2.60	2.20	2.60	2.40	1.80	2.20	2.40	2.20	2.00	2.00	2.00	2.00	2.40	1.80	2.20	2.00	2.00
Standard Error	0.24	0.37	0.24	0.51	0.58	0.37	0.75	0.58	0.45	0.45	0.45	0.45	0.40	0.37	0.37	0.32	0.32
Median	3.00	2.00	3.00	2.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	2.00	2.00	2.00
Mode	3.00	3.00	3.00	2.00	1.00	3.00	1.00	1.00	3.00	3.00	3.00	1.00	3.00	1.00	3.00	2.00	2.00
Standard Deviation	0.55	0.84	0.55	1.14	1.30	0.84	1.67	1.30	1.00	1.00	1.00	1.00	0.89	0.84	0.84	0.71	0.71
Sample Variance	0.30	0.70	0.30	1.30	1.70	0.70	2.80	1.70	1.00	1.00	1.00	1.00	0.80	0.70	0.70	0.50	0.50
Kurtosis	-3.33	-0.61	-3.33	-0.18	2.66	-0.61	0.54	-1.49	-3.00	-3.00	-3.00	-3.00	0.31	-0.61	-0.61	2.00	2.00
Skewness	-0.61	-0.51	-0.61	0.40	1.71	-0.51	1.09	0.54	0.00	0.00	0.00	0.00	-1.26	0.51	-0.51	0.00	0.00
Range	1	2	1	3	3	2	4	3	2	2	2	2	2	2	2	2	2
Minimum	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	3	3	3	4	4	3	5	4	3	3	3	3	3	3	3	3	3
Sum	13	11	13	12	9	11	12	11	10	10	10	10	12	9	11	10	10
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 70 (Cont.)

Planning and Analysis Scale Skill Level Run 1

Competency	C9			C10												C11		
Performance Statement	PS2			PS1				PS2		PS3		PS4				PS1		PS2
Scale #	4	5	6	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
Variable ID	V108	V109	V110	V111	V112	V113	V114	V115	V116	V117	V118	V119	V120	V121	V122	V123	V124	V125
rater3	3	3	2	3	3	2	2	3	3	3	3	3	3	3	3	3	3	3
rater4	4	3	3	3	4	3	4	3	3	3	4	3	3	4	3	3	4	2
rater5	1	1	1	1	2	1	2	1	1	1	2	1	1	1	1	1	4	3
rater1	2	2	2	3	3	3	3	3	2	3	2	3	3	2	2	2	3	2
rater2	4	4	3	3	3	3	3	3	2	2	2	2	4	4	4	4	4	4
Mean	2.80	2.60	2.20	2.60	3.00	2.40	2.80	2.60	2.20	2.40	2.60	2.40	2.80	2.80	2.60	2.60	3.60	2.80
Standard Error	0.58	0.51	0.37	0.40	0.32	0.40	0.37	0.40	0.37	0.40	0.40	0.40	0.49	0.58	0.51	0.51	0.24	0.37
Median	3.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00	2.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00	4.00	3.00
Mode	4.00	3.00	2.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	2.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00
Standard Deviation	1.30	1.14	0.84	0.89	0.71	0.89	0.84	0.89	0.84	0.89	0.89	0.89	1.10	1.30	1.14	1.14	0.55	0.84
Sample Variance	1.70	1.30	0.70	0.80	0.50	0.80	0.70	0.80	0.70	0.80	0.80	0.80	1.20	1.70	1.30	1.30	0.30	0.70
Kurtosis	-1.49	-0.18	-0.61	5.00	2.00	0.31	-0.61	5.00	-0.61	0.31	0.31	0.31	2.92	-1.49	-0.18	-0.18	-3.33	-0.61
Skewness	-0.54	-0.40	-0.51	-2.24	0.00	-1.26	0.51	-2.24	-0.51	-1.26	1.26	-1.26	-1.29	-0.54	-0.40	-0.40	-0.61	0.51
Range	3	3	2	2	2	2	2	2	2	2	2	2	3	3	3	3	1	2
Minimum	1	1	1	1	2	1	2	1	1	1	2	1	1	1	1	1	3	2
Maximum	4	4	3	3	4	3	4	3	3	3	4	3	4	4	4	4	4	4
Sum	14	13	11	13	15	12	14	13	11	12	13	12	14	14	13	13	18	14
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 70 (Cont.)

Planning and Analysis Scale Skill Level Run 1

Competency	C11		C12			
Performance Statement						
	PS3		PS1	PS2	PS3	PS4
Scale #	4	5	1	2	3	4
Variable ID	V126	V127	V128	V129	V130	V131
rater3	3	3	3	1	3	2
rater4	2	3	4	2	2	4
rater5	3	4	2	1	2	2
rater1	3	2	1	3	2	2
rater2	4	4	4	2	4	4
Mean	3.00	3.20	2.80	1.80	2.60	2.80
Standard Error	0.32	0.37	0.58	0.37	0.40	0.49
Median	3.00	3.00	3.00	2.00	2.00	2.00
Mode	3.00	3.00	4.00	1.00	2.00	2.00
Standard Deviation	0.71	0.84	1.30	0.84	0.89	1.10
Sample Variance	0.50	0.70	1.70	0.70	0.80	1.20
Kurtosis	2.00	-0.61	-1.49	-0.61	0.31	-3.33
Skewness	0.00	-0.51	-0.54	0.51	1.26	0.61
Range	2	2	3	2	2	2
Minimum	2	2	1	1	2	2
Maximum	4	4	4	3	4	4
Sum	15	16	14	9	13	14
Count	5	5	5	5	5	5

Table 71

Design and Development Scale Skill Level Run 1

Competency	C13								C14								
Performance Statement	PS1			PS2		PS3		PS4	PS1		PS2		PS3			PS4	
Scale #	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	9
Variable ID	V132	V133	V134	V135	V136	V137	V138	V139	V140	V141	V142	V143	V144	V145	V146	V147	V148
rater3	3	2	3	3	3	2	3	3	3	3	3	2	3	3	3	3	3
rater4	4	3	2	4	2	2	2	4	2	2	2	1	1	1	2	2	2
rater5	1	3	3	1	3	3	1	1	1	1	1	1	1	1	1	1	1
rater1	2	2	2	2	2	2	2	3	2	2	2	2	2	3	3	3	2
rater2	4	3	3	3	4	4	3	4	3	3	3	3	3	3	4	4	4
Mean	2.80	2.60	2.60	2.60	2.80	2.60	2.20	3.00	2.20	2.20	2.20	1.80	2.00	2.20	2.60	2.60	2.40
Standard Error	0.58	0.24	0.24	0.51	0.37	0.40	0.37	0.55	0.37	0.37	0.37	0.37	0.45	0.49	0.51	0.51	0.51
Median	3.00	3.00	3.00	3.00	3.00	2.00	2.00	3.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	3.00	2.00
Mode	4.00	3.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	2.00
Standard Deviation	1.30	0.55	0.55	1.14	0.84	0.89	0.84	1.22	0.84	0.84	0.84	0.84	1.00	1.10	1.14	1.14	1.14
Sample Variance	1.70	0.30	0.30	1.30	0.70	0.80	0.70	1.50	0.70	0.70	0.70	0.70	1.00	1.20	1.30	1.30	1.30
Kurtosis	-1.49	-3.33	-3.33	-0.18	-0.61	0.31	-0.61	2.00	-0.61	-0.61	-0.61	-0.61	-3.00	-3.33	-0.18	-0.18	-0.18
Skewness	-0.54	-0.61	-0.61	-0.40	0.51	1.26	-0.51	-1.36	-0.51	-0.51	-0.51	0.51	0.00	-0.61	-0.40	-0.40	0.40
Range	3	1	1	3	2	2	2	3	2	2	2	2	2	2	3	3	3
Minimum	1	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1
Maximum	4	3	3	4	4	4	3	4	3	3	3	3	3	3	4	4	4
Sum	14	13	13	13	14	13	11	15	11	11	11	9	10	11	13	13	12
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 71 (Cont.)

Design and Development Scale Skill Level Run 1

Competency	C14							C15								
Performance Statement	PS5		PS6			PS7		PS1		PS2		PS3		PS4		PS5
Scale #	10	11	12	13	14	15	16	1	2	3	4	5	6	7	8	9
Variable ID	V149	V150	V151	V152	V153	V154	V155	V156	V157	V158	V159	V160	V161	V162	V163	V164
rater3	3	3	3	3	3	3	2	2	2	2	4	4	3	3	3	3
rater4	2	2	3	2	2	4	4	1	1	1	4	4	2	2	2	1
rater5	1	1	1	1	1	1	1	1	1	1	3	3	1	1	1	1
rater1	2	3	2	3	3	3	3	1	2	2	3	2	2	2	3	2
rater2	4	3	3	3	4	3	1	2	2	4	4	4	3	3	3	3
Mean	2.40	2.40	2.40	2.40	2.60	2.80	2.20	1.40	1.60	2.00	3.60	3.40	2.20	2.20	2.40	2.00
Standard Error	0.51	0.40	0.40	0.40	0.51	0.49	0.58	0.24	0.24	0.55	0.24	0.40	0.37	0.37	0.40	0.45
Median	2.00	3.00	3.00	3.00	3.00	3.00	2.00	1.00	2.00	2.00	4.00	4.00	2.00	2.00	3.00	2.00
Mode	2.00	3.00	3.00	3.00	3.00	3.00	1.00	1.00	2.00	2.00	4.00	4.00	3.00	3.00	3.00	3.00
Standard Deviation	1.14	0.89	0.89	0.89	1.14	1.10	1.30	0.55	0.55	1.22	0.55	0.89	0.84	0.84	0.89	1.00
Sample Variance	1.30	0.80	0.80	0.80	1.30	1.20	1.70	0.30	0.30	1.50	0.30	0.80	0.70	0.70	0.80	1.00
Kurtosis	-0.18	0.31	0.31	0.31	-0.18	2.92	-1.49	-3.33	-3.33	2.00	-3.33	0.31	-0.61	-0.61	0.31	-3.00
Skewness	0.40	-1.26	-1.26	-1.26	-0.40	-1.29	0.54	0.61	-0.61	1.36	-0.61	-1.26	-0.51	-0.51	-1.26	0.00
Range	3	2	2	2	3	3	3	1	1	3	1	2	2	2	2	2
Minimum	1	1	1	1	1	1	1	1	1	1	3	2	1	1	1	1
Maximum	4	3	3	3	4	4	4	2	2	4	4	4	3	3	3	3
Sum	12	12	12	12	13	14	11	7	8	10	18	17	11	11	12	10
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 71 (Cont.)

Design and Development Scale Skill Level Run 1

Competency	C16						C17			C18								
Performance Statement	PS1				PS2	PS3	PS1	PS2	PS3	PS1	PS2		PS3		PS4		PS5	
Scale #	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6	7	8	9
Variable ID	V165	V166	V167	V168	V169	V170	V171	V172	V173	V174	V175	V176	V177	V178	V179	V180	V181	V182
rater3	1	2	2	2	3	3	2	3	4	3	3	3	3	2	3	2	3	2
rater4	1	1	1	1	1	3	2	3	3	3	3	3	3	3	3	3	3	3
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	2	2	2	1	2	2	1	1	1	2	2	2	2	3	2	2	3	3
rater2	2	2	3	3	2	3	2	2	2	4	4	4	4	4	4	4	4	4
Mean	1.40	1.60	1.80	1.60	1.80	2.40	1.60	2.00	2.20	2.60	2.60	2.60	2.60	2.60	2.60	2.40	2.80	2.60
Standard Error	0.24	0.24	0.37	0.40	0.37	0.40	0.24	0.45	0.58	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.49	0.51
Median	1.00	2.00	2.00	1.00	2.00	3.00	2.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	3.00	3.00
Mode	1.00	2.00	2.00	1.00	1.00	3.00	2.00	3.00	1.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	3.00	3.00
Standard Deviation	0.55	0.55	0.84	0.89	0.84	0.89	0.55	1.00	1.30	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.10	1.14
Sample Variance	0.30	0.30	0.70	0.80	0.70	0.80	0.30	1.00	1.70	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.20	1.30
Kurtosis	-3.33	-3.33	-0.61	0.31	-0.61	0.31	-3.33	-3.00	-1.49	-0.18	-0.18	-0.18	-0.18	-0.18	-0.18	-0.18	2.92	-0.18
Skewness	0.61	-0.61	0.51	1.26	0.51	-1.26	-0.61	0.00	0.54	-0.40	-0.40	-0.40	-0.40	-0.40	-0.40	0.40	-1.29	-0.40
Range	1	1	2	2	2	2	1	2	3	3	3	3	3	3	3	3	3	3
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	2	2	3	3	3	3	2	3	4	4	4	4	4	4	4	4	4	4
Sum	7	8	9	8	9	12	8	10	11	13	13	13	13	13	13	12	14	13
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 71 (Cont.)

Design and Development Scale Skill Level Run 1

Competency	C18						
Performance Statement	PS6	PS7		PS8		PS9	
Scale #	10	11	12	13	14	15	16
Variable ID	V183	V184	V185	V186	V187	V188	V189
rater3	3	3	3	3	3	4	3
rater4	2	2	2	2	1	1	2
rater5	1	1	1	1	1	1	1
rater1	2	3	3	3	2	3	3
rater2	4	4	4	3	4	4	1
Mean	2.40	2.60	2.60	2.40	2.20	2.60	2.00
Standard Error	0.51	0.51	0.51	0.40	0.58	0.68	0.45
Median	2.00	3.00	3.00	3.00	2.00	3.00	2.00
Mode	2.00	3.00	3.00	3.00	1.00	4.00	3.00
Standard Deviation	1.14	1.14	1.14	0.89	1.30	1.52	1.00
Sample Variance	1.30	1.30	1.30	0.80	1.70	2.30	1.00
Kurtosis	-0.18	-0.18	-0.18	0.31	-1.49	-3.08	-3.00
Skewness	0.40	-0.40	-0.40	-1.26	0.54	-0.32	0.00
Range	3	3	3	2	3	3	2
Minimum	1	1	1	1	1	1	1
Maximum	4	4	4	3	4	4	3
Sum	12	13	13	12	11	13	10
Count	5	5	5	5	5	5	5

Table 72

Implementation and Management Scale Skill Level Run 1

Competency	C19															
Performance Statement	PS1	PS2	PS3	PS4	PS5		PS6	PS7		PS8		PS9			PS10	
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Variable ID	V190	V191	V192	V193	V194	V195	V196	V197	V198	V199	V200	V201	V202	V203	V204	V205
rater3	3	2	3	3	3	3	3	4	4	3	3	3	3	4	4	3
rater4	1	3	3	4	1	1	2	2	3	3	3	2	2	2	2	2
rater5	1	1	1	1	2	2	2	2	3	3	3	2	2	2	2	1
rater1	2	2	3	3	3	3	1	2	4	3	3	3	3	3	2	3
rater2	3	3	3	4	3	2	4	3	3	3	3	3	3	3	4	2
Mean	2.00	2.20	2.60	3.00	2.40	2.20	2.40	2.60	3.40	3.00	3.00	2.60	2.60	2.80	2.80	2.20
Standard Error	0.45	0.37	0.40	0.55	0.40	0.37	0.51	0.40	0.24	0.00	0.00	0.24	0.24	0.37	0.49	0.37
Median	2.00	2.00	3.00	3.00	3.00	2.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00
Mode	3.00	2.00	3.00	3.00	3.00	3.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	3.00
Standard Deviation	1.00	0.84	0.89	1.22	0.89	0.84	1.14	0.89	0.55	0.00	0.00	0.55	0.55	0.84	1.10	0.84
Sample Variance	1.00	0.70	0.80	1.50	0.80	0.70	1.30	0.80	0.30	0.00	0.00	0.30	0.30	0.70	1.20	0.70
Kurtosis	-3.00	-0.61	5.00	2.00	0.31	-0.61	-0.18	0.31	-3.33	0.00	0.00	-3.33	-3.33	-0.61	-3.33	-0.61
Skewness	0	-0.51	-2.24	-1.36	-1.26	-0.51	0.4	1.26	0.61	0.00	0.00	-0.61	-0.61	0.51	0.61	-0.51
Range	2	2	2	3	2	2	3	2	1	0	0	1	1	2	2	2
Minimum	1	1	1	1	1	1	1	2	3	3	3	2	2	2	2	1
Maximum	3	3	3	4	3	3	4	4	4	3	3	3	3	4	4	3
Sum	10	11	13	15	12	11	12	13	17	15	15	13	13	14	14	11
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 72 (Cont.)

Implementation and Management Scale Skill Level Run 1

Competency	C20									C21								
Performance Statement	PS1		PS2	PS3	PS4		PS5	PS6		PS1	PS2		PS3	PS4		PS5		PS6
Scale #	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
Variable ID	V206	V207	V208	V209	V210	V211	V212	V213	V214	V215	V216	V217	V218	V219	V220	V221	V222	V223
rater3	4	4	3	3	3	4	3	3	4	5	5	5	5	5	5	5	4	5
rater4	3	2	2	1	2	2	3	4	1	2	3	1	4	4	4	2	2	2
rater5	1	1	1	1	2	2	1	2	1	1	1	1	2	2	3	3	5	3
rater1	3	3	3	2	3	2	3	3	2	3	3	3	3	3	3	3	3	2
rater2	1	2	1	3	2	3	1	2	3	3	4	4	5	3	3	4	4	3
Mean	2.40	2.40	2.00	2.00	2.40	2.60	2.20	2.80	2.20	2.80	3.20	2.80	3.80	3.40	3.60	3.40	3.60	3.00
Standard Error	0.60	0.51	0.45	0.45	0.24	0.40	0.49	0.37	0.58	0.66	0.66	0.80	0.58	0.51	0.40	0.51	0.51	0.55
Median	3.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	2.00	3.00	3.00	3.00	4.00	3.00	3.00	3.00	4.00	3.00
Mode	3.00	2.00	3.00	3.00	2.00	2.00	3.00	3.00	1.00	3.00	3.00	1.00	5.00	3.00	3.00	3.00	4.00	2.00
Standard Deviation	1.34	1.14	1.00	1.00	0.55	0.89	1.10	0.84	1.30	1.48	1.48	1.79	1.30	1.14	0.89	1.14	1.14	1.22
Sample Variance	1.80	1.30	1.00	1.00	0.30	0.80	1.20	0.70	1.70	2.20	2.20	3.20	1.70	1.30	0.80	1.30	1.30	1.50
Kurtosis	-2.41	-0.18	-3.00	-3.00	-3.33	0.31	-3.33	-0.61	-1.49	0.87	0.87	-2.32	-1.49	-0.18	0.31	-0.18	-0.18	2.00
Skewness	-0.17	0.4	0	0	0.61	1.26	-0.61	0.51	0.54	0.55	-0.55	0.05	-0.54	0.4	1.26	0.4	-0.4	1.36
Range	3	3	2	2	1	2	2	2	3	4	4	4	3	3	2	3	3	3
Minimum	1	1	1	1	2	2	1	2	1	1	1	1	2	2	3	2	2	2
Maximum	4	4	3	3	3	4	3	4	4	5	5	5	5	5	5	5	5	5
Sum	12	12	10	10	12	13	11	14	11	14	16	14	19	17	18	17	18	15
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 72 (Cont.)

Implementation and Management Scale Skill Level Run 1

Competency	C21			C22						C23								
Performance Statement	PS7	PS8		PS1		PS2		PS3		PS1			PS2		PS3		PS4	
Scale #	10	11	12	1	2	3	4	5	6	1	2	3	4	5	6	7	8	9
Variable ID	V224	V225	V226	V227	V228	V229	V230	V231	V232	V233	V234	V235	V236	V237	V238	V239	V240	V241
rater3	5	5	4	5	5	5	5	5	5	4	4	3	4	3	3	3	4	3
rater4	2	2	2	4	2	2	2	4	4	2	2	2	2	3	3	3	3	3
rater5	2	3	2	1	1	1	1	1	2	2	2	1	1	1	1	2	2	2
rater1	3	3	3	2	3	3	3	2	2	3	3	3	3	3	3	3	3	3
rater2	4	3	4	4	4	4	4	4	4	4	4	3	3	3	3	4	4	4
Mean	3.20	3.20	3.00	3.20	3.00	3.00	3.00	3.20	3.40	3.00	3.00	2.40	2.60	2.60	2.60	3.00	3.20	3.00
Standard Error	0.58	0.49	0.45	0.73	0.71	0.71	0.71	0.73	0.60	0.45	0.45	0.40	0.51	0.40	0.40	0.32	0.37	0.32
Median	3.00	3.00	3.00	4.00	3.00	3.00	3.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Mode	2.00	3.00	4.00	4.00	#N/A	#N/A	#N/A	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	4.00	3.00
Standard Deviation	1.30	1.10	1.00	1.64	1.58	1.58	1.58	1.64	1.34	1.00	1.00	0.89	1.14	0.89	0.89	0.71	0.84	0.71
Sample Variance	1.70	1.20	1.00	2.70	2.50	2.50	2.50	2.70	1.80	1.00	1.00	0.80	1.30	0.80	0.80	0.50	0.70	0.50
Kurtosis	-1.49	2.92	-3.00	-1.69	-1.20	-1.20	-1.20	-1.69	-2.41	-3.00	-3.00	0.31	-0.18	5.00	5.00	2.00	-0.61	2.00
Skewness	0.54	1.29	0	-0.52	-0	-0	-0	-0.52	-0.17	0	0	-1.26	-0.4	-2.24	-2.24	0	-0.51	0
Range	3	3	2	4	4	4	4	4	3	2	2	2	3	2	2	2	2	2
Minimum	2	2	2	1	1	1	1	1	2	2	2	1	1	1	1	2	2	2
Maximum	5	5	4	5	5	5	5	5	5	4	4	3	4	3	3	4	4	4
Sum	16	16	15	16	15	15	15	16	17	15	15	12	13	13	13	15	16	15
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 72 (Cont.)

Implementation and Management Scale Skill Level Run 1

Competency	C23			
Performance Statement	PS5			
Scale #	10	11	12	13
Variable ID	V242	V243	V244	V245
rater3	3	4	4	4
rater4	2	3	2	3
rater5	2	2	2	2
rater1	3	3	3	2
rater2	4	4	4	4
Mean	2.80	3.20	3.00	3.00
Standard Error	0.37	0.37	0.45	0.45
Median	3.00	3.00	3.00	3.00
Mode	3.00	4.00	4.00	4.00
Standard Deviation	0.84	0.84	1.00	1.00
Sample Variance	0.70	0.70	1.00	1.00
Kurtosis	-0.61	-0.61	-3.00	-3.00
Skewness	0.51	-0.51	0	0
Range	2	2	2	2
Minimum	2	2	2	2
Maximum	4	4	4	4
Sum	14	16	15	15
Count	5	5	5	5

Table 73

Digital Media Scale Skill Level Run 1

Competency	C24														C25			
Performance Statement	PS1	PS2	PS3			PS4	PS5	PS6		PS7			PS8		PS1		PS2	
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	1	2	3	4
Variable ID	V246	V247	V248	V249	V250	V251	V252	V253	V254	V255	V256	V257	V258	V259	V260	V261	V262	V263
rater3	3	4	4	4	4	3	4	4	4	4	3	4	4	4	3	4	4	3
rater4	2	2	2	2	2	4	2	2	2	4	4	2	2	2	2	2	2	2
rater5	1	1	1	1	1	1	1	3	2	2	2	2	2	1	1	1	2	1
rater1	2	2	2	3	2	2	2	3	3	2	2	2	2	2	3	3	2	2
rater2	3	3	3	3	3	3	3	3	3	4	3	4	4	4	3	3	3	3
Mean	2.20	2.40	2.40	2.60	2.40	2.60	2.40	3.00	2.80	3.20	2.80	2.80	2.80	2.60	2.40	2.60	2.60	2.20
Standard Error	0.37	0.51	0.51	0.51	0.51	0.51	0.51	0.32	0.37	0.49	0.37	0.49	0.49	0.60	0.40	0.51	0.40	0.37
Median	2.00	2.00	2.00	3.00	2.00	3.00	2.00	3.00	3.00	4.00	3.00	2.00	2.00	2.00	3.00	3.00	2.00	2.00
Mode	3.00	2.00	2.00	3.00	2.00	3.00	2.00	3.00	2.00	4.00	3.00	2.00	2.00	4.00	3.00	3.00	2.00	3.00
Standard Deviation	0.84	1.14	1.14	1.14	1.14	1.14	1.14	0.71	0.84	1.10	0.84	1.10	1.10	1.34	0.89	1.14	0.89	0.84
Sample Variance	0.70	1.30	1.30	1.30	1.30	1.30	1.30	0.50	0.70	1.20	0.70	1.20	1.20	1.80	0.80	1.30	0.80	0.70
Kurtosis	-0.61	-0.18	-0.18	-0.18	-0.18	-0.18	-0.18	2.00	-0.61	-3.33	-0.61	-3.33	-3.33	-2.41	0.31	-0.18	0.31	-0.61
Skewness	-0.51	0.40	0.40	-0.40	0.40	-0.40	0.40	0.00	0.51	-0.61	0.51	0.61	0.61	0.17	-1.26	-0.40	1.26	-0.51
Range	2	3	3	3	3	3	3	2	2	2	2	2	2	3	2	3	2	2
Minimum	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	2	1
Maximum	3	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3
Sum	11	12	12	13	12	13	12	15	14	16	14	14	14	13	12	13	13	11
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 73 (Cont.)

Digital Media Scale Skill Level Run 1

Competency	C25											C26						
Performance Statement		PS3			PS4			PS5			PS6		PS1				PS2	
Scale #	5	6	7	8	9	10	11	12	13	14	15	1	2	3	4	5	6	7
Variable ID	V264	V265	V266	V267	V268	V269	V270	V271	V272	V273	V274	V275	V276	V277	V278	V279	V280	V281
rater3	4	4	4	4	3	4	3	5	5	4	3	3	4	2	3	4	3	3
rater4	2	3	1	3	2	2	2	1	2	3	2	3	3	3	3	2	3	3
rater5	1	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	1
rater1	2	2	3	3	3	3	2	3	3	3	2	3	2	2	2	3	3	3
rater2	3	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Mean	2.40	3.00	2.80	3.20	2.60	2.80	2.40	2.80	3.00	2.80	2.20	2.80	2.80	2.40	2.60	2.80	2.80	2.40
Standard Error	0.51	0.45	0.58	0.37	0.24	0.37	0.24	0.66	0.55	0.49	0.37	0.20	0.37	0.24	0.24	0.37	0.20	0.40
Median	2.00	3.00	3.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	2.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00
Mode	2.00	4.00	4.00	4.00	3.00	2.00	2.00	3.00	2.00	3.00	3.00	3.00	3.00	2.00	3.00	2.00	3.00	3.00
Standard Deviation	1.14	1.00	1.30	0.84	0.55	0.84	0.55	1.48	1.22	1.10	0.84	0.45	0.84	0.55	0.55	0.84	0.45	0.89
Sample Variance	1.30	1.00	1.70	0.70	0.30	0.70	0.30	2.20	1.50	1.20	0.70	0.20	0.70	0.30	0.30	0.70	0.20	0.80
Kurtosis	-0.18	-3.00	-1.49	-0.61	-3.33	-0.61	-3.33	0.87	2.00	2.92	-0.61	5.00	-0.61	-3.33	-3.33	-0.61	5.00	0.31
Skewness	0.40	0.00	-0.54	-0.51	-0.61	0.51	0.61	0.55	1.36	-1.29	-0.51	-2.24	0.51	0.61	-0.61	0.51	-2.24	-1.26
Range	3	2	3	2	1	2	1	4	3	3	2	1	2	1	1	2	1	2
Minimum	1	2	1	2	2	2	2	1	2	1	1	2	2	2	2	2	2	1
Maximum	4	4	4	4	3	4	3	5	5	4	3	3	4	3	3	4	3	3
Sum	12	15	14	16	13	14	12	14	15	14	11	14	14	12	13	14	14	12
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 73 (Cont.)

Digital Media Scale Skill Level Run 1

Competency	C26				C27										C28		
Performance Statement	PS3		PS4		PS1					PS2					PS1		
Scale #	8	9	10	11	1	2	3	4	5	6	7	8	9	10	1	2	3
Variable ID	V282	V283	V284	V285	V286	V287	V288	V289	V290	V291	V292	V293	V294	V295	V296	V297	V298
rater3	4	4	4	4	2	2	2	2	2	4	4	3	5	3	4	3	3
rater4	2	4	2	2	1	1	1	1	1	1	1	1	1	1	2	2	1
rater5	1	2	1	2	1	1	1	1	1	3	3	3	2	1	2	2	1
rater1	3	3	3	2	2	2	3	2	2	2	2	3	3	3	3	3	3
rater2	3	3	3	3	3	3	3	3	3	5	5	5	4	4	4	3	3
Mean	2.60	3.20	2.60	2.60	1.80	1.80	2.00	1.80	1.80	3.00	3.00	3.00	3.00	2.40	3.00	2.60	2.20
Standard Error	0.51	0.37	0.51	0.40	0.37	0.37	0.45	0.37	0.37	0.71	0.71	0.63	0.71	0.60	0.45	0.24	0.49
Median	3.00	3.00	3.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Mode	3.00	4.00	3.00	2.00	2.00	2.00	1.00	2.00	2.00	#N/A	#N/A	3.00	#N/A	3.00	4.00	3.00	3.00
Standard Deviation	1.14	0.84	1.14	0.89	0.84	0.84	1.00	0.84	0.84	1.58	1.58	1.41	1.58	1.34	1.00	0.55	1.10
Sample Variance	1.30	0.70	1.30	0.80	0.70	0.70	1.00	0.70	0.70	2.50	2.50	2.00	2.50	1.80	1.00	0.30	1.20
Kurtosis	-0.18	-0.61	-0.18	0.31	-0.61	-0.61	-3.00	-0.61	-0.61	-1.20	-1.20	2.00	-1.20	-2.41	-3.00	-3.33	-3.33
Skewness	-0.40	-0.51	-0.40	1.26	0.51	0.51	0.00	0.51	0.51	0.00	0.00	0.00	0.00	-0.17	0.00	-0.61	-0.61
Range	3	2	3	2	2	2	2	2	2	4	4	4	4	3	2	1	2
Minimum	1	2	1	2	1	1	1	1	1	1	1	1	1	1	2	2	1
Maximum	4	4	4	4	3	3	3	3	3	5	5	5	5	4	4	3	3
Sum	13	16	13	13	9	9	10	9	9	15	15	15	15	12	15	13	11
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 73 (Cont.)

Digital Media Scale Skill Level Run 1

Competency	C28									
Performance Statement	PS2				PS3				PS4	
Scale #	4	5	6	7	8	9	10	11	12	13
Variable ID	V299	V300	V301	V302	V303	V304	V305	V306	V307	V308
rater3	3	3	3	4	3	4	3	3	4	3
rater4	1	2	2	2	2	2	2	2	2	2
rater5	1	2	2	2	1	1	1	1	1	1
rater1	2	3	3	2	3	3	3	3	2	3
rater2	3	3	3	4	3	2	3	2	3	4
Mean	2.00	2.60	2.60	2.80	2.40	2.40	2.40	2.20	2.40	2.60
Standard Error	0.45	0.24	0.24	0.49	0.40	0.51	0.40	0.37	0.51	0.51
Median	2.00	3.00	3.00	2.00	3.00	2.00	3.00	2.00	2.00	3.00
Mode	3.00	3.00	3.00	2.00	3.00	2.00	3.00	3.00	2.00	3.00
Standard Deviation	1.00	0.55	0.55	1.10	0.89	1.14	0.89	0.84	1.14	1.14
Sample Variance	1.00	0.30	0.30	1.20	0.80	1.30	0.80	0.70	1.30	1.30
Kurtosis	-3.00	-3.33	-3.33	-3.33	0.31	-0.18	0.31	-0.61	-0.18	-0.18
Skewness	0.00	-0.61	-0.61	0.61	-1.26	0.40	-1.26	-0.51	0.40	-0.40
Range	2	1	1	2	2	3	2	2	3	3
Minimum	1	2	2	2	1	1	1	1	1	1
Maximum	3	3	3	4	3	4	3	3	4	4
Sum	10	13	13	14	12	12	12	11	12	13
Count	5	5	5	5	5	5	5	5	5	5

Table 74

Technical Writing Scale Skill Level Run 1

Competency	C29												C30					
Performance Statement	PS1		PS2		PS3	PS4		PS5		PS6	PS7		PS1		PS2		PS3	PS4
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
Variable ID	V309	V310	V311	V312	V313	V314	V315	V316	V317	V318	V319	V320	V321	V322	V323	V324	V325	V326
rater3	3	2	3	3	4	5	5	4	4	4	4	5	5	4	4	4	4	3
rater4	2	2	2	2	1	2	1	2	2	2	1	1	2	1	2	2	1	2
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	2	3	2	3	3	3	3	3	2	3	3	2	3	3	2	3	3	3
rater2	3	3	3	3	3	4	3	3	3	3	3	4	4	4	3	3	3	4
Mean	2.20	2.40	2.40	3.00	2.60	2.60	2.40	2.60	2.40	2.60	3.00	2.60	2.40	2.60	2.40	2.60	2.60	2.40
Standard Error	0.37	0.40	0.60	0.71	0.75	0.51	0.51	0.51	0.60	0.81	0.71	0.68	0.51	0.51	0.60	0.51	0.51	0.60
Median	2.00	3.00	3.00	3.00	3.00	3.00	2.00	3.00	3.00	2.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00
Mode	3.00	3.00	1.00	#N/A	1.00	3.00	2.00	3.00	1.00	1.00	#N/A	4.00	2.00	3.00	1.00	3.00	3.00	1.00
Standard Deviation	0.84	0.89	1.34	1.58	1.67	1.14	1.14	1.14	1.34	1.82	1.58	1.52	1.14	1.14	1.34	1.14	1.14	1.34
Sample Variance	0.70	0.80	1.80	2.50	2.80	1.30	1.30	1.30	1.80	3.30	2.50	2.30	1.30	1.30	1.80	1.30	1.30	1.80
Kurtosis	-0.61	0.31	-2.41	-1.20	-0.61	-0.18	-0.18	-0.18	-2.41	-2.23	-1.20	-3.08	-0.18	-0.18	-2.41	-0.18	-0.18	-2.41
Skewness	-0.51	-1.26	-0.17	0.00	0.51	-0.40	0.40	-0.40	-0.17	0.57	0.00	-0.32	0.40	-0.40	-0.17	-0.40	-0.40	-0.17
Range	2	2	3	4	4	3	3	3	3	4	4	3	3	3	3	3	3	3
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	3	3	4	5	5	4	4	4	4	5	5	4	4	4	4	4	4	4
Sum	11	12	12	15	13	13	12	13	12	13	15	13	12	13	12	13	13	12
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 74 (Cont.)

Technical Writing Scale Skill Level Run 1

Competency	C30				C31											C32		
Performance Statement	PS5		PS6		PS1		PS2				PS3		PS4	PS5	PS6	PS1		
Scale #	7	8	9	10	1	2	3	4	5	6	7	8	9	10	11	1	2	3
Variable ID	V327	V328	V329	V330	V331	V332	V333	V334	V335	V336	V337	V338	V339	V340	V341	V342	V343	V344
rater3	3	4	4	3	4	4	4	4	3	3	3	3	3	3	3	3	4	3
rater4	2	1	1	2	1	1	2	3	1	3	1	1	1	1	1	1	1	1
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	3	3	2	3	2	3	3	3	2	3	2	2	2	3	2	3	3	3
rater2	4	3	4	4	4	4	3	2	3	2	3	3	4	4	4	3	4	3
Mean	2.40	2.60	2.40	2.60	2.60	2.60	2.00	2.40	2.00	2.00	2.20	2.40	2.20	2.20	2.60	2.20	2.00	2.60
Standard Error	0.68	0.51	0.68	0.68	0.51	0.51	0.45	0.40	0.45	0.45	0.58	0.60	0.58	0.49	0.68	0.49	0.45	0.81
Median	2.00	3.00	2.00	3.00	3.00	3.00	2.00	3.00	2.00	2.00	2.00	3.00	2.00	3.00	3.00	3.00	2.00	2.00
Mode	4.00	3.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	1.00	3.00	1.00	3.00	4.00	3.00	3.00	1.00
Standard Deviation	1.52	1.14	1.52	1.52	1.14	1.14	1.00	0.89	1.00	1.00	1.30	1.34	1.30	1.10	1.52	1.10	1.00	1.82
Sample Variance	2.30	1.30	2.30	2.30	1.30	1.30	1.00	0.80	1.00	1.00	1.70	1.80	1.70	1.20	2.30	1.20	1.00	3.30
Kurtosis	-3.08	-0.18	-3.08	-3.08	-0.18	-0.18	-3.00	0.31	-3.00	-3.00	-1.49	-2.41	-1.49	-3.33	-3.08	-3.33	-3.00	-2.23
Skewness	0.32	-0.40	0.32	-0.32	-0.40	-0.40	0.00	-1.26	0.00	0.00	0.54	-0.17	0.54	-0.61	-0.32	-0.61	0.00	0.57
Range	3	3	3	3	3	3	2	2	2	2	3	3	3	2	3	2	2	4
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	4	4	4	4	4	4	3	3	3	3	4	4	4	3	4	3	3	5
Sum	12	13	12	13	13	13	10	12	10	10	11	12	11	11	13	11	10	13
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 74 (Cont.)

Technical Writing Scale Skill Level Run 1

Competency	C32										C33					
Performance Statement	PS2	PS3		PS4		PS5			PS6		PS1	PS2	PS3	PS4		PS5
Scale #	4	5	6	7	8	9	10	11	12	13	1	2	3	4	5	6
Variable ID	V345	V346	V347	V348	V349	V350	V351	V352	V353	V354	V355	V356	V357	V358	V359	V360
rater3	3	4	5	3	3	3	3	3	4	4	3	4	4	4	3	4
rater4	1	1	1	1	1	1	1	1	1	1	4	4	3	3	2	2
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	2	2	2	3	3	3	3	3	3	3	2	3	2	3	3	3
rater2	3	5	5	4	4	3	4	4	4	4	3	2	4	4	3	2
Mean	2.80	2.40	2.40	2.20	2.40	2.40	2.60	2.60	2.60	2.80	2.80	3.00	2.40	2.40	2.25	2.00
Standard Error	0.92	0.60	0.60	0.49	0.60	0.60	0.68	0.68	0.51	0.58	0.58	0.55	0.40	0.51	0.48	0.41
Median	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.50	2.00
Mode	5.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	3.00	4.00	4.00	4.00	3.00	2.00	3.00	2.00
Standard Deviation	2.05	1.34	1.34	1.10	1.34	1.34	1.52	1.52	1.14	1.30	1.30	1.22	0.89	1.14	0.96	0.82
Sample Variance	4.20	1.80	1.80	1.20	1.80	1.80	2.30	2.30	1.30	1.70	1.70	1.50	0.80	1.30	0.92	0.67
Kurtosis	-3.16	-2.41	-2.41	-3.33	-2.41	-2.41	-3.08	-3.08	-0.18	-1.49	-1.49	2.00	0.31	-0.18	-1.29	1.50
Skewness	0.44	-0.17	-0.17	-0.61	-0.17	-0.17	-0.32	-0.32	-0.40	-0.54	-0.54	-1.36	-1.26	0.40	-0.85	0.00
Range	4	3	3	2	3	3	3	3	3	3	3	3	2	3	2	2
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	5	4	4	3	4	4	4	4	4	4	4	4	3	4	3	3
Sum	14	12	12	11	12	12	13	13	13	14	14	15	12	12	9	8
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4

Table 75

Web Development and Administration Scale Skill Level Run 1

Competency	C34													C35		
Performance Statement	PS1	PS2	PS3		PS4	PS5		PS6		PS7				PS1		PS2
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13	1	2	3
Variable ID	V361	V362	V363	V364	V365	V366	V367	V368	V369	V370	V371	V372	V373	V374	V375	V376
rater3	3	4	4	5	4	4	4	3	3	3	3	4	4	4	4	4
rater4	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1
rater5	1	1	2	2	1	1	2	1	1	1	1	1	1	1	2	1
rater1	3	3	2	3	3	3	2	2	3	3	3	3	3	3	3	3
rater2	4	5	5	5	3	3	3	3	3	4	4	4	4	3	4	3
Mean	2.40	2.80	2.80	3.20	2.40	2.40	2.40	2.00	2.40	2.40	2.40	2.60	2.60	2.40	2.80	2.40
Standard Error	0.60	0.80	0.73	0.80	0.60	0.60	0.51	0.45	0.40	0.60	0.60	0.68	0.68	0.60	0.58	0.60
Median	3.00	3.00	2.00	3.00	3.00	3.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Mode	3.00	1.00	2.00	5.00	1.00	1.00	2.00	3.00	3.00	3.00	3.00	4.00	4.00	1.00	4.00	1.00
Standard Deviation	1.34	1.79	1.64	1.79	1.34	1.34	1.14	1.00	0.89	1.34	1.34	1.52	1.52	1.34	1.30	1.34
Sample Variance	1.80	3.20	2.70	3.20	1.80	1.80	1.30	1.00	0.80	1.80	1.80	2.30	2.30	1.80	1.70	1.80
Kurtosis	-2.41	-2.32	-1.69	-2.32	-2.41	-2.41	-0.18	-3.00	0.31	-2.41	-2.41	-3.08	-3.08	-2.41	-1.49	-2.41
Skewness	-0.17	0.05	0.52	-0.05	-0.17	-0.17	0.40	0.00	-1.26	-0.17	-0.17	-0.32	-0.32	-0.17	-0.54	-0.17
Range	3	4	4	4	3	3	3	2	2	3	3	3	3	3	3	3
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	4	5	5	5	4	4	4	3	3	4	4	4	4	4	4	4
Sum	12	14	14	16	12	12	12	10	12	12	12	13	13	12	14	12
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 75 (Cont.)

Web Development and Administration Scale Skill Level Run 1

Competency	C35										C36							
Performance Statement	PS3			PS4	PS5	PS6	PS7	PS8	PS9		PS1	PS2	PS3			PS4		
Scale #	4	5	6	7	8	9	10	11	12	13	1	2	3	4	5	6	7	8
Variable ID	V377	V378	V379	V380	V381	V382	V383	V384	V385	V386	V387	V388	V389	V390	V391	V392	V393	V394
rater3	4	5	4	3	5	4	4	4	4	4	5	4	4	4	4	3	3	3
rater4	1	1	1	1	1	1	3	1	1	1	2	1	3	3	1	1	1	1
rater5	2	2	1	3	3	2	3	2	2	2	1	1	1	1	1	1	2	3
rater1	3	3	3	3	3	3	3	3	3	3	3	2	2	3	2	2	2	3
rater2	5	3	3	5	5	5	4	4	4	4	4	3	3	3	3	4	4	4
Mean	3.00	2.80	2.40	3.00	3.40	3.00	3.40	2.80	2.80	2.80	3.00	2.20	2.60	2.80	2.20	2.20	2.40	2.80
Standard Error	0.71	0.66	0.60	0.63	0.75	0.71	0.24	0.58	0.58	0.58	0.71	0.58	0.51	0.49	0.58	0.58	0.51	0.49
Median	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	3.00	3.00	2.00	2.00	2.00	3.00
Mode	#N/A	3.00	1.00	3.00	5.00	#N/A	3.00	4.00	4.00	4.00	#N/A	1.00	3.00	3.00	1.00	1.00	2.00	3.00
Standard Deviation	1.58	1.48	1.34	1.41	1.67	1.58	0.55	1.30	1.30	1.30	1.58	1.30	1.14	1.10	1.30	1.30	1.14	1.10
Sample Variance	2.50	2.20	1.80	2.00	2.80	2.50	0.30	1.70	1.70	1.70	2.50	1.70	1.30	1.20	1.70	1.70	1.30	1.20
Kurtosis	-1.20	0.87	-2.41	2.00	-0.61	-1.20	-3.33	-1.49	-1.49	-1.49	-1.20	-1.49	-0.18	2.92	-1.49	-1.49	-0.18	2.92
Skewness	0.00	0.55	-0.17	0.00	-0.51	0.00	0.61	-0.54	-0.54	-0.54	0.00	0.54	-0.40	-1.29	0.54	0.54	0.40	-1.29
Range	4	4	3	4	4	4	1	3	3	3	4	3	3	3	3	3	3	3
Minimum	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1
Maximum	5	5	4	5	5	5	4	4	4	4	5	4	4	4	4	4	4	4
Sum	15	14	12	15	17	15	17	14	14	14	15	11	13	14	11	11	12	14
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 75 (Cont.)

Web Development and Administration Scale Skill Level Run 1

Competency	C36	C37												C38					
Performance Statement	PS5	PS1	PS2	PS3	PS4	PS5	PS6				PS7	PS8		PS1		PS2		PS3	
Scale #	9	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
Variable ID	V395	V396	V397	V398	V399	V400	V401	V402	V403	V404	V405	V406	V407	V408	V409	V410	V411	V412	V413
rater3	3	5	4	4	3	3	3	3	3	3	3	4	3	3	3	5	5	5	5
rater4	1	1	1	1	2	1	3	3	3	1	1	3	3	4	4	4	4	4	4
rater5	3	1	2	1	1	1	1	2	3	2	1	2	2	5	4	5	5	4	5
rater1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
rater2	3	5	3	2	3	4	2	2	2	3	3	4	4	3	3	3	3	3	3
Mean	2.60	3.00	2.60	2.20	2.40	2.40	2.40	2.60	2.80	2.40	2.20	3.20	3.00	3.60	3.40	4.00	4.00	3.80	4.00
Standard Error	0.40	0.89	0.51	0.58	0.40	0.60	0.40	0.24	0.20	0.40	0.49	0.37	0.32	0.40	0.24	0.45	0.45	0.37	0.45
Median	3.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00	4.00
Mode	3.00	5.00	3.00	1.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	3.00	3.00	3.00	5.00	5.00	4.00	5.00
Standard Deviation	0.89	2.00	1.14	1.30	0.89	1.34	0.89	0.55	0.45	0.89	1.10	0.84	0.71	0.89	0.55	1.00	1.00	0.84	1.00
Sample Variance	0.80	4.00	1.30	1.70	0.80	1.80	0.80	0.30	0.20	0.80	1.20	0.70	0.50	0.80	0.30	1.00	1.00	0.70	1.00
Kurtosis	5.00	-3.00	-0.18	-1.49	0.31	-2.41	0.31	-3.33	5.00	0.31	-3.33	-0.61	2.00	0.31	-3.33	-3.00	-3.00	-0.61	-3.00
Skewness	-2.24	0.00	-0.40	0.54	-1.26	-0.17	-1.26	-0.61	-2.24	-1.26	-0.61	-0.51	0.00	1.26	0.61	0.00	0.00	0.51	0.00
Range	2	4	3	3	2	3	2	1	1	2	2	2	2	2	1	2	2	2	2
Minimum	1	1	1	1	1	1	1	2	2	1	1	2	2	3	3	3	3	3	3
Maximum	3	5	4	4	3	4	3	3	3	3	3	4	4	5	4	5	5	5	5
Sum	13	15	13	11	12	12	12	13	14	12	11	16	15	18	17	20	20	19	20
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 75 (Cont.)

Web Development and Administration Scale Skill Level Run 1

Competency	C38		C39														C40	
Performance Statement	PS4		PS1		PS2	PS3	PS4	PS5	PS6		PS7		PS8		PS9		PS1	PS2
Scale #	7	8	1	2	3	4	5	6	7	8	9	10	11	12	13	14	1	2
Variable ID	V414	V415	V416	V417	V418	V419	V420	V421	V422	V423	V424	V425	V426	V427	V428	V429	V430	V431
rater3	5	5	5	4	4	4	4	1	5	5	5	4	4	4	5	5	4	4
rater4	4	4	2	3	4	2	2	2	4	4	4	4	4	4	4	4	2	2
rater5	5	4	5	4	5	4	5	5	5	5	5	5	5	5	5	5	5	5
rater1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
rater2	4	4	4	4	5	4	4	4	5	4	4	4	4	4	4	3	4	4
Mean	4.20	4.00	3.80	3.60	4.20	3.40	3.60	3.00	4.40	4.20	4.20	4.00	4.00	4.00	4.20	4.00	3.60	3.60
Standard Error	0.37	0.32	0.58	0.24	0.37	0.40	0.51	0.71	0.40	0.37	0.37	0.32	0.32	0.32	0.37	0.45	0.51	0.51
Median	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.00	5.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Mode	5.00	4.00	5.00	4.00	4.00	4.00	4.00	#N/A	5.00	5.00	5.00	4.00	4.00	4.00	5.00	5.00	4.00	4.00
Standard Deviation	0.84	0.71	1.30	0.55	0.84	0.89	1.14	1.58	0.89	0.84	0.84	0.71	0.71	0.71	0.84	1.00	1.14	1.14
Sample Variance	0.70	0.50	1.70	0.30	0.70	0.80	1.30	2.50	0.80	0.70	0.70	0.50	0.50	0.50	0.70	1.00	1.30	1.30
Kurtosis	-0.61	2.00	-1.49	-3.33	-0.61	0.31	-0.18	-1.20	0.31	-0.61	-0.61	2.00	2.00	2.00	-0.61	-3.00	-0.18	-0.18
Skewness	-0.51	0.00	-0.54	-0.61	-0.51	-1.26	-0.40	0.00	-1.26	-0.51	-0.51	0.00	0.00	0.00	-0.51	0.00	-0.40	-0.40
Range	2	2	3	1	2	2	3	4	2	2	2	2	2	2	2	2	3	3
Minimum	3	3	2	3	3	2	2	1	3	3	3	3	3	3	3	3	2	2
Maximum	5	5	5	4	5	4	5	5	5	5	5	5	5	5	5	5	5	5
Sum	21	20	19	18	21	17	18	15	22	21	21	20	20	20	21	20	18	18
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 75 (Cont.)

Web Development and Administration Scale Skill Level Run 1

Competency	C40							C41										
Performance Statement	PS3		PS4	PS5		PS6		PS1		PS2		PS3	PS4	PS5		PS6	
Scale #	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9	10
Variable ID	V432	V433	V434	V435	V436	V437	V438	V439	V440	V441	V442	V443	V444	V445	V446	V447	V448
rater3	4	3	3	3	3	4	3	5	4	4	4	1	4	4	4	4	4
rater4	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1
rater5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
rater1	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3
rater2	4	4	4	4	4	4	4	3	4	4	4	4	4	4	4	4	4
Mean	3.60	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	2.80	3.40	3.40	3.40	3.40	3.40
Standard Error	0.51	0.51	0.51	0.51	0.51	0.60	0.51	0.75	0.68	0.68	0.68	0.80	0.68	0.68	0.68	0.68	0.68
Median	4.00	3.00	3.00	3.00	3.00	4.00	3.00	3.00	4.00	4.00	4.00	3.00	4.00	4.00	4.00	4.00	4.00
Mode	4.00	3.00	3.00	3.00	3.00	4.00	3.00	5.00	4.00	4.00	4.00	1.00	4.00	4.00	4.00	4.00	4.00
Standard Deviation	1.14	1.14	1.14	1.14	1.14	1.34	1.14	1.67	1.52	1.52	1.52	1.79	1.52	1.52	1.52	1.52	1.52
Sample Variance	1.30	1.30	1.30	1.30	1.30	1.80	1.30	2.80	2.30	2.30	2.30	3.20	2.30	2.30	2.30	2.30	2.30
Kurtosis	-0.18	-0.18	-0.18	-0.18	-0.18	-2.41	-0.18	-0.61	1.46	1.46	1.46	-2.32	1.46	1.46	1.46	1.46	1.46
Skewness	-0.40	0.40	0.40	0.40	0.40	-0.17	0.40	-0.51	-1.12	-1.12	-1.12	0.05	-1.12	-1.12	-1.12	-1.12	-1.12
Range	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4
Minimum	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1
Maximum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Sum	18	17	17	17	17	17	17	17	17	17	17	14	17	17	17	17	17
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 76

Professional Foundations Scale Skill Level Run 2

Competency	C1																	
Performance Statement	PS1			PS2			PS3				PS4			PS5		PS6		
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Variable ID	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22	V23	V24	V25	V26	V27
rater3	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	2
rater4	2	2	3	4	2	5	3	4	4	3	3	5	3	3	4	4	4	5
rater5	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2	2
rater2	5	5	5	4	5	5	3	3	5	3	3	5	4	3	5	5	4	5
rater1	5	5	5	4	5	5	3	4	5	3	3	5	4	3	5	5	4	5
Mean	2.8	2.8	3	2.8	2.8	3.4	2.2	2.8	3.6	2.2	2.2	3.4	2.6	2.2	3.2	3.2	3	3.8
Standard Error	0.92	0.92	0.89	0.73	0.92	0.98	0.49	0.58	0.68	0.49	0.49	0.98	0.68	0.49	0.92	0.92	0.63	0.73
Median	2	2	3	4	2	5	3	3	4	3	3	5	3	3	4	4	4	5
Mode	1	1	1	4	1	5	3	4	2	3	3	5	1	3	1	1	4	5
Standard Deviation	2.05	2.05	2.00	1.64	2.05	2.19	1.10	1.30	1.52	1.10	1.10	2.19	1.52	1.10	2.05	2.05	1.41	1.64
Sample Variance	4.2	4.2	4	2.7	4.2	4.8	1.2	1.7	2.3	1.2	1.2	4.8	2.3	1.2	4.2	4.2	2	2.7
Kurtosis	-3.16	-3.16	-3.00	-3.33	-3.16	-3.33	-3.33	-1.49	-3.08	-3.33	-3.33	-3.33	-3.08	-3.33	-3.16	-3.16	-1.75	-3.33
Skewness	0.44	0.44	0.00	-0.61	0.44	-0.61	-0.61	-0.54	-0.32	-0.61	-0.61	-0.61	-0.32	-0.61	-0.44	-0.44	-0.88	-0.61
Range	4	4	4	3	4	4	2	3	3	2	2	4	3	2	4	4	3	3
Minimum	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2
Maximum	5	5	5	4	5	5	3	4	5	3	3	5	4	3	5	5	4	5
Sum	14	14	15	14	14	17	11	14	18	11	11	17	13	11	16	16	15	19
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 76 (Cont.)

Professional Foundations Scale Skill Level Run 2

Competency	C1					C2						C3					
Performance Statement	PS7		PS8		PS9		PS1		PS2	PS3		PS1	PS2			PS3	
Scale #	19	20	21	22	23	1	2	3	4	5	6	1	2	3	4	5	6
Variable ID	V28	V29	V30	V31	V32	V33	V34	V35	V36	V37	V38	V39	V40	V41	V42	V43	V44
rater3	1	1	1	1	1	4	4	4	4	4	4	4	2	2	2	4	4
rater4	4	4	4	3	3	5	5	5	1	3	5	5	5	2	3	5	5
rater5	1	1	1	1	1	5	5	4	5	5	5	3	4	4	3	5	5
rater2	5	2	2	2	2	5	5	3	1	4	4	3	4	3	1	5	4
rater1	5	5	1	3	3	5	5	3	1	3	5	5	5	5	1	5	4
Mean	3.2	2.6	1.8	2	2	4.8	4.8	3.8	2.4	3.8	4.6	4	4	3.2	2	4.8	4.4
Standard Error	0.92	0.81	0.58	0.45	0.45	0.20	0.20	0.37	0.87	0.37	0.24	0.45	0.55	0.58	0.45	0.20	0.24
Median	4	2	1	2	2	5	5	4	1	4	5	4	4	3	2	5	4
Mode	1	1	1	1	1	5	5	4	1	4	5	5	5	2	3	5	4
Standard Deviation	2.05	1.82	1.30	1.00	1.00	0.45	0.45	0.84	1.95	0.84	0.55	1.00	1.22	1.30	1.00	0.45	0.55
Sample Variance	4.2	3.3	1.7	1	1	0.2	0.2	0.7	3.8	0.7	0.3	1	1.5	1.7	1	0.2	0.3
Kurtosis	-3.16	-2.23	2.66	-3.00	-3.00	5.00	5.00	-0.61	-2.48	-0.61	-3.33	-3.00	2.00	-1.49	-3.00	5.00	-3.33
Skewness	-0.44	0.57	1.71	0.00	0.00	-2.24	-2.24	0.51	0.76	0.51	-0.61	0.00	-1.36	0.54	0.00	-2.24	0.61
Range	4	4	3	2	2	1	1	2	4	2	1	2	3	3	2	1	1
Minimum	1	1	1	1	1	4	4	3	1	3	4	3	2	2	1	4	4
Maximum	5	5	4	3	3	5	5	5	5	5	5	5	5	5	3	5	5
Sum	16	13	9	10	10	24	24	19	12	19	23	20	20	16	10	24	22
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 76 (Cont.)

Professional Foundations Scale Skill Level Run 2

Competency	C3				C4										C5			
Performance Statement	PS4		PS5		PS1				PS2		PS3		PS4		PS1		PS2	
Scale #	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4
Variable ID	V45	V46	V47	V48	V49	V50	V51	V52	V53	V54	V55	V56	V57	V58	V59	V60	V61	V62
rater3	4	4	2	4	3	3	3	2	3	3	4	4	4	4	1	1	1	1
rater4	4	4	4	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5
rater5	3	5	5	3	1	1	1	1	1	1	2	2	1	1	1	1	1	1
rater2	4	5	5	5	5	3	5	3	5	3	3	3	5	5	5	5	5	5
rater1	4	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	3
Mean	3.8	4.6	4.2	4.4	3.8	3.4	3.8	3.2	3.8	3.4	3.8	3.8	4	3.8	3.2	3.2	3.2	3
Standard Error	0.20	0.24	0.58	0.40	0.80	0.75	0.80	0.80	0.80	0.75	0.58	0.58	0.77	0.73	0.92	0.92	0.92	0.89
Median	4	5	5	5	5	3	5	3	5	3	4	4	5	4	4	4	4	3
Mode	4	5	5	5	5	3	5	5	5	3	5	5	5	4	1	1	1	1
Standard Deviation	0.45	0.55	1.30	0.89	1.79	1.67	1.79	1.79	1.79	1.67	1.30	1.30	1.73	1.64	2.05	2.05	2.05	2.00
Sample Variance	0.2	0.3	1.7	0.8	3.2	2.8	3.2	3.2	3.2	2.8	1.7	1.7	3	2.7	4.2	4.2	4.2	4
Kurtosis	5.00	-3.33	2.66	0.31	0.31	-0.61	0.31	-2.32	0.31	-0.61	-1.49	-1.49	3.67	3.25	-3.16	-3.16	-3.16	-3.00
Skewness	-2.24	-0.61	-1.71	-1.26	-1.26	-0.51	-1.26	-0.05	-1.26	-0.51	-0.54	-0.54	-1.92	-1.74	-0.44	-0.44	-0.44	0.00
Range	1	1	3	2	4	4	4	4	4	4	3	3	4	4	4	4	4	4
Minimum	3	4	2	3	1	1	1	1	1	1	2	2	1	1	1	1	1	1
Maximum	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Sum	19	23	21	22	19	17	19	16	19	17	19	19	20	19	16	16	16	15
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 76 (Cont.)

Professional Foundations Scale Skill Level Run 2

Competency	C5									
Performance Statement	PS3			PS4				PS5		
Scale #	5	6	7	8	9	10	11	12	13	14
Variable ID	V63	V64	V65	V66	V67	V68	V69	V70	V71	V72
rater3	1	1	1	1	1	1	1	1	1	1
rater4	5	5	5	5	5	5	5	4	3	3
rater5	1	1	1	1	1	1	1	1	1	1
rater2	5	5	5	5	5	5	5	3	3	3
rater1	4	4	4	5	4	5	4	3	3	3
Mean	3.2	3.2	3.2	3.4	3.2	3.4	3.2	2.4	2.2	2.2
Standard Error	0.92	0.92	0.92	0.98	0.92	0.98	0.92	0.60	0.49	0.49
Median	4	4	4	5	4	5	4	3	3	3
Mode	1	1	1	5	1	5	1	1	3	3
Standard Deviation	2.05	2.05	2.05	2.19	2.05	2.19	2.05	1.34	1.10	1.10
Sample Variance	4.2	4.2	4.2	4.8	4.2	4.8	4.2	1.8	1.2	1.2
Kurtosis	-3.16	-3.16	-3.16	-3.33	-3.16	-3.33	-3.16	-2.41	-3.33	-3.33
Skewness	-0.44	-0.44	-0.44	-0.61	-0.44	-0.61	-0.44	-0.17	-0.61	-0.61
Range	4	4	4	4	4	4	4	3	2	2
Minimum	1	1	1	1	1	1	1	1	1	1
Maximum	5	5	5	5	5	5	5	4	3	3
Sum	16	16	16	17	16	17	16	12	11	11
Count	5	5	5	5	5	5	5	5	5	5

Table 77

Planning and Analysis Scale Skill Level Run 2

Competency	C6											C7						
Performance Statement	PS1		PS2		PS3		PS4		PS5		PS6	PS1			PS2		PS3	
Scale #	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5	6	7
Variable ID	V73	V74	V75	V76	V77	V78	V79	V80	V81	V82	V83	V84	V85	V86	V87	V88	V89	V90
rater3	1	1	1	1	2	2	1	1	1	2	4	1	1	1	1	1	3	1
rater4	4	4	4	5	5	4	5	5	5	5	5	5	4	4	4	5	4	5
rater5	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1
rater1	4	5	2	2	5	3	4	5	5	5	5	2	5	4	4	5	5	5
rater2	4	5	2	2	5	5	4	5	5	5	5	2	5	3	4	3	3	5
Mean	2.8	3.2	2	2.2	3.6	3	3	3.4	3.4	3.6	4.2	2.2	3.2	2.6	2.8	3	3.2	3.4
Standard Error	0.73	0.92	0.55	0.73	0.87	0.71	0.84	0.98	0.98	0.87	0.58	0.73	0.92	0.68	0.73	0.89	0.66	0.98
Median	4	4	2	2	5	3	4	5	5	5	5	2	4	3	4	3	3	5
Mode	4	1	1	1	5	#N/A	1	5	5	5	5	1	1	1	4	1	3	5
Standard Deviation	1.64	2.05	1.22	1.64	1.95	1.58	1.87	2.19	2.19	1.95	1.30	1.64	2.05	1.52	1.64	2.00	1.48	2.19
Sample Variance	2.7	4.2	1.5	2.7	3.8	2.5	3.5	4.8	4.8	3.8	1.7	2.7	4.2	2.3	2.7	4	2.2	4.8
Kurtosis	-3.33	-3.16	2.00	3.25	-2.48	-1.20	-2.90	-3.33	-3.33	-2.48	2.66	3.25	-3.16	-3.08	-3.33	-3.00	0.87	-3.33
Skewness	-0.61	-0.44	1.36	1.74	-0.76	0.00	-0.38	-0.61	-0.61	-0.76	-1.71	1.74	-0.44	-0.32	-0.61	0.00	-0.55	-0.61
Range	3	4	3	4	4	4	4	4	4	4	3	4	4	3	3	4	4	4
Minimum	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1
Maximum	4	5	4	5	5	5	5	5	5	5	5	5	5	4	4	5	5	5
Sum	14	16	10	11	18	15	15	17	17	18	21	11	16	13	14	15	16	17
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 77 (Cont.)

Planning and Analysis Scale Skill Level Run 2

Competency	C7			C8											C9		
Performance Statement	PS4		PS5			PS1				PS2			PS3			PS1	
Scale #	8	9	10	1	2	3	4	5	6	7	8	9	10	11	1	2	3
Variable ID	V91	V92	V93	V94	V95	V96	V97	V98	V99	V100	V101	V102	V103	V104	V105	V106	V107
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	5	5	5	4	4	4	5	4	4	4	4	4	5	4	5	1	5
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	5	5	5	4	5	1	5	5	2	2	2	4	5	3	2	1	5
rater2	5	5	5	4	5	2	5	5	2	2	2	4	5	3	2	4	2
Mean	3.4	3.4	3.4	2.8	3.2	1.8	3.4	3.2	2	2	2	2.8	3.4	2.4	2.2	1.6	2.8
Standard Error	0.98	0.98	0.98	0.73	0.92	0.58	0.98	0.92	0.55	0.55	0.55	0.73	0.98	0.60	0.73	0.60	0.92
Median	5	5	5	4	4	1	5	4	2	2	2	4	5	3	2	1	2
Mode	5	5	5	4	1	1	5	1	1	1	1	4	5	1	1	1	1
Standard Deviation	2.19	2.19	2.19	1.64	2.05	1.30	2.19	2.05	1.22	1.22	1.22	1.64	2.19	1.34	1.64	1.34	2.05
Sample Variance	4.8	4.8	4.8	2.7	4.2	1.7	4.8	4.2	1.5	1.5	1.5	2.7	4.8	1.8	2.7	1.8	4.2
Kurtosis	-3.33	-3.33	-3.33	-3.33	-3.16	2.66	-3.33	-3.16	2.00	2.00	2.00	-3.33	-3.33	-2.41	3.25	5.00	-3.16
Skewness	-0.61	-0.61	-0.61	-0.61	-0.44	1.71	-0.61	-0.44	1.36	1.36	1.36	-0.61	-0.61	-0.17	1.74	2.24	0.44
Range	4	4	4	3	4	3	4	4	3	3	3	3	4	3	4	3	4
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	5	5	5	4	5	4	5	5	4	4	4	4	5	4	5	4	5
Sum	17	17	17	14	16	9	17	16	10	10	10	14	17	12	11	8	14
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 77 (Cont.)

Planning and Analysis Scale Skill Level Run 2

Competency		C9						C10							
Performance Statement		PS2				PS1			PS2		PS3			PS4	
Scale #	4	5	6	1	2	3	4	5	6	7	8	9	10	11	12
Variable ID	V108	V109	V110	V111	V112	V113	V114	V115	V116	V117	V118	V119	V120	V121	V122
rater3	1	1	1	3	3	3	3	2	1	2	1	2	1	3	3
rater4	4	5	5	4	4	5	5	4	4	4	4	5	5	4	4
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	4	5	5	4	4	5	5	4	4	4	4	5	4	4	4
rater2	4	5	5	4	4	2	2	4	4	4	4	5	5	4	4
Mean	2.8	3.4	3.4	3.2	3.2	3.2	3.2	3	2.8	3	2.8	3.6	3.2	3.2	3.2
Standard Error	0.73	0.98	0.98	0.58	0.58	0.80	0.80	0.63	0.73	0.63	0.73	0.87	0.92	0.58	0.58
Median	4	5	5	4	4	3	3	4	4	4	4	5	4	4	4
Mode	4	5	5	4	4	5	5	4	4	4	4	5	1	4	4
Standard Deviation	1.64	2.19	2.19	1.30	1.30	1.79	1.79	1.41	1.64	1.41	1.64	1.95	2.05	1.30	1.30
Sample Variance	2.7	4.8	4.8	1.7	1.7	3.2	3.2	2	2.7	2	2.7	3.8	4.2	1.7	1.7
Kurtosis	-3.33	-3.33	-3.33	2.66	2.66	-2.32	-2.32	-1.75	-3.33	-1.75	-3.33	-2.48	-3.16	2.66	2.66
Skewness	-0.61	-0.61	-0.61	-1.71	-1.71	-0.05	-0.05	-0.88	-0.61	-0.88	-0.61	-0.76	-0.44	-1.71	-1.71
Range	3	4	4	3	3	4	4	3	3	3	3	4	4	3	3
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	4	5	5	4	4	5	5	4	4	4	4	5	5	4	4
Sum	14	17	17	16	16	16	16	15	14	15	14	18	16	16	16
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 77 (Cont.)

Planning and Analysis Scale Skill Level Run 2

Competency	C11					C12			
Performance Statement	PS1		PS2	PS3		PS1	PS2	PS3	PS4
Scale #	1	2	3	4	5	1	2	3	4
Variable ID	V123	V124	V125	V126	V127	V128	V129	V130	V131
rater3	2	4	1	2	2	3	2	2	4
rater4	4	4	5	5	5	5	3	5	4
rater5	1	3	2	2	3	1	1	1	1
rater1	4	4	5	4	4	5	3	4	5
rater2	4	4	5	5	5	5	3	5	5
Mean	3	3.8	3.6	3.6	3.8	3.8	2.4	3.4	3.8
Standard Error	0.63	0.20	0.87	0.68	0.58	0.80	0.40	0.81	0.73
Median	4	4	5	4	4	5	3	4	4
Mode	4	4	5	2	5	5	3	5	4
Standard Deviation	1.41	0.45	1.95	1.52	1.30	1.79	0.89	1.82	1.64
Sample Variance	2	0.2	3.8	2.3	1.7	3.2	0.8	3.3	2.7
Kurtosis	-1.75	5.00	-2.48	-3.08	-1.49	0.31	0.31	-2.23	3.25
Skewness	-0.88	-2.24	-0.76	-0.32	-0.54	-1.26	-1.26	-0.57	-1.74
Range	3	1	4	3	3	4	2	4	4
Minimum	1	3	1	2	2	1	1	1	1
Maximum	4	4	5	5	5	5	3	5	5
Sum	15	19	18	18	19	19	12	17	19
Count	5	5	5	5	5	5	5	5	5

Table 78

Design and Development Scale Skill Level Run 2

Competency	C13								C14								
Performance Statement		PS1		PS2		PS3		PS4	PS1		PS2			PS3		PS4	
Scale #	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	9
Variable ID	V132	V133	V134	V135	V136	V137	V138	V139	V140	V141	V142	V143	V144	V145	V146	V147	V148
rater3	1	2	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1
rater4	5	5	5	5	5	5	5	1	5	3	5	4	3	5	4	5	4
rater5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater1	5	5	5	5	5	5	5	4	5	3	5	5	3	5	4	5	4
rater2	5	5	5	5	5	5	5	1	5	3	5	5	3	5	4	5	4
Mean	3.4	3.6	3.4	3.4	3.4	3.4	3.4	2.2	3.4	2.2	3.4	3.2	2.2	3.4	2.8	3.4	2.8
Standard Error	0.98	0.87	0.98	0.98	0.98	0.98	0.98	0.73	0.98	0.49	0.98	0.92	0.49	0.98	0.73	0.98	0.73
Median	5	5	5	5	5	5	5	1	5	3	5	4	3	5	4	5	4
Mode	5	5	5	5	5	5	5	1	5	3	5	1	3	5	4	5	4
Standard Deviation	2.19	1.95	2.19	2.19	2.19	2.19	2.19	1.64	2.19	1.10	2.19	2.05	1.10	2.19	1.64	2.19	1.64
Sample Variance	4.8	3.8	4.8	4.8	4.8	4.8	4.8	2.7	4.8	1.2	4.8	4.2	1.2	4.8	2.7	4.8	2.7
Kurtosis	-3.33	-2.48	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.16	-3.33	-3.33	-3.33	-3.33	-3.33
Skewness	-0.61	-0.76	-0.61	-0.61	-0.61	-0.61	-0.61	0.61	-0.61	-0.61	-0.61	-0.44	-0.61	-0.61	-0.61	-0.61	-0.61
Range	4	4	4	4	4	4	4	3	4	2	4	4	2	4	3	4	3
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	5	5	5	5	5	5	5	4	5	3	5	5	3	5	4	5	4
Sum	17	18	17	17	17	17	17	11	17	11	17	16	11	17	14	17	14
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 78 (Cont.)

Design and Development Scale Skill Level Run 2

Competency	C14							C15								
Performance Statement	PS5		PS6			PS7		PS1		PS2		PS3		PS4		PS5
Scale #	10	11	12	13	14	15	16	1	2	3	4	5	6	7	8	9
Variable ID	V149	V150	V151	V152	V153	V154	V155	V156	V157	V158	V159	V160	V161	V162	V163	V164
rater3	1	1	1	1	3	4	4	3	2	2	4	4	2	2	2	4
rater4	5	5	5	5	4	4	3	4	4	4	5	5	5	5	5	5
rater5	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1
rater1	5	5	5	5	5	5	3	4	4	5	5	5	5	5	5	5
rater2	5	5	5	5	5	5	3	5	4	5	5	5	5	5	5	5
Mean	3.4	3.4	3.4	3.4	3.6	3.8	2.8	3.4	3	3.4	4.2	4.2	3.6	3.6	3.6	4
Standard Error	0.98	0.98	0.98	0.98	0.75	0.73	0.49	0.68	0.63	0.81	0.58	0.58	0.87	0.87	0.87	0.77
Median	5	5	5	5	4	4	3	4	4	4	5	5	5	5	5	5
Mode	5	5	5	5	5	4	3	4	4	5	5	5	5	5	5	5
Standard Deviation	2.19	2.19	2.19	2.19	1.67	1.64	1.10	1.52	1.41	1.82	1.30	1.30	1.95	1.95	1.95	1.73
Sample Variance	4.8	4.8	4.8	4.8	2.8	2.7	1.2	2.3	2	3.3	1.7	1.7	3.8	3.8	3.8	3
Kurtosis	-3.33	-3.33	-3.33	-3.33	0.54	3.25	2.92	1.46	-1.75	-2.23	2.66	2.66	-2.48	-2.48	-2.48	3.67
Skewness	-0.61	-0.61	-0.61	-0.61	-1.09	-1.74	-1.29	-1.12	-0.88	-0.57	-1.71	-1.71	-0.76	-0.76	-0.76	-1.92
Range	4	4	4	4	4	4	3	4	3	4	3	3	4	4	4	4
Minimum	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1
Maximum	5	5	5	5	5	5	4	5	4	5	5	5	5	5	5	5
Sum	17	17	17	17	18	19	14	17	15	17	21	21	18	18	18	20
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 78 (Cont.)

Design and Development Scale Skill Level Run 2

Competency	C16						C17			C18						
Performance Statement	PS1				PS2	PS3	PS1	PS2	PS3	PS1	PS2		PS3		PS4	
Scale #	1	2	3	4	5	6	1	2	3	1	2	3	4	5	6	7
Variable ID	V165	V166	V167	V168	V169	V170	V171	V172	V173	V174	V175	V176	V177	V178	V179	V180
rater3	1	1	1	1	1	4	2	2	2	3	3	3	4	4	4	4
rater4	5	5	5	5	4	4	5	5	5	5	4	4	5	3	5	3
rater5	1	1	1	1	1	1	1	1	1	2	1	1	2	1	1	1
rater1	5	5	5	5	5	5	5	5	5	5	4	4	5	3	5	3
rater2	5	5	5	5	5	5	5	5	5	5	4	4	5	3	5	3
Mean	3.4	3.4	3.4	3.4	3.2	3.8	3.6	3.6	3.6	4	3.2	3.2	4.2	2.8	4	2.8
Standard Error	0.98	0.98	0.98	0.98	0.92	0.73	0.87	0.87	0.87	0.63	0.58	0.58	0.58	0.49	0.77	0.49
Median	5	5	5	5	4	4	5	5	5	5	4	4	5	3	5	3
Mode	5	5	5	5	1	4	5	5	5	5	4	4	5	3	5	3
Standard Deviation	2.19	2.19	2.19	2.19	2.05	1.64	1.95	1.95	1.95	1.41	1.30	1.30	1.30	1.10	1.73	1.10
Sample Variance	4.8	4.8	4.8	4.8	4.2	2.7	3.8	3.8	3.8	2	1.7	1.7	1.7	1.2	3	1.2
Kurtosis	-3.33	-3.33	-3.33	-3.33	-3.16	3.25	-2.48	-2.48	-2.48	-1.75	2.66	2.66	2.66	2.92	3.67	2.92
Skewness	-0.61	-0.61	-0.61	-0.61	-0.44	-1.74	-0.76	-0.76	-0.76	-0.88	-1.71	-1.71	-1.71	-1.29	-1.92	-1.29
Range	4	4	4	4	4	4	4	4	4	3	3	3	3	3	4	3
Minimum	1	1	1	1	1	1	1	1	1	2	1	1	2	1	1	1
Maximum	5	5	5	5	5	5	5	5	5	5	4	4	5	4	5	4
Sum	17	17	17	17	16	19	18	18	18	20	16	16	21	14	20	14
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

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Table 84

Skill Level Scale Confidence Interval Run 1-3

Run 1	Run 2	Run 3

Table 78 (Cont.)

Design and Development Scale Skill Level Run 2

Competency	C18								
Performance Statement	PS5		PS6	PS7		PS8		PS9	
Scale #	8	9	10	11	12	13	14	15	16
Variable ID	V181	V182	V183	V184	V185	V186	V187	V188	V189
rater3	4	4	2	2	4	4	4	4	4
rater4	5	3	5	4	5	5	5	5	5
rater5	2	1	2	1	1	1	2	2	1
rater1	5	3	5	4	4	5	5	5	3
rater2	5	3	5	4	5	5	5	5	3
Mean	4.2	2.8	3.8	3	3.8	4	4.2	4.2	3.2
Standard Error	0.58	0.49	0.73	0.63	0.73	0.77	0.58	0.58	0.66
Median	5	3	5	4	4	5	5	5	3
Mode	5	3	5	4	4	5	5	5	3
Standard Deviation	1.30	1.10	1.64	1.41	1.64	1.73	1.30	1.30	1.48
Sample Variance	1.7	1.2	2.7	2	2.7	3	1.7	1.7	2.2
Kurtosis	2.66	2.92	-3.33	-1.75	3.25	3.67	2.66	2.66	0.87
Skewness	-1.71	-1.29	-0.61	-0.88	-1.74	-1.92	-1.71	-1.71	-0.55
Range	3	3	3	3	4	4	3	3	4
Minimum	2	1	2	1	1	1	2	2	1
Maximum	5	4	5	4	5	5	5	5	5
Sum	21	14	19	15	19	20	21	21	16
Count	5	5	5	5	5	5	5	5	5

Table 79

Implementation and Management Scale Skill Level Run 2

Competency	C19																C20	
Performance Statement	PS1	PS2	PS3	PS4	PS5		PS6	PS7		PS8		PS9			PS10		PS1	
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1	2
Variable ID	V190	V191	V192	V193	V194	V195	V196	V197	V198	V199	V200	V201	V202	V203	V204	V205	V206	V207
rater3	1	1	1	4	1	1	1	1	4	2	2	1	1	1	1	1	1	2
rater4	2	3	5	5	5	5	5	5	5	4	5	3	5	4	5	3	5	4
rater5	1	1	1	2	1	2	2	1	4	4	4	4	3	3	2	1	1	1
rater1	2	3	5	5	5	5	4	5	5	4	5	1	5	4	4	3	5	4
rater2	2	3	5	5	5	5	5	5	5	4	5	5	5	4	4	5	5	4
Mean	1.6	2.2	3.4	4.2	3.4	3.6	3.4	3.4	4.6	3.6	4.2	2.8	3.8	3.2	3.2	2.6	3.4	3
Standard Error	0.24	0.49	0.98	0.58	0.98	0.87	0.81	0.98	0.24	0.40	0.58	0.80	0.80	0.58	0.73	0.75	0.98	0.63
Median	2	3	5	5	5	5	4	5	5	4	5	3	5	4	4	3	5	4
Mode	2	3	5	5	5	5	5	5	5	4	5	1	5	4	4	1	5	4
Standard Deviation	0.55	1.10	2.19	1.30	2.19	1.95	1.82	2.19	0.55	0.89	1.30	1.79	1.79	1.30	1.64	1.67	2.19	1.41
Sample Variance	0.3	1.2	4.8	1.7	4.8	3.8	3.3	4.8	0.3	0.8	1.7	3.2	3.2	1.7	2.7	2.8	4.8	2
Kurtosis	-3.33	-3.33	-3.33	2.66	-3.33	-2.48	-2.23	-3.33	-3.33	5.00	2.66	-2.32	0.31	2.66	-1.69	-0.61	-3.33	-1.75
Skewness	-0.61	-0.61	-0.61	-1.71	-0.61	-0.76	-0.57	-0.61	-0.61	-2.24	-1.71	0.05	-1.26	-1.71	-0.52	0.51	-0.61	-0.88
Range	1	2	4	3	4	4	4	4	1	2	3	4	4	3	4	4	4	3
Minimum	1	1	1	2	1	1	1	1	4	2	2	1	1	1	1	1	1	1
Maximum	2	3	5	5	5	5	5	5	5	4	5	5	5	4	5	5	5	4
Sum	8	11	17	21	17	18	17	17	23	18	21	14	19	16	16	13	17	15
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 79 (Cont.)

Implementation and Management Scale Skill Level Run 2

Competency	C20							C21									
Performance Statement	PS2	PS3	PS4		PS5	PS6		PS1	PS2		PS3	PS4		PS5		PS6	PS7
Scale #	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9	10
Variable ID	V208	V209	V210	V211	V212	V213	V214	V215	V216	V217	V218	V219	V220	V221	V222	V223	V224
rater3	1	1	1	1	4	4	2	1	1	1	1	4	4	2	3	3	2
rater4	4	3	5	5	3	5	5	5	5	4	3	5	5	5	5	5	5
rater5	1	1	2	1	1	2	1	2	2	1	2	2	4	4	5	5	5
rater1	4	5	5	5	5	5	5	5	5	5	3	5	5	3	5	5	5
rater2	4	5	5	5	3	5	5	4	5	5	3	5	5	5	5	5	5
Mean	2.8	3	3.6	3.4	3.2	4.2	3.6	3.4	3.6	3.2	2.4	4.2	4.6	3.8	4.6	4.6	4.4
Standard Error	0.73	0.89	0.87	0.98	0.66	0.58	0.87	0.81	0.87	0.92	0.40	0.58	0.24	0.58	0.40	0.40	0.60
Median	4	3	5	5	3	5	5	4	5	4	3	5	5	4	5	5	5
Mode	4	1	5	5	3	5	5	5	5	1	3	5	5	5	5	5	5
Standard Deviation	1.64	2.00	1.95	2.19	1.48	1.30	1.95	1.82	1.95	2.05	0.89	1.30	0.55	1.30	0.89	0.89	1.34
Sample Variance	2.7	4	3.8	4.8	2.2	1.7	3.8	3.3	3.8	4.2	0.8	1.7	0.3	1.7	0.8	0.8	1.8
Kurtosis	-3.33	-3.00	-2.48	-3.33	0.87	2.66	-2.48	-2.23	-2.48	-3.16	0.31	2.66	-3.33	-1.49	5.00	5.00	5.00
Skewness	-0.61	0.00	-0.76	-0.61	-0.55	-1.71	-0.76	-0.57	-0.76	-0.44	-1.26	-1.71	-0.61	-0.54	-2.24	-2.24	-2.24
Range	3	4	4	4	4	3	4	4	4	4	2	3	1	3	2	2	3
Minimum	1	1	1	1	1	2	1	1	1	1	1	2	4	2	3	3	2
Maximum	4	5	5	5	5	5	5	5	5	5	3	5	5	5	5	5	5
Sum	14	15	18	17	16	21	18	17	18	16	12	21	23	19	23	23	22
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 79 (Cont.)

Implementation and Management Scale Skill Level Run 2

Competency	C21		C22						C23						
Performance Statement	PS8		PS1		PS2		PS3		PS1			PS2		PS3	
Scale #	11	12	1	2	3	4	5	6	1	2	3	4	5	6	7
Variable ID	V225	V226	V227	V228	V229	V230	V231	V232	V233	V234	V235	V236	V237	V238	V239
rater3	4	2	4	4	4	4	4	4	2	2	2	2	2	2	2
rater4	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5
rater5	3	3	1	1	1	1	1	1	2	2	1	1	1	2	1
rater1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
rater2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mean	4.4	3.8	4	4	4	4	4	4	3.8	3.8	3.6	3.6	3.6	3.8	3.6
Standard Error	0.40	0.58	0.77	0.77	0.77	0.77	0.77	0.77	0.73	0.73	0.87	0.87	0.87	0.73	0.87
Median	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5
Mode	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Standard Deviation	0.89	1.30	1.73	1.73	1.73	1.73	1.73	1.73	1.64	1.64	1.95	1.95	1.95	1.64	1.95
Sample Variance	0.8	1.7	3	3	3	3	3	3	2.7	2.7	3.8	3.8	3.8	2.7	3.8
Kurtosis	0.31	-1.49	3.67	3.67	3.67	3.67	3.67	3.67	-3.33	-3.33	-2.48	-2.48	-2.48	-3.33	-2.48
Skewness	-1.26	-0.54	-1.92	-1.92	-1.92	-1.92	-1.92	-1.92	-0.61	-0.61	-0.76	-0.76	-0.76	-0.61	-0.76
Range	2	3	4	4	4	4	4	4	3	3	4	4	4	3	4
Minimum	3	2	1	1	1	1	1	1	2	2	1	1	1	2	1
Maximum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Sum	22	19	20	20	20	20	20	20	19	19	18	18	18	19	18
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 79 (Cont.)

Implementation and Management Scale Skill Level Run 2

Competency	C23					
Performance Statement	PS4			PS5		
Scale #	8	9	10	11	12	13
Variable ID	V240	V241	V242	V243	V244	V245
rater3	2	2	2	2	2	2
rater4	5	5	5	5	5	5
rater5	2	1	1	2	2	3
rater1	5	5	5	5	5	5
rater2	5	5	5	5	5	5
Mean	3.8	3.6	3.6	3.8	3.8	4
Standard Error	0.73	0.87	0.87	0.73	0.73	0.63
Median	5	5	5	5	5	5
Mode	5	5	5	5	5	5
Standard Deviation	1.64	1.95	1.95	1.64	1.64	1.41
Sample Variance	2.7	3.8	3.8	2.7	2.7	2
Kurtosis	-3.33	-2.48	-2.48	-3.33	-3.33	-1.75
Skewness	-0.61	-0.76	-0.76	-0.61	-0.61	-0.88
Range	3	4	4	3	3	3
Minimum	2	1	1	2	2	2
Maximum	5	5	5	5	5	5
Sum	19	18	18	19	19	20
Count	5	5	5	5	5	5

Table 80

Digital Media Scale Skill Level Run 2

Competency	C24														C25			
Performance Statement	PS1	PS2		PS3		PS4	PS5	PS6		PS7			PS8		PS1		PS2	
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	1	2	3	4
Variable ID	V246	V247	V248	V249	V250	V251	V252	V253	V254	V255	V256	V257	V258	V259	V260	V261	V262	V263
rater3	2	2	2	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1
rater4	5	5	5	4	4	4	5	5	5	5	5	4	4	5	5	5	5	4
rater5	1	1	2	1	1	1	1	2	2	1	1	1	2	1	2	2	1	1
rater1	5	5	5	5	5	5	4	5	5	5	5	4	5	5	5	5	5	5
rater2	5	2	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5
Mean	3.6	3	3.8	3.4	3.4	3.4	3.4	3.8	3.8	3.6	3.6	2.8	3.4	3.6	3.6	3.6	3.4	3.2
Standard Error	0.87	0.84	0.73	0.81	0.81	0.81	0.81	0.73	0.73	0.87	0.87	0.73	0.81	0.87	0.87	0.87	0.98	0.92
Median	5	2	5	4	4	4	4	5	5	5	5	4	4	5	5	5	5	4
Mode	5	2	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	1
Standard Deviation	1.95	1.87	1.64	1.82	1.82	1.82	1.82	1.64	1.64	1.95	1.95	1.64	1.82	1.95	1.95	1.95	2.19	2.05
Sample Variance	3.8	3.5	2.7	3.3	3.3	3.3	3.3	2.7	2.7	3.8	3.8	2.7	3.3	3.8	3.8	3.8	4.8	4.2
Kurtosis	-2.48	-2.90	-3.33	-2.23	-2.23	-2.23	-2.23	-3.33	-3.33	-2.48	-2.48	-3.33	-2.23	-2.48	-2.48	-2.48	-3.33	-3.16
Skewness	-0.76	0.38	-0.61	-0.57	-0.57	-0.57	-0.57	-0.61	-0.61	-0.76	-0.76	-0.61	-0.57	-0.76	-0.76	-0.76	-0.61	-0.44
Range	4	4	3	4	4	4	4	3	3	4	4	3	4	4	4	4	4	4
Minimum	1	1	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1
Maximum	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5
Sum	18	15	19	17	17	17	17	19	19	18	18	14	17	18	18	18	17	16
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 80 (Cont.)

Digital Media Scale Skill Level Run 2

Competency	C25											C26			
Performance Statement		PS3			PS4				PS5		PS6		PS1		
Scale #	5	6	7	8	9	10	11	12	13	14	15	1	2	3	4
Variable ID	V264	V265	V266	V267	V268	V269	V270	V271	V272	V273	V274	V275	V276	V277	V278
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	4	5	5	5	5	5	4	5	5	4	4	5	5	5	4
rater5	1	2	2	2	2	2	2	2	2	1	2	1	1	1	2
rater1	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5
rater2	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5
Mean	3.2	3.6	3.6	3.6	3.6	3.6	3.4	3.6	3.6	2.8	3.4	3.4	3.4	3.4	3.4
Standard Error	0.92	0.87	0.87	0.87	0.87	0.87	0.81	0.87	0.87	0.73	0.81	0.98	0.98	0.98	0.81
Median	4	5	5	5	5	5	4	5	5	4	4	5	5	5	4
Mode	1	5	5	5	5	5	5	5	5	4	5	5	5	5	5
Standard Deviation	2.05	1.95	1.95	1.95	1.95	1.95	1.82	1.95	1.95	1.64	1.82	2.19	2.19	2.19	1.82
Sample Variance	4.2	3.8	3.8	3.8	3.8	3.8	3.3	3.8	3.8	2.7	3.3	4.8	4.8	4.8	3.3
Kurtosis	-3.16	-2.48	-2.48	-2.48	-2.48	-2.48	-2.23	-2.48	-2.48	-3.33	-2.23	-3.33	-3.33	-3.33	-2.23
Skewness	-0.44	-0.76	-0.76	-0.76	-0.76	-0.76	-0.57	-0.76	-0.76	-0.61	-0.57	-0.61	-0.61	-0.61	-0.57
Range	4	4	4	4	4	4	4	4	4	3	4	4	4	4	4
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5
Sum	16	18	18	18	18	18	17	18	18	14	17	17	17	17	17
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 80 (Cont.)

Digital Media Scale Skill Level Run 2

Competency	C26							C27									
Performance Statement		PS2		PS3		PS4				PS1					PS2		
Scale #	5	6	7	8	9	10	11	1	2	3	4	5	6	7	8	9	10
Variable ID	V279	V280	V281	V282	V283	V284	V285	V286	V287	V288	V289	V290	V291	V292	V293	V294	V295
rater3	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1
rater4	4	4	5	5	5	4	4	4	4	4	3	4	3	5	4	5	4
rater5	1	1	1	2	3	1	2	1	1	1	2	2	5	5	5	5	4
rater1	4	5	1	4	3	5	3	5	5	5	3	5	3	5	5	5	4
rater2	4	5	5	5	3	5	3	5	5	5	5	5	5	5	5	5	4
Mean	2.8	3.2	2.6	3.4	3.2	3.2	2.6	3.2	3.2	3.2	2.8	3.4	3.4	4.2	4	4.2	3.4
Standard Error	0.73	0.92	0.98	0.81	0.49	0.92	0.51	0.92	0.92	0.92	0.66	0.81	0.75	0.80	0.77	0.80	0.60
Median	4	4	1	4	3	4	3	4	4	4	3	4	3	5	5	5	4
Mode	4	1	1	5	3	1	3	1	1	1	3	5	3	5	5	5	4
Standard Deviation	1.64	2.05	2.19	1.82	1.10	2.05	1.14	2.05	2.05	2.05	1.48	1.82	1.67	1.79	1.73	1.79	1.34
Sample Variance	2.7	4.2	4.8	3.3	1.2	4.2	1.3	4.2	4.2	4.2	2.2	3.3	2.8	3.2	3	3.2	1.8
Kurtosis	-3.33	-3.16	-3.33	-2.23	2.92	-3.16	-0.18	-3.16	-3.16	-3.16	0.87	-2.23	-0.61	5.00	3.67	5.00	5.00
Skewness	-0.61	-0.44	0.61	-0.57	1.29	-0.44	-0.40	-0.44	-0.44	-0.44	0.55	-0.57	-0.51	-2.24	-1.92	-2.24	-2.24
Range	3	4	4	4	3	4	3	4	4	4	4	4	4	4	4	4	3
Minimum	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	4	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5	4
Sum	14	16	13	17	16	16	13	16	16	16	14	17	17	21	20	21	17
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 80 (Cont.)

Digital Media Scale Skill Level Run 2

Competency	C28												
Performance Statement	PS1				PS2				PS3			PS4	
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13
Variable ID	V296	V297	V298	V299	V300	V301	V302	V303	V304	V305	V306	V307	V308
rater3	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	5	4	4	5	4	4	5	4	5	4	4	5	3
rater5	3	3	3	3	2	2	2	2	1	2	1	2	1
rater1	5	5	4	5	4	4	4	5	3	5	5	5	3
rater2	5	5	5	5	4	4	4	5	3	5	5	5	5
Mean	3.8	3.6	3.4	3.8	3	3	3.2	3.4	2.6	3.4	3.2	3.6	2.6
Standard Error	0.80	0.75	0.68	0.80	0.63	0.63	0.73	0.81	0.75	0.81	0.92	0.87	0.75
Median	5	4	4	5	4	4	4	4	3	4	4	5	3
Mode	5	5	4	5	4	4	4	5	1	5	1	5	1
Standard Deviation	1.79	1.67	1.52	1.79	1.41	1.41	1.64	1.82	1.67	1.82	2.05	1.95	1.67
Sample Variance	3.2	2.8	2.3	3.2	2	2	2.7	3.3	2.8	3.3	4.2	3.8	2.8
Kurtosis	0.31	0.54	1.46	0.31	-1.75	-1.75	-1.69	-2.23	-0.61	-2.23	-3.16	-2.48	-0.61
Skewness	-1.26	-1.09	-1.12	-1.26	-0.88	-0.88	-0.52	-0.57	0.51	-0.57	-0.44	-0.76	0.51
Range	4	4	4	4	3	3	4	4	4	4	4	4	4
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	5	5	5	5	4	4	5	5	5	5	5	5	5
Sum	19	18	17	19	15	15	16	17	13	17	16	18	13
Count	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 81

Technical Writing Scale Skill Level Run 2

Competency	C29												C30					
Performance Statement	PS1		PS2		PS3	PS4		PS5		PS6	PS7		PS1		PS2		PS3	PS4
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
Variable ID	V309	V310	V311	V312	V313	V314	V315	V316	V317	V318	V319	V320	V321	V322	V323	V324	V325	V326
rater3	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1
rater4	5	4	5	5	5	4	5	4	4	4	5	5	5	4	5	5	5	4
rater5	1	1	1	1	1	2	2	2	1	1	1	1	5	3	3	1	2	1
rater1	5	4	5	5	2	4	5	5	5	5	2	5	2	4	5	5	5	3
rater2	5	4	5	5	2	4	5	5	5	5	2	5	2	4	5	5	5	5
Mean	3.4	2.8	3.4	3.4	2.2	3	3.6	3.4	3.2	3.2	2.2	3.4	3.2	3.4	4	3.4	3.6	2.8
Standard Error	0.98	0.73	0.98	0.98	0.73	0.63	0.87	0.81	0.92	0.92	0.73	0.98	0.73	0.40	0.63	0.98	0.87	0.80
Median	5	4	5	5	2	4	5	4	4	4	2	5	2	4	5	5	5	3
Mode	5	4	5	5	1	4	5	5	1	1	1	5	2	4	5	5	5	1
Standard Deviation	2.19	1.64	2.19	2.19	1.64	1.41	1.95	1.82	2.05	2.05	1.64	2.19	1.64	0.89	1.41	2.19	1.95	1.79
Sample Variance	4.8	2.7	4.8	4.8	2.7	2	3.8	3.3	4.2	4.2	2.7	4.8	2.7	0.8	2	4.8	3.8	3.2
Kurtosis	-3.33	-3.33	-3.33	-3.33	3.25	-1.75	-2.48	-2.23	-3.16	-3.16	3.25	-3.33	-3.33	0.31	-1.75	-3.33	-2.48	-2.32
Skewness	-0.61	-0.61	-0.61	-0.61	1.74	-0.88	-0.76	-0.57	-0.44	-0.44	1.74	-0.61	0.61	-1.26	-0.88	-0.61	-0.76	0.05
Range	4	3	4	4	4	3	4	4	4	4	4	4	3	2	3	4	4	4
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1
Maximum	5	4	5	5	5	4	5	5	5	5	5	5	5	4	5	5	5	5
Sum	17	14	17	17	11	15	18	17	16	16	11	17	16	17	20	17	18	14
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 81 (Cont.)

Technical Writing Scale Skill Level Run 2

Competency	C30				C31											C32		
Performance Statement	PS5		PS6		PS1			PS2			PS3		PS4	PS5	PS6	PS1		
Scale #	7	8	9	10	1	2	3	4	5	6	7	8	9	10	11	1	2	3
Variable ID	V327	V328	V329	V330	V331	V332	V333	V334	V335	V336	V337	V338	V339	V340	V341	V342	V343	V344
rater3	1	2	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1
rater4	4	4	5	4	5	5	5	5	5	5	5	5	5	4	5	5	5	5
rater5	1	1	1	1	2	2	2	1	2	2	1	1	1	1	1	1	2	1
rater1	3	2	5	4	5	5	4	4	5	4	5	5	5	4	5	5	5	5
rater2	5	2	5	4	5	5	5	4	5	4	5	5	5	4	1	5	5	5
Mean	2.8	2.2	3.4	2.8	3.8	3.8	3.6	3.2	3.8	3.4	3.6	3.6	3.4	2.8	2.6	3.4	3.6	3.4
Standard Error	0.80	0.49	0.98	0.73	0.73	0.73	0.68	0.73	0.73	0.60	0.87	0.87	0.98	0.73	0.98	0.98	0.87	0.98
Median	3	2	5	4	5	5	4	4	5	4	5	5	5	4	1	5	5	5
Mode	1	2	5	4	5	5	2	4	5	2	5	5	5	4	1	5	5	5
Standard Deviation	1.79	1.10	2.19	1.64	1.64	1.64	1.52	1.64	1.64	1.34	1.95	1.95	2.19	1.64	2.19	2.19	1.95	2.19
Sample Variance	3.2	1.2	4.8	2.7	2.7	2.7	2.3	2.7	2.7	1.8	3.8	3.8	4.8	2.7	4.8	4.8	3.8	4.8
Kurtosis	-2.32	2.92	-3.33	-3.33	-3.33	-3.33	-3.08	-1.69	-3.33	-2.41	-2.48	-2.48	-3.33	-3.33	-3.33	-3.33	-2.48	-3.33
Skewness	0.05	1.29	-0.61	-0.61	-0.61	-0.61	-0.32	-0.52	-0.61	-0.17	-0.76	-0.76	-0.61	-0.61	0.61	-0.61	-0.76	-0.61
Range	4	3	4	3	3	3	3	4	3	3	4	4	4	3	4	4	4	4
Minimum	1	1	1	1	2	2	2	1	2	2	1	1	1	1	1	1	1	1
Maximum	5	4	5	4	5	5	5	5	5	5	5	5	5	4	5	5	5	5
Sum	14	11	17	14	19	19	18	16	19	17	18	18	17	14	13	17	18	17
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 81 (Cont.)

Technical Writing Scale Skill Level Run 2

Competency	C32										C33					
Performance Statement	PS2	PS3		PS4		PS5			PS6		PS1	PS2	PS3	PS4		PS5
Scale #	4	5	6	7	8	9	10	11	12	13	1	2	3	4	5	6
Variable ID	V345	V346	V347	V348	V349	V350	V351	V352	V353	V354	V355	V356	V357	V358	V359	V360
rater3	1	1	2	2	1	1	1	1	2	2	4	4	4	4	4	4
rater4	4	5	5	3	4	4	4	4	5	5	4	5	5	5	5	5
rater5	1	3	3	1	1	1	1	3	3	3	5	1	1	3	3	3
rater1	5	5	5	3	5	4	5	5	5	5	5	5	5	5	5	5
rater2	5	5	5	5	4	4	4	5	5	5	5	5	1	5	5	5
Mean	3.2	3.8	4	2.8	3	2.8	3	3.6	4	4	4.6	4	3.2	4.4	4.4	4.4
Standard Error	0.92	0.80	0.63	0.66	0.84	0.73	0.84	0.75	0.63	0.63	0.24	0.77	0.92	0.40	0.40	0.40
Median	4	5	5	3	4	4	4	4	5	5	5	5	4	5	5	5
Mode	1	5	5	3	1	4	1	5	5	5	5	5	5	5	5	5
Standard Deviation	2.05	1.79	1.41	1.48	1.87	1.64	1.87	1.67	1.41	1.41	0.55	1.73	2.05	0.89	0.89	0.89
Sample Variance	4.2	3.2	2	2.2	3.5	2.7	3.5	2.8	2	2	0.3	3	4.2	0.8	0.8	0.8
Kurtosis	-3.16	0.31	-1.75	0.87	-2.90	-3.33	-2.90	0.54	-1.75	-1.75	-3.33	3.67	-3.16	0.31	0.31	0.31
Skewness	-0.44	-1.26	-0.88	0.55	-0.38	-0.61	-0.38	-1.09	-0.88	-0.88	-0.61	-1.92	-0.44	-1.26	-1.26	-1.26
Range	4	4	3	4	4	3	4	4	3	3	1	4	4	2	2	2
Minimum	1	1	2	1	1	1	1	1	2	2	4	1	1	3	3	3
Maximum	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5	5
Sum	16	19	20	14	15	14	15	18	20	20	23	20	16	22	22	22
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 82

Web Development and Administration Scale Skill Level Run 2

Competency	C34													C35		
Performance Statement	PS1	PS2	PS3		PS4	PS5		PS6		PS7				PS1		PS2
Scale #	1	2	3	4	5	6	7	8	9	10	11	12	13	1	2	3
Variable ID	V361	V362	V363	V364	V365	V366	V367	V368	V369	V370	V371	V372	V373	V374	V375	V376
rater3	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1
rater4	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5
rater5	1	2	2	2	1	2	3	2	2	2	2	1	1	1	2	1
rater1	5	2	5	5	5	5	5	5	5	5	4	5	5	5	5	5
rater2	5	2	5	5	5	5	5	5	5	5	4	5	5	5	5	5
Mean	3.4	2.4	3.8	3.8	3.6	3.8	4	3.8	3.8	3.8	3.2	3.6	3.6	3.4	3.6	3.4
Standard Error	0.98	0.68	0.73	0.73	0.87	0.73	0.63	0.73	0.73	0.73	0.49	0.87	0.87	0.98	0.87	0.98
Median	5	2	5	5	5	5	5	5	5	5	4	5	5	5	5	5
Mode	5	2	5	5	5	5	5	5	5	5	4	5	5	5	5	5
Standard Deviation	2.19	1.52	1.64	1.64	1.95	1.64	1.41	1.64	1.64	1.64	1.10	1.95	1.95	2.19	1.95	2.19
Sample Variance	4.8	2.3	2.7	2.7	3.8	2.7	2	2.7	2.7	2.7	1.2	3.8	3.8	4.8	3.8	4.8
Kurtosis	-3.33	3.72	-3.33	-3.33	-2.48	-3.33	-1.75	-3.33	-3.33	-3.33	-3.33	-2.48	-2.48	-3.33	-2.48	-3.33
Skewness	-0.61	1.75	-0.61	-0.61	-0.76	-0.61	-0.88	-0.61	-0.61	-0.61	-0.61	-0.76	-0.76	-0.61	-0.76	-0.61
Range	4	4	3	3	4	3	3	3	3	3	2	4	4	4	4	4
Minimum	1	1	2	2	1	2	2	2	2	2	2	1	1	1	1	1
Maximum	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5
Sum	17	12	19	19	18	19	20	19	19	19	16	18	18	17	18	17
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 82 (Cont.)

Web Development and Administration Scale Skill Level Run 2

Competency	C35										C36				
Performance Statement		PS3		PS4	PS5	PS6	PS7	PS8	PS9		PS1	PS2		PS3	
Scale #	4	5	6	7	8	9	10	11	12	13	1	2	3	4	5
Variable ID	V377	V378	V379	V380	V381	V382	V383	V384	V385	V386	V387	V388	V389	V390	V391
rater3	1	1	1	1	1	3	3	1	2	2	2	2	1	4	1
rater4	5	5	5	5	4	5	5	5	5	5	5	5	5	5	5
rater5	5	2	4	5	5	5	5	2	3	5	1	1	1	1	1
rater1	5	5	5	5	4	5	5	5	4	5	4	5	5	5	5
rater2	5	5	5	5	4	5	5	5	4	5	5	5	5	5	5
Mean	4.2	3.6	4	4.2	3.6	4.6	4.6	3.6	3.6	4.4	3.4	3.6	3.4	4	3.4
Standard Error	0.80	0.87	0.77	0.80	0.68	0.40	0.40	0.87	0.51	0.60	0.81	0.87	0.98	0.77	0.98
Median	5	5	5	5	4	5	5	5	4	5	4	5	5	5	5
Mode	5	5	5	5	4	5	5	5	4	5	5	5	5	5	5
Standard Deviation	1.79	1.95	1.73	1.79	1.52	0.89	0.89	1.95	1.14	1.34	1.82	1.95	2.19	1.73	2.19
Sample Variance	3.2	3.8	3	3.2	2.3	0.8	0.8	3.8	1.3	1.8	3.3	3.8	4.8	3	4.8
Kurtosis	5.00	-2.48	3.67	5.00	3.72	5.00	5.00	-2.48	-0.18	5.00	-2.23	-2.48	-3.33	3.67	-3.33
Skewness	-2.24	-0.76	-1.92	-2.24	-1.75	-2.24	-2.24	-0.76	-0.40	-2.24	-0.57	-0.76	-0.61	-1.92	-0.61
Range	4	4	4	4	4	2	2	4	3	3	4	4	4	4	4
Minimum	1	1	1	1	1	3	3	1	2	2	1	1	1	1	1
Maximum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Sum	21	18	20	21	18	23	23	18	18	22	17	18	17	20	17
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 82 (Cont.)

Web Development and Administration Scale Skill Level Run 2

Competency	C36				C37												C38	
Performance Statement	PS4			PS5	PS1	PS2	PS3	PS4	PS5	PS6				PS7	PS8		PS1	
Scale #	6	7	8	9	1	2	3	4	5	6	7	8	9	10	11	12	1	2
Variable ID	V392	V393	V394	V395	V396	V397	V398	V399	V400	V401	V402	V403	V404	V405	V406	V407	V408	V409
rater3	1	1	1	1	1	1	1	2	1	1	1	1	1	1	4	4	4	4
rater4	5	5	4	4	5	4	5	5	5	4	5	5	4	5	5	3	5	5
rater5	1	2	4	1	4	4	1	1	1	5	4	4	4	1	4	4	5	4
rater1	5	5	5	5	5	2	3	5	1	5	5	5	5	4	5	3	5	5
rater2	5	5	5	5	5	5	5	5	1	5	5	5	5	3	5	5	5	5
Mean	3.4	3.6	3.8	3.2	4	3.2	3	3.6	1.8	4	4	4	3.8	2.8	4.6	3.8	4.8	4.6
Standard Error	0.98	0.87	0.73	0.92	0.77	0.73	0.89	0.87	0.80	0.77	0.77	0.77	0.73	0.80	0.24	0.37	0.20	0.24
Median	5	5	4	4	5	4	3	5	1	5	5	5	4	3	5	4	5	5
Mode	5	5	4	1	5	4	1	5	1	5	5	5	4	1	5	4	5	5
Standard Deviation	2.19	1.95	1.64	2.05	1.73	1.64	2.00	1.95	1.79	1.73	1.73	1.73	1.64	1.79	0.55	0.84	0.45	0.55
Sample Variance	4.8	3.8	2.7	4.2	3	2.7	4	3.8	3.2	3	3	3	2.7	3.2	0.3	0.7	0.2	0.3
Kurtosis	-3.33	-2.48	3.25	-3.16	3.67	-1.69	-3.00	-2.48	5.00	3.67	3.67	3.67	3.25	-2.32	-3.33	-0.61	5.00	-3.33
Skewness	-0.61	-0.76	-1.74	-0.44	-1.92	-0.52	0.00	-0.76	2.24	-1.92	-1.92	-1.92	-1.74	0.05	-0.61	0.51	-2.24	-0.61
Range	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1	2	1	1
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	3	4	4
Maximum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Sum	17	18	19	16	20	16	15	18	9	20	20	20	19	14	23	19	24	23
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 82 (Cont.)

Web Development and Administration Scale Skill Level Run 2

Competency	C38						C39											
Performance Statement	PS2		PS3		PS4		PS1		PS2	PS3	PS4	PS5	PS6		PS7		PS8	
Scale #	3	4	5	6	7	8	1	2	3	4	5	6	7	8	9	10	11	12
Variable ID	V410	V411	V412	V413	V414	V415	V416	V417	V418	V419	V420	V421	V422	V423	V424	V425	V426	V427
rater3	4	4	4	4	4	4	1	1	4	1	1	4	4	4	4	4	4	4
rater4	5	5	5	5	5	3	5	5	4	5	4	4	4	5	5	5	5	5
rater5	4	4	4	4	5	5	5	5	5	4	5	4	5	5	5	5	5	5
rater1	5	5	5	5	5	3	2	5	4	5	5	3	5	5	4	5	5	5
rater2	5	5	5	5	5	3	2	3	5	5	5	1	3	5	4	5	5	5
Mean	4.6	4.6	4.6	4.6	4.8	3.6	3	3.8	4.4	4	4	3.2	4.2	4.8	4.4	4.8	4.8	4.8
Standard Error	0.24	0.24	0.24	0.24	0.20	0.40	0.84	0.80	0.24	0.77	0.77	0.58	0.37	0.20	0.24	0.20	0.20	0.20
Median	5	5	5	5	5	3	2	5	4	5	5	4	4	5	4	5	5	5
Mode	5	5	5	5	5	3	5	5	4	5	5	4	4	5	4	5	5	5
Standard Deviation	0.55	0.55	0.55	0.55	0.45	0.89	1.87	1.79	0.55	1.73	1.73	1.30	0.84	0.45	0.55	0.45	0.45	0.45
Sample Variance	0.3	0.3	0.3	0.3	0.2	0.8	3.5	3.2	0.3	3	3	1.7	0.7	0.2	0.3	0.2	0.2	0.2
Kurtosis	-3.33	-3.33	-3.33	-3.33	5.00	0.31	-2.90	0.31	-3.33	3.67	3.67	2.66	-0.61	5.00	-3.33	5.00	5.00	5.00
Skewness	-0.61	-0.61	-0.61	-0.61	-2.24	1.26	0.38	-1.26	0.61	-1.92	-1.92	-1.71	-0.51	-2.24	0.61	-2.24	-2.24	-2.24
Range	1	1	1	1	1	2	4	4	1	4	4	3	2	1	1	1	1	1
Minimum	4	4	4	4	4	3	1	1	4	1	1	1	3	4	4	4	4	4
Maximum	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5
Sum	23	23	23	23	24	18	15	19	22	20	20	16	21	24	22	24	24	24
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 82 (Cont.)

Web Development and Administration Scale Skill Level Run 2

Competency	C39		C40									C41				
Performance Statement	PS9		PS1	PS2	PS3		PS4	PS5		PS6		PS1		PS2		PS3
Scale #	13	14	1	2	3	4	5	6	7	8	9	1	2	3	4	5
Variable ID	V428	V429	V430	V431	V432	V433	V434	V435	V436	V437	V438	V439	V440	V441	V442	V443
rater3	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1
rater4	5	5	5	5	5	4	4	4	4	5	3	5	5	5	5	3
rater5	5	5	5	4	4	3	4	3	5	4	3	5	5	5	5	5
rater1	5	5	5	5	5	5	5	4	3	5	3	5	5	5	5	5
rater2	5	5	5	5	5	3	5	4	5	5	3	5	5	5	5	5
Mean	4.8	4.8	4.2	4	4	3.2	3.8	3.2	3.6	4	2.6	4.2	4.2	4.2	4.2	3.8
Standard Error	0.20	0.20	0.80	0.77	0.77	0.66	0.73	0.58	0.75	0.77	0.40	0.80	0.80	0.80	0.80	0.80
Median	5	5	5	5	5	3	4	4	4	5	3	5	5	5	5	5
Mode	5	5	5	5	5	3	4	4	5	5	3	5	5	5	5	5
Standard Deviation	0.45	0.45	1.79	1.73	1.73	1.48	1.64	1.30	1.67	1.73	0.89	1.79	1.79	1.79	1.79	1.79
Sample Variance	0.2	0.2	3.2	3	3	2.2	2.7	1.7	2.8	3	0.8	3.2	3.2	3.2	3.2	3.2
Kurtosis	5.00	5.00	5.00	3.67	3.67	0.87	3.25	2.66	0.54	3.67	5.00	5.00	5.00	5.00	5.00	0.31
Skewness	-2.24	-2.24	-2.24	-1.92	-1.92	-0.55	-1.74	-1.71	-1.09	-1.92	-2.24	-2.24	-2.24	-2.24	-2.24	-1.26
Range	1	1	4	4	4	4	4	3	4	4	2	4	4	4	4	4
Minimum	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	5	5	5	5	5	5	5	4	5	5	3	5	5	5	5	5
Sum	24	24	21	20	20	16	19	16	18	20	13	21	21	21	21	19
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 82 (Cont.)

Web Development and Administration Scale Skill Level Run 2

Competency	C41				
Performance Statement	PS4	PS5		PS6	
Scale #	6	7	8	9	10
Variable ID	V444	V445	V446	V447	V448
rater3	1	1	1	1	1
rater4	5	5	5	5	5
rater5	5	5	5	5	4
rater1	5	5	3	2	3
rater2	5	5	3	2	3
Mean	4.2	4.2	3.4	3	3.2
Standard Error	0.80	0.80	0.75	0.84	0.66
Median	5	5	3	2	3
Mode	5	5	5	5	3
Standard Deviation	1.79	1.79	1.67	1.87	1.48
Sample Variance	3.2	3.2	2.8	3.5	2.2
Kurtosis	5.00	5.00	-0.61	-2.90	0.87
Skewness	-2.24	-2.24	-0.51	0.38	-0.55
Range	4	4	4	4	4
Minimum	1	1	1	1	1
Maximum	5	5	5	5	5
Sum	21	21	17	15	16
Count	5	5	5	5	5

Table 83

Competency 4 and 7 Skill Level Run 3

Competency	C4										C7									
Performance Statement	PS1				PS2		PS3		PS4		PS1			PS2		PS3		PS4		PS5
Scale #	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Variable ID	V49	V50	V51	V52	V53	V54	V55	V56	V57	V58	V84	V85	V86	V87	V88	V89	V90	V91	V92	V93
rater3	5	1	5	1	5	1	1	1	5	5	2	5	4	4	5	3	5	5	5	5
rater4	5	5	5	5	5	5	5	5	5	5	2	5	4	4	5	3	5	5	5	5
rater5	5	3	5	3	5	3	3	3	5	5	2	5	4	4	5	5	5	5	5	5
rater2	5	3	5	3	5	3	3	3	5	5	2	5	4	4	4	3	5	5	5	5
rater1	5	5	5	5	5	5	5	5	5	5	2	5	1	4	5	5	5	5	5	5
Mean	5.00	3.40	5.00	3.40	5.00	3.40	3.40	3.40	5.00	5.00	2.00	5.00	3.40	4.00	4.80	3.80	5.00	5.00	5.00	5.00
Standard Error	0.00	0.75	0.00	0.75	0.00	0.75	0.75	0.75	0.00	0.00	0.00	0.00	0.60	0.00	0.20	0.49	0.00	0.00	0.00	0.00
Median	5	3	5	3	5	3	3	3	5	5	2	5	4	4	5	3	5	5	5	5
Mode	5	5	5	5	5	5	5	5	5	5	2	5	4	4	5	3	5	5	5	5
Standard Deviation	0.00	1.67	0.00	1.67	0.00	1.67	1.67	1.67	0.00	0.00	0.00	0.00	1.34	0.00	0.45	1.10	0.00	0.00	0.00	0.00
Sample Variance	0.00	2.80	0.00	2.80	0.00	2.80	2.80	2.80	0.00	0.00	0.00	0.00	1.80	0.00	0.20	1.20	0.00	0.00	0.00	0.00
Kurtosis	0.00	-0.61	0.00	-0.61	0.00	-0.61	-0.61	-0.61	0.00	0.00	0.00	0.00	5.00	0.00	5.00	-3.33	0.00	0.00	0.00	0.00
Skewness	0.00	-0.51	0.00	-0.51	0.00	-0.51	-0.51	-0.51	0.00	0.00	0.00	0.00	-2.24	0.00	-2.24	0.61	0.00	0.00	0.00	0.00
Range	0	4	0	4	0	4	4	4	0	0	0	0	3	0	1	2	0	0	0	0
Minimum	5	1	5	1	5	1	1	1	5	5	2	5	1	4	4	3	5	5	5	5
Maximum	5	5	5	5	5	5	5	5	5	5	2	5	4	4	5	5	5	5	5	5
Sum	25	17	25	17	25	17	17	17	25	25	10	25	17	20	24	19	25	25	25	25
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Sum	17	17	17	17	16	19	18	18	18	20	16	16	21	14
Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 84

Skill Level Scale Confidence Interval Run 1-3

	Run 1					Run 2			Run 3		
Factor	Mean	Std. Dev	Std Error	Lower Bound	Upper Bound	Mean	Lower	Upper	Mean	Lower	Upper
1	1.99	0.35	0.16	1.73	2.25	2.77	-1.03	0.51			
2	3.10	1.08	0.48	2.31	3.89	4.03	-1.73	0.14			
3	3.00	0.29	0.13	2.79	3.21	3.94	-1.15	0.73			
4	2.42	0.73	0.33	1.88	2.96	3.68	-1.80	0.72	4.20	-2.32	1.24
5	1.91	0.72	0.32	1.38	2.45	3.01	-1.63	0.57			
6	9.09	0.49	0.22	8.73	9.45	9.76	-1.03	0.31			
7	2.20	0.52	0.23	1.82	2.58	3.06	-1.24	0.48	3.72	-1.90	1.14
8	2.11	0.96	0.43	1.41	2.81	2.64	-1.23	-0.18			
9	2.30	0.82	0.37	1.70	2.90	2.70	-1.00	-0.20			
10	2.60	0.79	0.36	2.01	3.18	3.13	-1.12	-0.05			
11	3.04	0.59	0.26	2.61	3.47	3.56	-0.95	0.09			
12	2.00	0.58	0.26	1.57	2.43	2.68	-1.11	0.25			
13	2.65	0.61	0.27	2.20	3.10	3.28	-1.07	0.18			
14	2.34	0.85	0.38	1.71	2.96	3.16	-1.45	0.20			
15	2.31	0.68	0.31	1.81	2.81	3.67	-1.86	0.85			
16	1.77	0.61	0.27	1.32	2.21	3.43	-2.11	1.22			
17	1.93	0.93	0.41	1.25	2.61	3.60	-2.35	0.99			
18	2.51	0.99	0.45	1.78	3.24	3.59	-1.81	0.34			
19	2.61	0.55	0.25	2.21	3.02	3.33	-1.12	0.31			
20	2.33	0.79	0.35	1.76	2.91	3.36	-1.60	0.44			
21	3.25	1.02	0.46	2.50	4.00	3.92	-1.42	-0.09			
22	3.13	1.46	0.65	2.06	4.21	4.00	-1.94	-0.21			
23	2.88	0.81	0.36	2.28	3.47	3.72	-1.44	0.25			
24	2.64	0.90	0.40	1.98	3.31	3.47	-1.49	0.17			
25	2.65	0.88	0.39	2.01	3.30	3.45	-1.45	0.16			
26	2.69	0.63	0.28	2.23	3.15	3.15	-0.92	-0.01			
27	2.36	1.08	0.48	1.57	3.15	3.50	-1.93	0.35			
28	2.48	0.83	0.37	1.87	3.08	3.28	-1.41	0.19			
29	2.47	1.14	0.51	1.63	3.31	3.10	-1.47	-0.21			
30	2.58	1.25	0.56	1.66	3.50	3.07	-1.41	-0.43			
31	2.38	1.00	0.45	1.65	3.12	3.51	-1.86	0.39			
32	2.42	1.35	0.60	1.42	3.41	3.43	-2.01	0.02			
33	2.67	1.03	0.46	1.91	3.43	4.17	-2.26	0.74			
34	2.52	1.32	0.59	1.55	3.49	3.59	-2.03	0.09			
35	2.85	1.27	0.57	1.92	3.78	3.87	-1.950	0.09			
36	2.58	1.04	0.46	1.82	3.34	3.62	-1.81	0.28			

37	2.60	0.80	0.36	2.01	3.19	3.55	-1.54	0.36
38	3.88	0.73	0.33	3.34	4.41	4.53	-1.19	0.11
39	3.90	0.73	0.33	3.36	4.44	4.27	-0.91	-0.17
40	3.47	1.13	0.51	2.63	4.30	3.62	-0.99	-0.68
41	3.33	1.49	0.67	2.24	4.43	3.82	-1.59	-0.61

Table 85

Factor 4 and 7 Comparisons Skill Level Run 1

Competency	C4										C7									
Performance Statement	PS1				PS2		PS3		PS4		PS1			PS2		PS3		PS4		PS5
Scale #	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Variable ID	V49	V50	V51	V52	V53	V54	V55	V56	V57	V58	V84	V85	V86	V87	V88	V89	V90	V91	V92	V93
rater3	3	2	3	3	3	2	3	3	3	3	3	2	3	3	3	3	3	3	3	2
rater4	3	3	1	1	2	2	3	3	3	3	1	2	2	2	2	2	2	2	1	2
rater5	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	3	3	2	3
rater2	3	2	2	3	3	3	2	2	3	3	2	1	2	1	2	3	2	2	2	3
rater1	2	3	3	3	3	3	3	3	4	4	3	3	2	2	3	2	3	3	3	3
Mean	2.40	2.20	2.00	2.20	2.40	2.20	2.60	2.60	2.80	2.80	2.00	1.80	2.00	1.80	2.20	2.20	2.60	2.60	2.20	2.60

Table 86

Factor 4 and 7 Comparisons Skill Level Run 2

Competency	C4										C7									
Performance Statement	PS1				PS2		PS3		PS4		PS1			PS2		PS3		PS4		PS5
Scale #	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Variable ID	V49	V50	V51	V52	V53	V54	V55	V56	V57	V58	V84	V85	V86	V87	V88	V89	V90	V91	V92	V93
rater3	3	3	3	2	3	3	4	4	4	4	1	1	1	1	1	3	1	1	1	1
rater4	5	5	5	5	5	5	5	5	5	4	5	4	4	4	5	4	5	5	5	5
rater5	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1
rater2	5	3	5	3	5	3	3	3	5	5	2	5	4	4	5	5	5	5	5	5
rater1	5	5	5	5	5	5	5	5	5	5	2	5	3	4	3	3	5	5	5	5
Mean	3.80	3.40	3.80	3.20	3.80	3.40	3.80	3.80	4.00	3.80	2.20	3.20	2.60	2.80	3.00	3.20	3.40	3.40	3.40	3.40

Table 87

Factor 4 and 7 Comparisons Skill Level Run 3

Competency	C4										C7									
Performance Statement		PS1				PS2		PS3		PS4		PS1			PS2		PS3		PS4	PS5
Scale #	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Variable ID	V49	V50	V51	V52	V53	V54	V55	V56	V57	V58	V84	V85	V86	V87	V88	V89	V90	V91	V92	V93
rater3	5	1	5	1	5	1	1	1	5	5	2	5	4	4	5	3	5	5	5	5
rater4	5	5	5	5	5	5	5	5	5	5	2	5	4	4	5	3	5	5	5	5
rater5	5	3	5	3	5	3	3	3	5	5	2	5	4	4	5	5	5	5	5	5
rater2	5	3	5	3	5	3	3	3	5	5	2	5	4	4	4	3	5	5	5	5
rater1	5	5	5	5	5	5	5	5	5	5	2	5	1	4	5	5	5	5	5	5
Mean	5.00	3.40	5.00	3.40	5.00	3.40	3.40	3.40	5.00	5.00	2.00	5.00	3.40	4.00	4.80	3.80	5.00	5.00	5.00	5.00

Table 88

Reliability Coefficients Skill Level Scale Run 1-3

	Factor	Run 1	Run 2	Run 3
PF Scale	1	.80	.99	
	2	.92	.34	
	3	-.35	.65	
	4	.94	.98	NA
	5	.92	1.00	
PA Scale	6	.88	.98	
	7	.86	.98	NA
	8	.96	.98	
	9	.93	.91	
	10	.96	.98	
	11	.75	.93	
	12	.64	.96	
DD Scale	13	.79	.96	
	14	.97	.99	
	15	.93	.99	
	16	.97	.98	
	17	.92	1.00	
	18	.98	.99	
IM Scale	19	.91	.97	
	20	.91	.98	
	21	.95	.96	
	22	.97	1.00	
	23	.98	1.00	
DM Scale	24	.97	.99	
	25	.98	1.00	
	26	.93	.98	
	27	.97	.96	
	28	.97	.99	
TW Scale	29	.98	.99	
	30	.98	.95	
	31	.97	.99	
	32	.99	.99	
	33	.92	.92	
WDA Scale	34	.99	.99	
	35	.99	.98	
	36	.94	.98	
	37	.92	.93	
	38	.94	.71	
	39	.95	.88	
	40	.99	.98	
	41	.99	.98	

Table 89

PF Scale: Pilot Study Factor Loadings.

C	PS	SI	Var #	Rho
1	1	1	1	.83
		2	2	.96
		3	3	.86
	2	4	4	.98
		5	5	.94
	3	6	6	.61
		7	7	.25
	4	8	8	.57
		9	9	.38
	5	10	10	.42
		11	11	.36
	6	12	12	.50
		13	13	.27
		14	14	.62
	7	15	15	.73
		16	16	.66
	8	17	17	.61
		18	18	.45
	9	19	19	.61
		20	20	.28
		21	21	-.07
		22	22	.45
		23	23	.26
2	1	1	24	.48
		2	25	1.00
		3	26	.51
	2	4	27	.00
	3	5	28	.13
		6	29	.82
3	1	1	30	.63
	2	2	31	.53
		3	32	.54
	3	4	33	.12
		5	34	.50
		6	35	.66
	4	7	36	.35
		8	37	.34
	5	9	38	.93
		10	39	.89

		11	40	.45
4	1	1	41	.60
		2	42	.99
		3	43	.68
		4	44	.89
	2	5	45	.61
		6	46	.94
	3	7	47	.61
		8	48	.57
	4	9	49	.18
		10	50	.17
5	1	1	51	.92
		2	52	.96
	2	3	53	.91
		4	54	.60
	3	5	55	.97
		6	56	1.00
	4	7	57	.96
		8	58	.29
		9	59	.98
		10	60	.31
		11	61	.96
	5	12	62	.12
		13	63	.01
		14	64	-.14

Table 90

PA Scale: Pilot Study Factor Loadings.

C	PS	SI	Var #	Rho
6	1	1	65	.12
		2	66	-.06
	2	3	67	.98
		4	68	1.00
	3	5	69	-.45
		6	70	.02
	4	7	71	.36
	5	8	72	-.04
		9	73	.36
	6	10	74	-.08
		11	75	-.33
7	1	1	76	-.25
	2	2	77	.47
	3	3	78	.12
	4	4	79	-.10
		5	80	.47
		6	81	.70
	5	7	82	.96
		8	83	.99
		9	84	.99
		10	85	.96
8	1	1	86	.19
		2	87	-.51
	2	3	88	-.10
		4	89	-.22
		5	90	-.61
	3	6	91	.96
		7	92	1.00
	4	8	93	.94
		9	94	.27
	5	10	95	-.70
		11	96	.64
9	1	1	97	-.60
		2	98	-.42
		3	99	.60
	2	4	100	.78
		5	101	1.00
		6	102	.91
10	1	1	103	.97

		2	104	.81
		3	105	.83
		4	106	1.00
	2	5	107	.97
		6	108	.84
	3	7	109	.84
		8	110	.72
	4	9	111	.73
		10	112	.69
	5	11	113	.47
		12	114	.37
11	1	1	115	-.11
		2	116	.00
	2	3	117	.97
	3	4	118	.98
		5	119	.98
12	1	1	120	.87
	2	2	121	.69
	3	3	122	.78
	4	4	123	.96

Table 91

DD Scale: Pilot Study Factor Loadings.

C	PS	SI	Var #	Rho
13	1	1	124	1.00
		2	125	.74
		3	126	.77
	2	4	127	.80
		5	128	.77
	3	6	129	.95
		7	130	.95
	4	8	131	-.24
14	1	1	132	.94
		2	133	.53
	2	3	134	.96
		4	135	.71
		5	136	.47
	3	6	137	.96
	4	7	138	.29
		8	139	1.00
	5	9	140	.04
		10	141	.99
	6	11	142	.98
		12	143	.93
	7	13	144	.62
		14	145	.86
	8	15	146	.80
		16	147	.57
15	1	1	148	.92
		2	149	.92
	2	3	150	.66
		4	151	.34
	3	5	152	.27
		6	153	.28
	4	7	154	.31
		8	155	.31
	5	9	156	.48
16	1	1	157	.93
		2	158	1.00
		3	159	.95
		4	160	.91
	2	5	161	.56
	3	6	162	.86

17	1	1	163	.87
	2	2	164	.95
	3	3	165	.98
18	1	1	166	.90
	2	2	167	.27
		3	168	.33
	3	4	169	.91
		5	170	.55
	4	6	171	.85
		7	172	.55
	5	8	173	.75
		9	174	.38
	6	10	175	.82
	7	11	176	.17
		12	177	.76
	8	13	178	.67
	9	14	179	.81
		15	180	.94
		16	181	.39

Table 92

IM Scale: Pilot Study Factor Loadings

C	PS	SI	Var #	Rho
19	1	1	182	.04
	2	2	183	.35
	3	3	184	.91
	4	4	185	.56
	5	5	186	.88
		6	187	.75
		7	188	.79
	6	8	189	.86
	7	9	190	.84
		10	191	.84
		11	192	.80
	8	12	193	.47
	9	13	194	.93
		14	195	.70
		15	196	.75
	10	16	197	.30
20	1	1	198	.85
	2	2	199	.84
	3	3	200	.84
	4	4	201	.86
	5	5	202	.88
	6	6	203	.85
		7	204	.55
		8	205	.73
	7	9	206	.92
21	1	1	207	.88
	2	2	208	.95
		3	209	.92
	3	4	210	.67
	4	5	211	.93
	5	6	212	.89
		7	213	.70
		8	214	.84
	6	9	215	.83
	7	10	216	.96
	8	11	217	.88
		12	218	.87
22	1	1	219	.98
		2	220	.97

	2	3	221	.97
		4	222	.90
	3	5	223	.99
		6	224	.86
23	1	1	225	.67
		2	226	.71
	2	3	227	.94
		4	228	.88
	3	5	229	.73
		6	230	.96
	4	7	231	.89
		8	232	.91
	5	9	233	.92
		10	234	.89
		11	235	.96
		12	236	.96
	6	13	237	.87

Table 93

DM Scale: Pilot Study Factor Loadings

C	PS	SI	Var #	Rho
24	1	1	238	.60
24	2	2	239	.04
24	3	3	240	.70
24	3	4	241	.80
24	3	5	242	.80
24	4	6	243	.90
24	5	7	244	.90
24	6	8	245	.85
24	6	9	246	.85
24	7	10	247	.92
24	7	11	248	.60
24	8	12	249	.13
24	8	13	250	.91
24	8	14	251	.85
25	1	1	252	.92
25	1	2	253	.93
25	2	3	254	.91
25	2	4	255	.87
25	3	5	256	.85
25	3	6	257	.93
25	4	7	258	.92
25	4	8	259	.91
25	5	9	260	.89
25	5	10	261	.95
25	5	11	262	.90
25	6	12	263	.89
25	6	13	264	.93
25	7	14	265	.80
25	8	15	266	.81
26	1	1	267	.93
26	1	2	268	.67
26	1	3	269	.87
26	2	4	270	.81
26	3	5	271	.71
26	4	6	272	.87
26	4	7	273	.48
26	5	8	274	.93
26	6	9	275	.45
26	7	10	276	.90

	8	11	277	.77
27	1	1	278	.84
		2	279	.93
		3	280	.90
	2	4	281	.48
		5	282	.72
	3	6	283	.70
	4	7	284	.85
		8	285	.78
	5	9	286	.85
	6	10	287	.63
28	1	1	288	.96
		2	289	.94
	2	3	290	.86
		4	291	.85
	3	5	292	.89
		6	293	.90
		7	294	.79
	4	8	295	.94
		9	296	.87
	5	10	297	.95
		11	298	.86
		12	299	.87
		13	300	.81

Table 94

TW Scale: Pilot Study Factor Loadings

C	PS	SI	Var #	Rho
29	1	1	301	.76
	2	2	302	.79
		3	303	.81
		4	304	.95
	3	5	305	-223.00
	4	6	306	.62
		7	307	.97
	5	8	308	.96
		9	309	.74
		10	310	.90
	6	11	311	-.14
	7	12	312	.85
30	1	1	313	-.37
	2	2	314	.81
		3	315	.84
	3	4	316	.83
		5	317	.89
	4	6	318	.53
	5	7	319	.60
		8	320	.22
	6	9	321	.79
		10	322	.67
31	1	1	323	.88
		2	324	.95
	2	3	325	.83
		4	326	.73
		5	327	.87
		6	328	.80
	3	7	329	.93
		8	330	.93
	4	9	331	.86
	5	10	332	.50
	6	11	333	.02
32	1	1	334	.91
		2	335	.87
		3	336	.97
	2	4	337	.74
	3	5	338	.89
		6	339	.78

	4	7	340	.51
	5	8	341	.77
		9	342	.71
		10	343	.74
	6	11	344	.94
		12	345	.92
		13	346	.88
33	1	1	347	.83
	2	2	348	.92
	3	3	349	-.05
	4	4	350	.70
		5	351	.95
	5	6	352	.83

Table 95

WDA Scale: Pilot Study Factor Loadings

C	PS	SI	Var #	Rho
34	1	1	353	.72
	2	2	354	-.13
	3	3	355	.91
		4	356	.86
		5	357	.66
	4	6	358	.66
		7	359	.87
	5	8	360	.86
		9	361	.98
	6	10	362	.85
		11	363	.49
	7	12	364	.84
		13	365	.92
35	1	1	366	.90
		2	367	.99
	2	3	368	.86
	3	4	369	.94
		5	370	.95
		6	371	.97
	4	7	372	.85
	5	8	373	.43
		9	374	.87
	6	10	375	.93
	7	11	376	.97
	8	12	377	.41
	9	13	378	.91
36	1	1	379	.89
	2	2	380	.93
	3	3	381	.81
		4	382	.57
	4	5	383	.89
		6	384	.86
	5	7	385	.95
		8	386	.74
	6	9	387	.85
37	1	1	388	.85
	2	2	389	.81
	3	3	390	.28
	4	4	391	.83

		5	392	.03
	5	6	393	.46
		7	394	.83
	6	8	395	.91
		9	396	.80
	7	10	397	.73
		11	398	.84
	8	12	399	.56
38	1	1	400	.85
		2	401	.92
	2	3	402	.92
		4	403	.95
	3	5	404	.95
		6	405	.89
	4	7	406	.92
		8	407	.64
39	1	1	408	.14
		2	409	.87
	2	3	410	.77
	3	4	411	.90
	4	5	412	.90
	5	6	413	.06
		7	414	.68
	6	8	415	.95
		9	416	.71
	7	10	417	.80
		11	418	.94
	8	12	419	.93
	9	13	420	.89
		14	421	.86
40	1	1	422	.94
	2	2	423	.97
	3	3	424	.93
		4	425	.69
	4	5	426	.75
	5	6	427	.62
		7	428	.95
	6	8	429	.98
		9	430	.61
41	1	1	431	.94
		2	432	.98
	2	3	433	.96
		4	434	.96
	3	5	435	.86
	4	6	436	.95

	5	7	437	.89
		8	438	.86
	6	9	439	.39
		10	440	.80

Table 96

Pilot Study Scale Reliability Coefficients

	Sample	13
	Factor	Alpha
PF Scale	1	.99
	2	.34
	3	.65
	4	.98
	5	1.00
PA Scale	6	.98
	7	.98
	8	.98
	9	.91
	10	.98
	11	.93
	12	.96
DD Scale	13	.96
	14	.99
	15	.99
	16	.98
	17	1.00
	18	.99
IM Scale	19	.97
	20	.98
	21	.96
	22	1.00
	23	1.00
DM Scale	24	.99
	25	1.00
	26	.98
	27	.96
	28	.99
TW Scale	29	.99
	30	.95
	31	.99
	32	.99
	33	.82
WDA Scale	34	.99
	35	.98
	36	.98
	37	.93
	38	.71

	39	.88
	40	.98
	41	.98

Table 97

PF Scale: Validation Study A&B Factor Loadings and Test-Retest Reliability Coefficients

C	PS	SI	Var #	Pilot Rho	Valid Rho	T/RT Alpha
1	1	1	1	.83	.63	.76
		2	2	.96	.79	.76
		3	3	.86	.65	.70
	2	4	4	.98	.47	.76
		5	5	.94	.58	.89
	3	6	6	.61	.73	.70
	4	8	8	.57	.24	.24
	5	10	10	.42	.13	.56
	6	12	12	.50	.76	.20
		14	14	.62	.08	.40
	7	15	15	.73	.82	.74
		16	16	.66	.87	.67
	8	17	17	.61	.60	.29
		18	18	.45	.94	.30
	9	19	19	.61	.67	.44
		22	22	.45	.10	.40
2	1	1	24	.48	.30	.54
		2	25	1.00	1.00	.49
		3	26	.51	.10	.29
	3	6	29	.82	.73	.42
3	*1	1	30	.63	.32	.46
	2	2	31	.53	.53	.70
		3	32	.54	.40	.57
	3	5	34	.50	.42	.86
		6	35	.66	.48	.68
	5	9	38	.93	.80	.75
		10	39	.89	.47	.44
		11	40	.45	.81	.74
4	1	1	41	.60	.46	.77
		2	42	.99	.79	.60
		3	43	.68	.53	.78
		4	44	.89	.72	.54
	2	5	45	.61	.50	.85
		6	46	.94	.76	.57
	3	7	47	.61	.83	.80
		8	48	.57	.78	.75
5	1	1	51	.92	.80	.73
		2	52	.96	.80	.89

	2	3	53	.91	.81	.76
		4	54	.60	.05	.34
	3	5	55	.97	.84	.80
		6	56	1.00	.93	.88
	4	7	57	.96	.92	.79
		9	59	.98	.89	.84
		11	61	.96	.81	.79

* denotes that item has been earmarked as a watch item during future validity and reliability studies.

Table 98

PA Scale: Validation Study A&B Factor Loadings and Test-Retest Reliability Coefficients

C	PS	SI	Var #	Pilot Rho	Valid Rho	T/RT Alpha
6	2	3	67	.98	.97	.28
		4	68	1.00	.97	.34
7	2	2	77	.47	.51	.54
	4	5	80	.47	.45	.56
		*6	81	.70	.35	.43
	5	7	82	.96	.96	.69
		8	83	.99	.96	.80
		9	84	.99	.78	.74
		10	85	.96	.79	.72
8	3	6	91	.96	.93	.38
		7	92	1.00	.98	.35
	4	8	93	.94	.87	.31
	5	11	94	.64	.53	.33
9	1	3	96	.60	.41	.59
	2	4	100	.78	.46	.54
		5	101	1.00	.67	.73
		6	102	.91	.91	.85
10	1	1	103	.97	.45	.58
		2	104	.81	.70	.20
		*3	105	.83	.38	.55
		*4	106	1.00	.32	.44
	2	5	107	.97	.87	.07
		6	108	.84	.90	.00
	3	7	109	.84	.86	.30
		8	110	.72	.92	-.06
	4	9	111	.73	.46	.78
		*10	112	.69	.39	.73
	5	11	113	.47	.44	.28
		12	114	.37	.82	.37
11	2	3	117	.97	.91	.76
	3	4	118	.98	.94	.54
		5	119	.98	.91	.48
12	1	1	120	.87	.77	.32
	2	2	121	.69	.06	-.07
	3	3	122	.78	.61	.29
	*4	4	123	.96	.39	.49

* denotes that item has been earmarked as a watch item during future validity and reliability studies.

Table 99

DD Scale: Validation Study A&B Factor Loadings and Test-Retest Reliability Coefficients

C	PS	SI	Var #	Pilot Rho	Valid Rho	T/RT Alpha
13	1	1	124	1.00	.73	.69
		2	125	.74	.68	.75
		3	126	.77	.60	.69
	2	4	127	.80	.78	.78
		5	128	.77	.70	.90
	3	6	129	.95	.81	.79
		7	130	.95	.74	.93
14	1	1	132	.94	.92	.87
		2	133	.53	.01	.51
	2	3	134	.96	.93	.92
		4	135	.71	.59	.67
		5	136	.47	.00	.22
	3	6	137	.96	.92	.94
	4	8	139	1.00	.97	.93
	5	10	141	.99	.89	.93
	6	11	142	.98	.97	.88
		12	143	.93	.95	.79
	7	13	144	.62	.54	.79
		*14	145	.86	.31	.71
	8	15	146	.80	.42	.40
		16	147	.57	.11	.57
15	1	1	148	.92	.95	.40
		2	149	.92	.93	.58
	2	3	150	.66	.63	.57
	5	9	156	.48	.30	.66
16	1	1	157	.93	.96	.42
		2	158	1.00	.87	.85
		3	159	.95	1.00	.82
		4	160	.91	.85	.83
	*2	5	161	.56	.33	.79
	3	6	162	.86	.77	.67
17	1	1	163	.87	.96	.72
	2	2	164	.95	.99	.75
	3	3	165	.98	.97	.63
18	1	1	166	.90	.60	.72
	3	4	169	.91	.81	.71

		5	170	.55	.05	.38
	4	6	171	.85	.89	.75
		7	172	.55	.01	.25
	5	8	173	.75	.84	.79
	6	10	175	.82	.74	.78
	7	12	177	.76	.76	.81
	8	13	178	.67	.05	.10
	9	14	179	.81	.71	.95
		15	180	.94	.75	.95

* denotes that item has been earmarked as a watch item during future validity and reliability studies.

Table 100

IM Scale: Validation Study A&B Factor Loadings and Test-Retest Reliability Coefficients

C	PS	SI	Var #	Pilot Rho	Valid Rho	T/RT Alpha
19	*3	3	184	.91	.39	.72
	4	4	185	.56	.65	.85
	5	5	186	.88	.76	.65
		6	187	.75	.14	.67
		7	188	.79	.47	.69
	6	8	189	.86	.56	.75
	7	9	190	.84	.84	.91
		10	191	.84	.50	.28
		11	192	.80	.81	.75
	8	12	193	.47	.01	.67
	9	13	194	.93	.59	.88
		*14	195	.70	.32	.84
		15	196	.75	.13	.42
20	1	1	198	.85	.66	.68
	2	2	199	.84	.29	.45
	3	3	200	.84	.24	.57
	4	4	201	.86	.45	.64
	5	5	202	.88	.78	.78
	6	6	203	.85	.64	.75
		7	204	.55	.03	.59
		8	205	.73	.66	.63
	7	9	206	.92	.48	.62
21	1	1	207	.88	.29	.32
	2	2	208	.95	.76	.88
		3	209	.92	.55	.86
	3	4	210	.67	.01	.31
	4	5	211	.93	.67	.68
	5	6	212	.89	.29	.46
		7	213	.70	.22	.65
		8	214	.84	.27	.59
	6	9	215	.83	.76	.75
	7	10	216	.96	.79	.86
	8	*11	217	.88	.38	.76
		12	218	.87	.47	.51
22	1	1	219	.98	.97	.78
		2	220	.97	.95	.80
	2	3	221	.97	.94	.76
		4	222	.91	.96	.83

	3	5	223	.99	.93	.85
		6	224	.86	.91	.72
23	1	1	225	.67	.60	.94
		2	226	.71	.60	.93
	2	3	227	.94	.74	.77
		4	228	.88	.76	.74
	3	5	229	.73	.66	.85
		6	230	.96	.89	.82
	4	7	231	.89	.86	.77
		8	232	.91	.86	.67
	5	9	233	.92	.92	.68
		10	234	.89	.93	.86
		11	235	.96	.87	.78
		12	236	.96	.91	.79
	6	13	237	.87	.59	.93

* denotes that item has been earmarked as a watch item during future validity and reliability studies.

Table 101

DM Scale: Validation Study A&B Factor Loadings and Test-Retest Reliability Coefficients

C	PS	SI	Var #	Pilot Rho	Valid Rho	T/RT Alpha
24	1	1	238	.60	.57	.87
	3	3	240	.70	.87	.91
		4	241	.80	.27	.22
		5	242	.80	.77	.89
	4	6	243	.90	.86	.88
	5	7	244	.90	.76	.86
	6	8	245	.85	.26	.40
		9	246	.85	.28	.47
	7	10	247	.92	.79	.90
		11	248	.60	.25	.37
	8	13	250	.91	.81	.83
		14	251	.85	.65	.84
25	1	1	252	.92	.79	.85
		2	253	.93	.79	.86
	2	3	254	.91	.75	.89
		4	255	.87	.71	.85
	3	5	256	.85	.86	.86
		6	257	.93	.94	.97
	4	7	258	.92	.84	.89
		8	259	.92	.71	.91
	5	9	260	.89	.82	.87
		10	261	.95	.74	.90
		11	262	.90	.92	.92
	6	12	263	.89	.90	.87
		13	264	.93	.91	.90
	7	14	265	.80	.59	.63
	8	15	266	.81	.52	.79
26	1	1	267	.93	.95	.82
		2	268	.67	.83	.85
		3	269	.87	.90	.88
	2	4	270	.81	.85	.89
	3	5	271	.71	.73	.59
	4	6	272	.87	.93	.80
		7	273	.48	.02	.49
	5	8	274	.93	.58	.40
	6	9	275	.45	.07	.67

APPENDIX C: PERMISSION TO USE PREMISES, NAMES, AND SUBJECTS O

ORGANIZATION

	7	10	276	.90	.79	.69
	8	11	277	.77	.17	.45
27	1	1	278	.84	.95	.84
		2	279	.93	.95	.92
		3	280	.90	.99	.94
	2	4	281	.48	.25	.50
		5	282	.72	.65	.91
	3	6	283	.70	.21	.50
	4	7	284	.85	.48	.81
		8	285	.78	.57	.85
	5	9	286	.85	.28	.67
	6	10	287	.63	.53	.60
28	1	1	288	.96	.72	.89
		2	289	.94	.87	.88
	2	3	290	.86	.63	.53
		4	291	.85	.76	.83
	3	5	292	.89	.77	.62
		6	293	.90	.84	.71
		7	294	.79	.60	.72
	4	8	295	.94	.89	.88
		9	296	.87	.25	.80
	5	10	297	.95	.84	.96
		11	298	.86	.64	.88
		12	299	.87	.85	.80
		*13	300	.81	.34	.61

* denotes that item has been earmarked as a watch item during future validity and reliability studies.

Table 102

TW Scale: Validation Study A&B Factor Loadings and Test-Retest Reliability Coefficients

C	PS	SI	Var #	Pilot Rho	Valid Rho	T/RT Alpha
29	1	1	301	.76	.42	.83
	2	2	302	.79	.29	.39
		3	303	.81	.53	.77
		4	304	.95	.88	.80
	4	6	306	.62	.54	.55
		7	307	.97	.86	.92
	5	8	308	.96	.94	.84
		9	309	.74	.82	.86
		10	310	.90	.96	.81
	7	12	312	.85	.90	.91
30	2	2	314	.81	.79	.80
		3	315	.84	.65	.96
	3	4	316	.83	.86	.80
		5	317	.89	.94	.84
	4	6	318	.53	.17	.80
	5	7	319	.60	.16	.82
	6	9	321	.79	.63	.87
		10	322	.67	.74	.75
31	1	1	323	.88	.92	.90
		2	324	.95	.92	.93
	2	3	325	.83	.84	.87
		4	326	.73	.82	.69
		5	327	.87	.72	.67
		6	328	.80	.73	.68
	3	7	329	.93	.89	.85
		8	330	.93	.89	.93
	4	9	331	.86	.91	.95
	5	10	332	.50	.73	.57
32	1	1	334	.91	.88	.87
		2	335	.87	.78	.93
		3	336	.97	.84	.78
	2	4	337	.74	.81	.86
	3	5	338	.89	.85	.92
		6	339	.78	.78	.95
	4	7	340	.51	.25	.64

	5	*8	341	.77	.37	.72
		9	342	.71	.29	.66
		10	343	.74	.26	.47
	6	11	344	.94	.65	.90
		12	345	.92	.87	.96
		13	346	.88	.86	.98
33	1	1	347	.83	.46	.70
	2	2	348	.92	.78	.79
	4	4	350	.70	.26	.56
		5	351	.95	.90	.65
	5	6	352	.83	.93	.80

* denotes that item has been earmarked as a watch item during future validity and reliability studies.

Table 103

WDA Scale: Validation Study A&B Factor Loadings and Test-Retest Reliability Coefficients

C	PS	SI	Var #	Pilot Rho	Valid Rho	T/RT Alpha
34	1	1	353	.72	.71	.85
	3	3	355	.91	.82	.67
		4	356	.86	.79	.75
		5	357	.66	.24	.67
	4	6	358	.66	.24	.66
		7	359	.87	.83	.88
	5	8	360	.86	.84	.89
		9	361	.98	.90	.83
	6	10	362	.85	.88	.91
		11	363	.49	.69	.74
	7	12	364	.84	.79	.88
		13	365	.92	.82	.723
35	1	1	366	.90	.85	.93
		2	367	.99	.93	.90
	2	3	368	.86	.86	.78
	3	4	369	.94	.95	.91
		5	370	.95	.95	.93
		6	371	.97	.95	.86
	4	7	372	.85	.87	.91
	5	8	373	.43	.73	.78
		9	374	.87	.92	.96
	6	10	375	.93	.87	.82
	7	11	376	.97	.84	.80
	8	12	377	.41	.60	.87
	9	13	378	.91	.80	.90
36	1	1	379	.89	.88	.91
	2	2	380	.93	.84	.80
	3	3	381	.81	.77	.94
		4	382	.57	.28	.63
	4	5	383	.89	.97	.85
		6	384	.86	.83	.81
	5	7	385	.95	.85	.91
		8	386	.74	.83	.75
	6	9	377	.85	.93	.85
37	1	1	388	.85	.81	.79
	2	2	389	.81	.76	.62

	4	4	391	.83	.59	.87
	5	*6	393	.46	.39	.34
		7	394	.83	.94	.93
	6	8	395	.91	.78	.87
		9	396	.80	.89	.83
	7	10	397	.73	.76	.77
		11	398	.84	.85	.78
	*8	12	399	.56	.34	.48
38	1	1	400	.85	.91	.95
		2	401	.92	.89	.85
	2	3	402	.92	.97	.89
		4	403	.95	.96	.90
	3	5	404	.95	.96	.84
		6	405	.89	.95	.83
	4	7	406	.92	.93	.89
		8	407	.64	.47	.75
39	1	2	409	.87	.81	.68
	2	3	410	.77	.80	.78
	3	4	411	.90	.94	.92
	4	5	412	.90	.90	.89
	*5	7	414	.68	.39	.57
	6	8	415	.95	.87	.90
		9	416	.71	.79	.57
	7	10	417	.80	.84	.83
		11	418	.94	.91	.94
	8	12	419	.93	.85	.88
	9	13	420	.89	.95	.82
		14	421	.86	.92	.85
40	1	1	422	.94	.99	.87
	2	2	423	.97	.97	.90
	3	3	424	.93	.93	.90
		4	425	.69	.45	.55
	4	5	426	.75	.95	.86
	5	6	427	.62	.69	.79
		7	428	.95	.75	.79
	6	8	429	.98	.82	.75
		9	430	.61	.42	.56
41	1	1	431	.94	.94	.94
		2	432	.98	.90	.91
	2	3	433	.96	.91	.96
		4	434	.96	.91	.92
	3	5	435	.86	.79	.79
	4	6	436	.95	.86	.87
	5	7	437	.89	.95	.84
		8	438	.86	.62	.51

	6	10	440	.80	.62	.49

* denotes that item has been earmarked as a watch item during future validity and reliability studies.

Table 104

Validation Study A&B Reliability Coefficients

	Sample	49	30	
	Factor	A	B	△AB
PF Scale	1	.90	.95	.04
	2	.74	.87	.12
	3	.89	.92	.03
	4	.94	.97	.02
	5	.96	.97	.01
PA Scale	6	.97	.98	.02
	7	.94	.93	.01
	8	.86	.83	.04
	9	.84	.95	.16
	10	.93	.95	.02
	11	.95	.97	.02
	12	.37	.78	.42
DD Scale	13	.93	.98	.05
	14	.93	.97	.04
	15	.90	.97	.07
	16	.96	.98	.02
	17	.98	.98	.01
	18	.90	.96	.07
IM Scale	19	.86	.92	.06
	20	.87	.94	.06
	21	.89	.96	.07
	22	.99	.97	.02
	23	.97	.99	.02
DM Scale	24	.95	.94	.01
	25	.98	.99	.01
	26	.93	.91	.02
	27	.95	.92	.03
	28	.96	.96	.00
TW Scale	29	.96	.97	.01
	30	.92	.93	.01
	31	.98	.98	.00
	32	.96	.96	.00
	33	.89	.95	.06
WDA Scale	34	.96	.96	.00
	35	.99	.98	.01
	36	.97	.96	.01
	37	.97	.96	.01
	38	.98	.95	.03

	39	.98	.96	.02
	40	.97	.94	.03
	41	.97	.97	.00

Table 105

Scale Composition Reduction Comparisons between Initial, Content Validity, Pilot, and Validation Studies

		Initial			Content Validity		Pilot		Validation	
		C	PS	SI	PS	SI	PS	SI	PS	SI
Scales	PF	1	9	27	9	23	9	16	7	12
		2	3	6	3	6	2	4	2	2
		3	5	10	5	11	4	8	3	7
		4	4	10	4	10	3	8	3	8
		5	5	11	5	14	4	9	4	8
	PF Sum	5	26	64	26	64	22	45	19	37
	PA	6	6	12	6	11	1	2	1	2
		7	5	14	5	10	3	7	3	6
		8	5	11	5	11	3	4	3	4
		9	2	6	2	6	2	4	2	4
		10	5	12	5	12	5	11	5	9
		11	3	7	3	5	2	3	2	3
		12	4	5	4	4	4	4	2	2
	PA Sum	7	30	67	30	59	20	35	18	30
	DD	13	4	8	4	8	3	7	3	7
		14	8	15	8	16	8	14	8	10
		15	5	9	5	9	3	4	2	3
		16	3	6	3	6	3	6	2	5
		17	3	3	3	3	3	3	3	3
		18	9	17	9	16	8	11	7	8
	DD Sum	6	32	58	32	58	28	45	25	36
	IM	19	10	14	10	16	7	13	5	8
		20	7	10	7	9	7	9	5	6
		21	8	12	8	12	8	12	5	6
		22	3	6	3	6	3	6	3	6
		23	6	13	6	13	6	13	6	13
	IM Sum	5	34	55	34	56	31	53	24	39
	DM	24	8	14	8	14	7	12	6	8
		25	8	18	8	15	8	15	8	15
		26	8	13	8	11	8	11	6	8
		27	6	10	6	10	6	10	4	7
		28	5	10	5	13	5	13	5	11
	DM Sum	5	35	65	35	63	34	61	31	49
	TW	29	7	11	7	12	5	10	5	9
		30	6	10	6	10	5	8	3	6

		31	6	11	6	11	5	10	5	10
		32	6	13	6	13	6	13	4	9
		33	5	6	5	6	4	5	4	4
	TW Sum	5	30	46	30	52	25	46	21	38
	WDA	34	7	10	7	13	6	12	6	10
		35	9	12	9	13	9	13	9	13
		36	6	11	6	9	6	9	6	8
		37	8	10	8	12	7	10	6	8
		38	4	7	4	8	4	8	4	8
		39	9	14	9	14	9	12	8	11
		40	6	9	6	9	6	9	6	9
		41	6	10	6	10	6	9	6	9
	WDA Sum	8	55	83	55	88	53	82	51	76
	Total	41	242	438	242	440	213	367	189	305

Table 106

Dropped Items from Final Inventory PF and PA Scale

PF Scale

C	PS	SI
1	3	**7**
	4	**8**
		9
	5	**10**
		11
	6	**13**
		14
	9	**20**
		21
		22
		23
2	**1**	**1**
		3
	2	**4**
	3	**5**
3	**1**	**1**
	3	**4**
	4	**7**
		8
4	**4**	**9**
		10
5	2	**4**
	4	**8**
		10
	5	**11**
		12
		13

Omitted	6	19

PA Scale

C	PS	SI
6	**1**	**1**
		2
	3	**5**
		6
	4	**7**
	5	**8**
		9
	6	**10**
		11
7	**3**	**3**
	4	**4**
	4	**6**
8	**1**	**1**
		2
	2	**3**
		4
		5
	5	**10**
9	1	**1**
		2
10	1	**3**
		4
	4	**10**
11	**1**	**1**
		2
12	**2**	**4**
	4	**4**

Omitted	11	27

Table 107

Dropped Scale Items from Final Inventory DD and IM Scale

DD Scale

C	PS	SI
13	**4**	**8**
14	1	**2**
	2	**5**
	4	**7**
	5	**9**
	7	**14**
	8	**16**
15	2	**4**
	3	**5**
		6
	4	**7**
		8
	5	**9**
16	**2**	**5**
17	**2**	**1**
		2
	5	**9**
	7	**11**
	9	**16**
18	3	**5**
	4	7
	8	**13**

Omitted	5	21

IM Scale

C	PS	SI
19	**1**	**1**
	2	**2**
	3	**3**
	5	**6**
	8	**12**
	9	**14**
		15
	10	**16**
20	**2**	**2**
	3	**3**
	6	**7**
21	**1**	**1**
	3	**4**
	5	**6**
		7
		8
	8	**11**

Omitted	12	17

Table 108

Dropped Items from Final Inventory DM, TW, and WDA Scale

DM Scale

C	PS	SI
24	**2**	**2**
	3	**4**
	6	**8**
		9
	7	**11**
	8	**12**
26	4	**7**
27	2	**4**
	3	**6**
	5	**9**
28	4	**9**
	5	**13**
Omitted	4	12

TW Scale

C	PS	SI
29	2	**2**
	3	**5**
	4	**6**
	5	**7**
	6	**11**
30	**1**	**1**
	5	**8**
31	**6**	**11**
32	**4**	**7**
	5	**9**
		10
33	**3**	**3**
	4	**4**
Omitted	7	13

WDA Scale

C	PS	SI
34	**2**	**2**
	3	**5**
	4	**6**
36	3	**4**
37	**3**	**3**
	4	**5**
	5	**6**
	8	**12**
39	**1**	**1**
	5	**6**
		7
41	6	**9**
Omitted	5	12

APPENDIX B: FIGURES

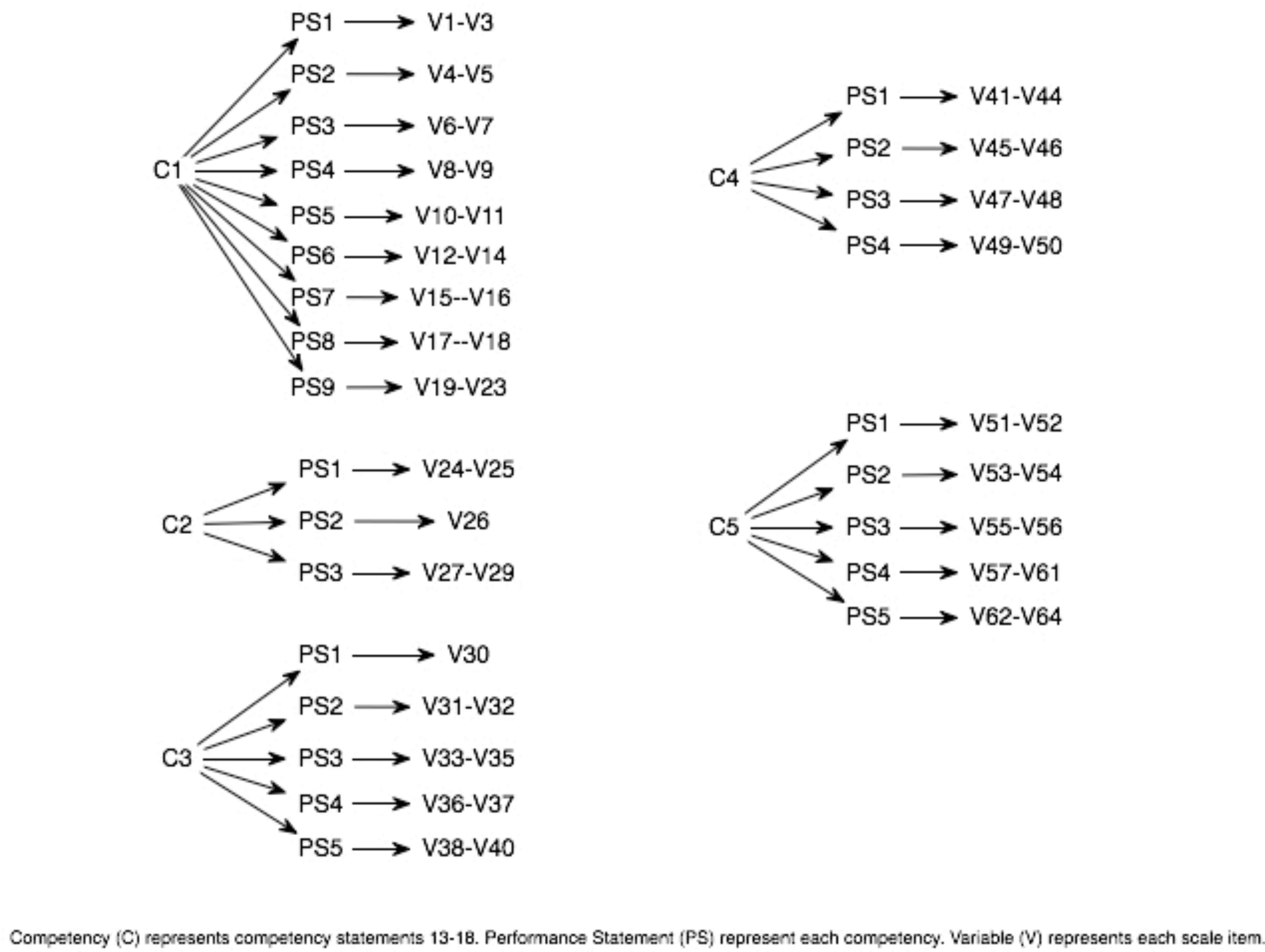
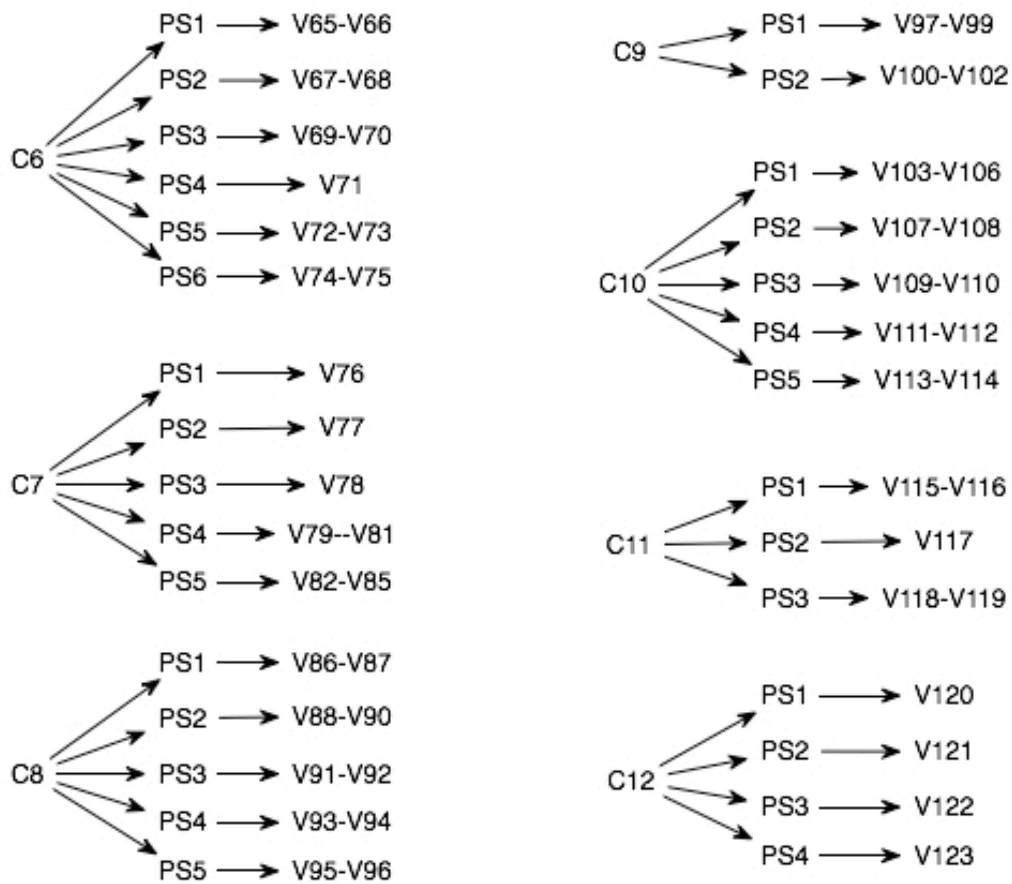
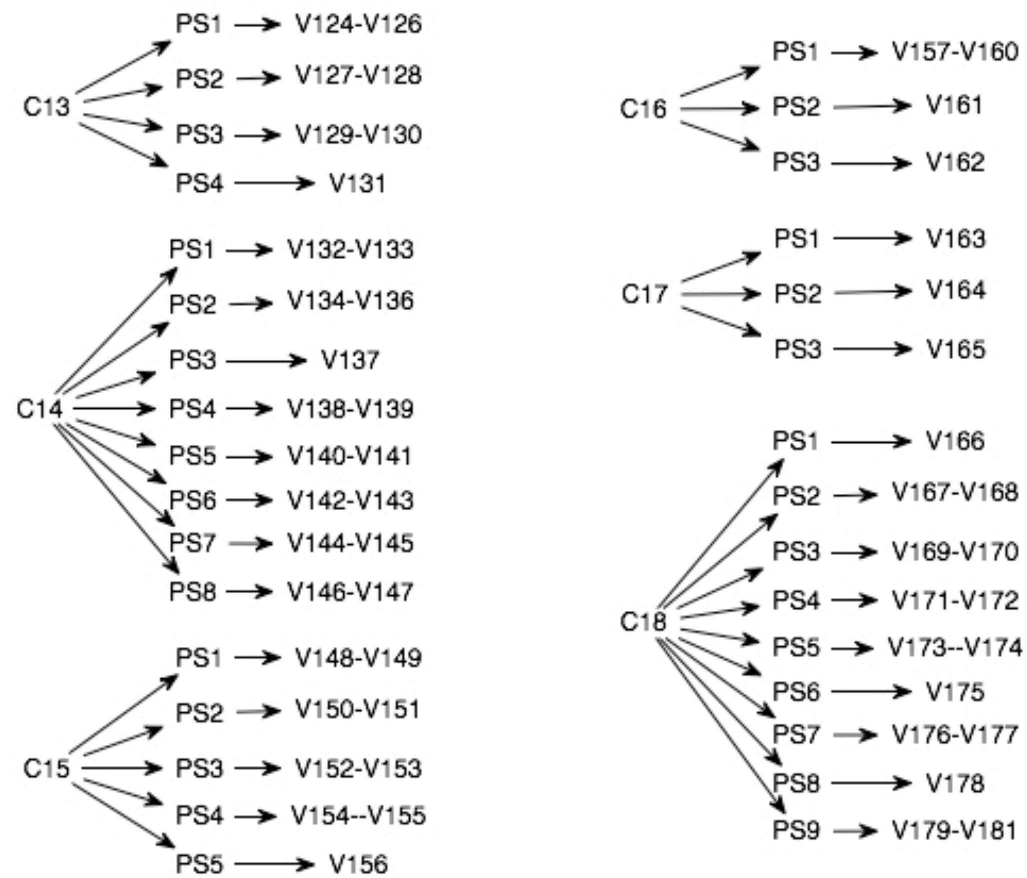


Figure 12. Professional foundations scale path diagram.



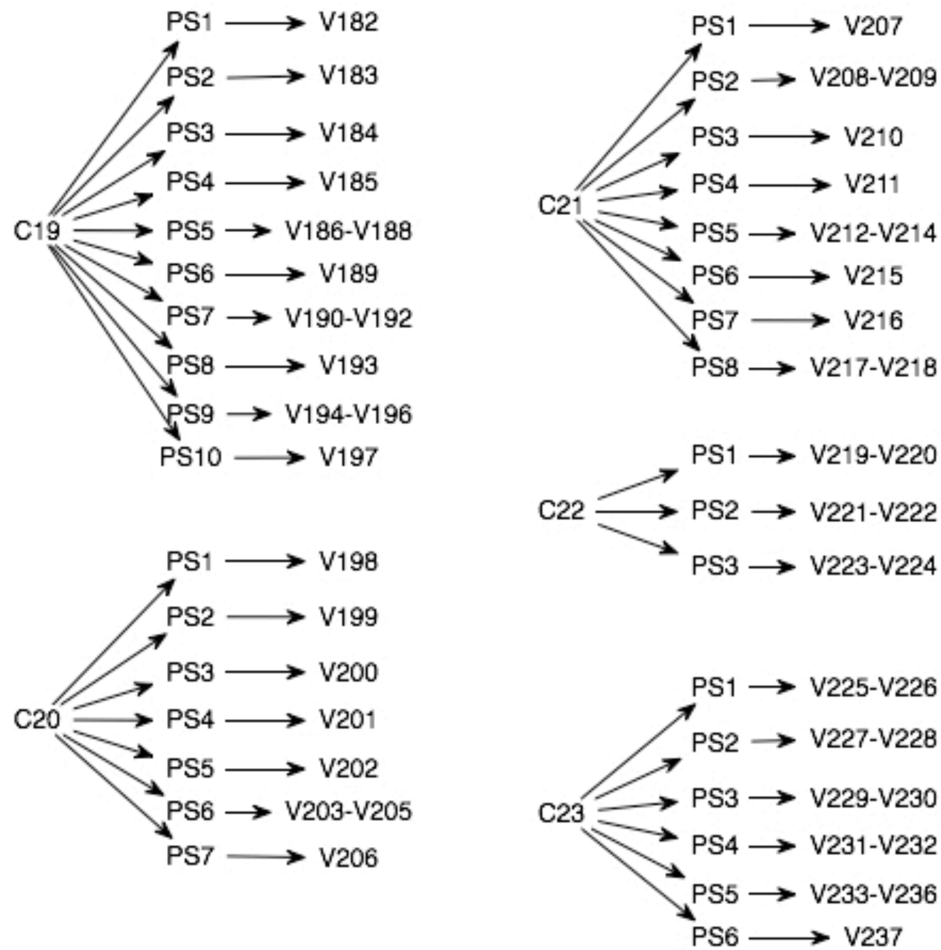
Competency (C) represents competency statements 13-18. Performance Statement (PS) represent each competency. Variable (V) represents each scale item.

Figure 13. Planning and analysis scale path diagram.



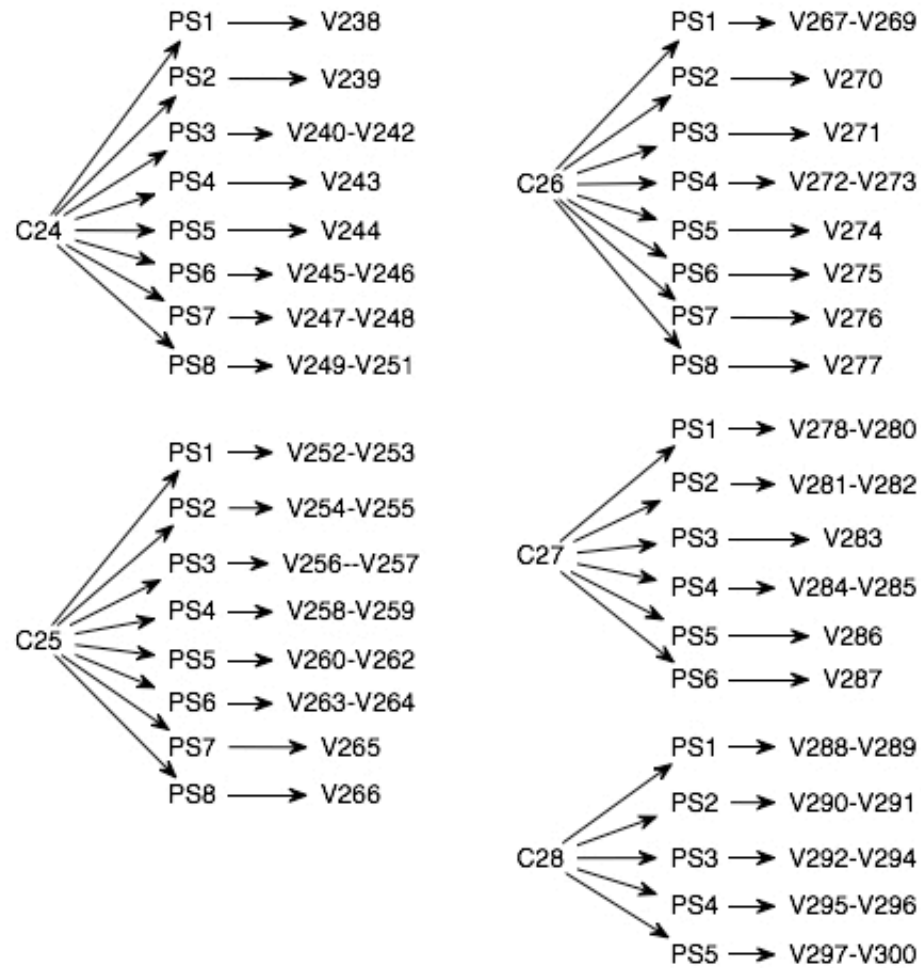
Competency (C) represents competency statements 13-18. Performance Statement (PS) represent each competency. Variable (V) represents each scale item.

Figure 14. Design and development scale path diagram.



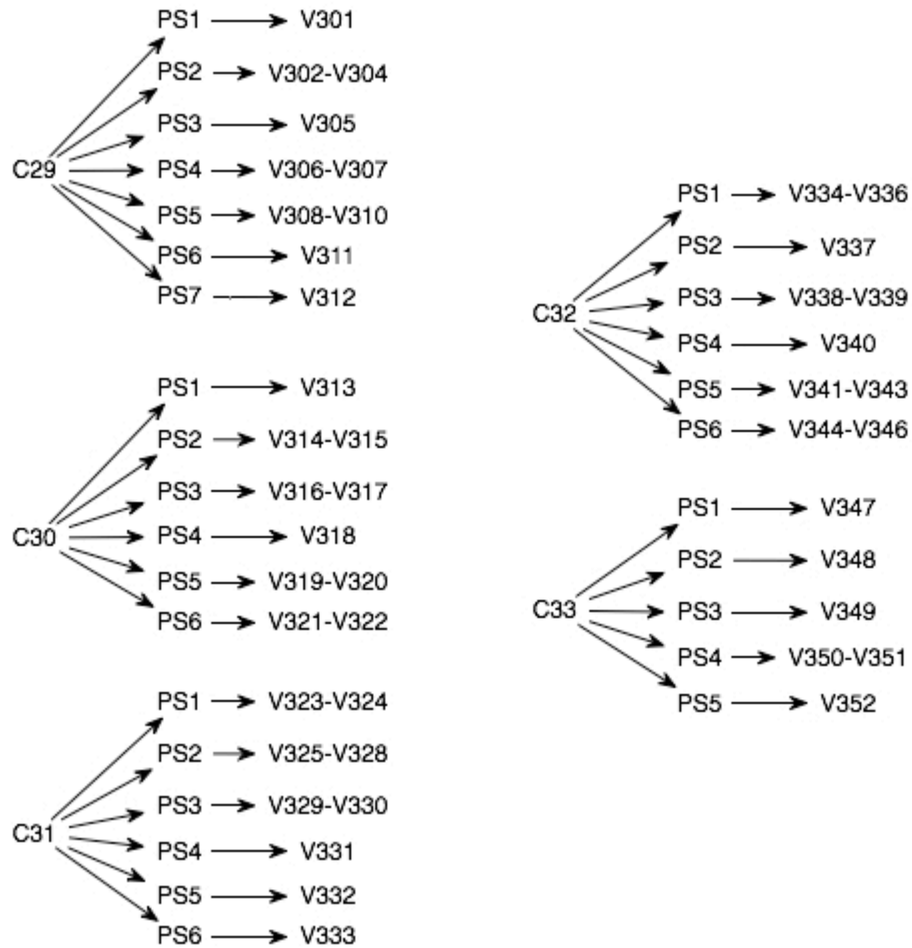
Competency (C) represents competency statements 13-18. Performance Statement (PS) represent each competency. Variable (V) represents each scale item.

Figure 15. Implementation and management scale path diagram.



Competency (C) represents competency statements 13-18. Performance Statement (PS) represent each competency. Variable (V) represents each scale item.

Figure 16. Digital media scale path diagram.



Competency (C) represents competency statements 13-18. Performance Statement (PS) represent each competency. Variable (V) represents each scale item.

Figure 17. Technical writing scale path diagram.

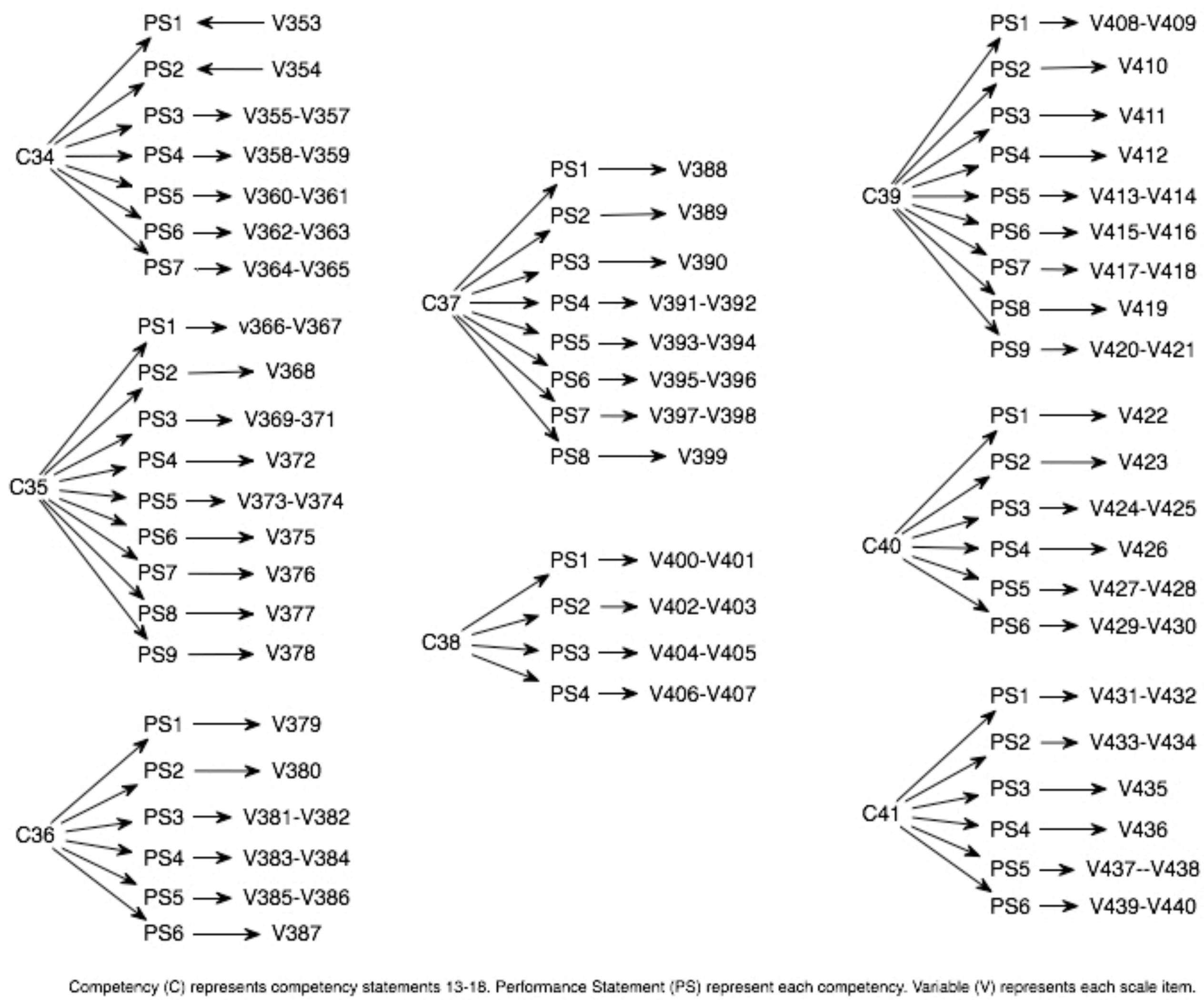


Figure 18. Web development and administration scale path diagram.

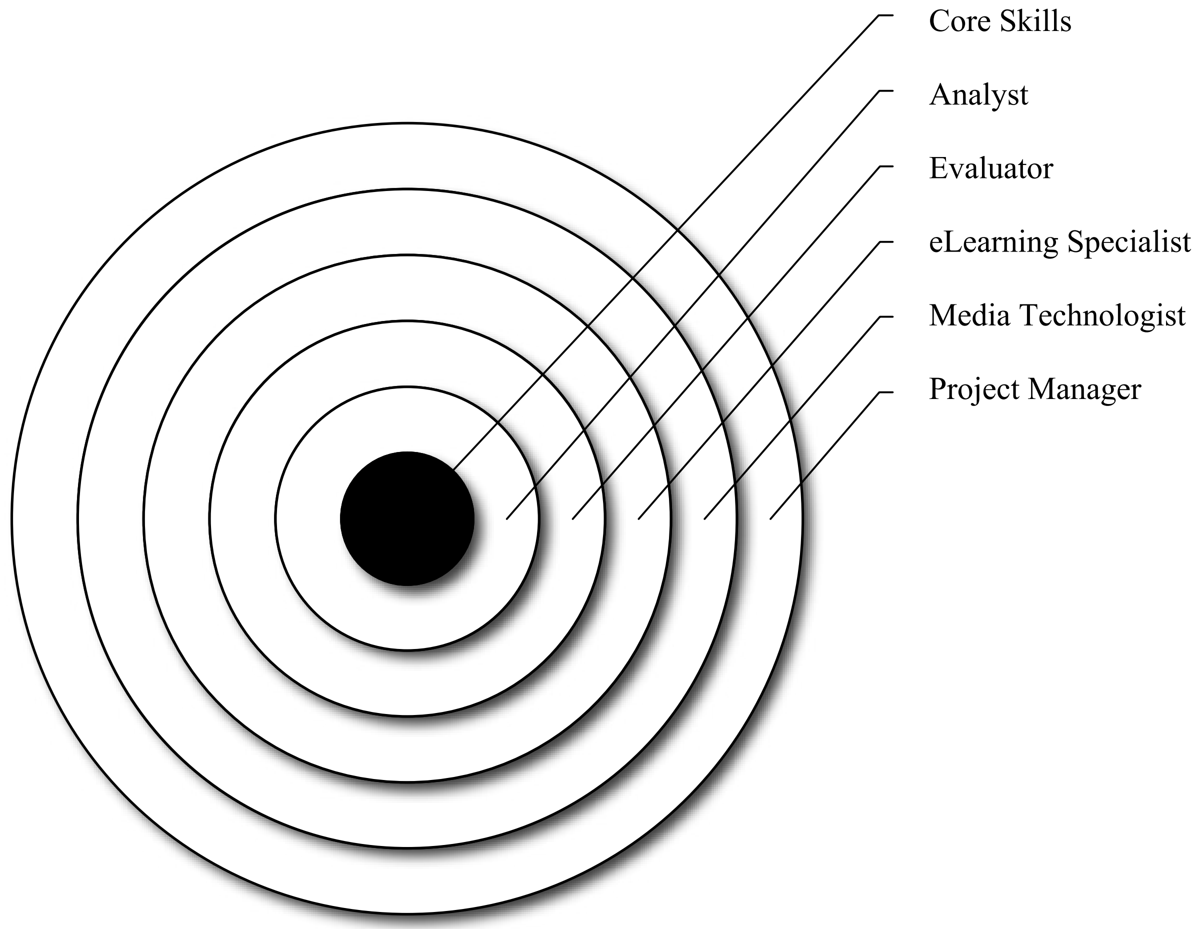


Figure 19. Top conical view of expanded learning technology roles.

	2	4	270	.81	.85	.89
	3	5	271	.71	.73	.59
	4	6	272	.87	.93	.80
		7	273	.48	.02	.49
	5	8	274	.93	.58	.40
	6	9	275	.45	.07	.67

APPENDIX C: PERMISSION TO USE PREMISES, NAMES, AND SUBJECTS OF ORGANIZATION

UNIVERSITY OF PHOENIX

INFORMED CONSENT: PERMISSION TO USE PREMISES, NAME, AND/OR SUBJECTS

(Facility, Organization, University, Institution, or Association)

Intel Corporation
Name of Facility, Organization, University, Institution, or Association

I hereby authorize Tammé McCowin, student of University of Phoenix, to use the premises, name and/or subjects requested to conduct a study entitled The Development and Validation of an Instrument to Assess Instructional Design Competency.

Signature

January 29, 2007
Date

End User Training Manager
Title

Intel Corporation
Name of Facility

APPENDIX D: INFORMED CONSENT PARTICIPANTS 18 YEARS OF AGE AND OLDER

Dear participant,

I am a student at the University of Phoenix working to earn a doctorate in educational leadership. I am conducting a research study entitled *The Development and Validation of an Instrument to Assess Instructional Design Competency*. The purpose of this research study is to develop and validate the Instructional Systems Design Performance (ISD Performance) inventory to assess the professional competencies of instructional designers and instructional developers.

There are two parts to this research study effort. Phase one will focus on instrument development and phase two will focus on instrument validation for use in the field. In phase one, I will conduct two studies, which require soliciting participation from two different samples. Information obtained from study one will be used to refine the instrument. Study two will be used to confirm the results obtained from study one.

Phase One: Instrument Development (Pilot Test)

- Study 1 will consist of 100-150 randomly selected participants to test the initial item pool of the instrument.

- Study 2 will consist of 100-150 randomly selected participants to test the refined item pool of the instrument.

In phase two, I will conduct three additional studies. These studies are necessary to finalize the instrument and to confirm test-retest reliability and concurrent validity.

Phase Two: Instrument Validation (Finalize Instrument)

- Study 3 will consist of 100-150 participants randomly selected to finalize the instrument.

- Study 4 will consist of 100-150 third-party participants selected by participants in study 3. Individuals from study 3 are asked to select a colleague, manager, or third-party who is familiar with their skill capabilities to rate them on the ISD Performance Inventory.

- Study 5 will consist of 75 participants selected by ISD content experts with knowledge of the skill capabilities of each participant. Participants will be grouped by skill level into five separate groups to help establish cut-off scores for each skill category. The skill categories include: novice, advanced beginner, competent, proficient, and expert.

<u>Benefits of Participation</u>

Your participation in this research study will serve as an ongoing effort to develop and advance the instructional technology field. The study is intended to develop and validate an assessment instrument to assist professionals and organizations with measuring performance against known competency standards to help guide educational programming, selection, placement, career planning, and professional development.

Additionally, participants will be given the option to participate in a random drawing to win one of three prizes: one 30GB Video iPod and two 4GB iPod Nanos. All participants will receive free online training as a reward for contributing to this research study. Notification will be sent to all participants upon completion of this research study with URL and login information to access their free training course. Three lucky winners randomly selected from the sample population will be notified via email of their award and delivery of prizes will be arranged individually with each winner.

Confidentiality Statement

There are no foreseeable risks to you except the collection of your name, email address, phone number, and generic demographic information. With the exception of Study three, participant names will be masked and assigned pseudonyms to ensure confidentiality. Study three participants will need to identify a third-party (by name, email address, known relationship, and other demographic information), such as a colleague or manager who is familiar with their skill capabilities to rate them on the ISD Performance Inventory. In this case, only the selected third-party rater will know the identity of the study three participants submitting the request for a third-party to participate in the study.

Informed Consent and Permission to Participate Acknowledgement

Your participation in this dissertation study is voluntary. If you choose to participate you will be randomly placed in one or more of the designated study groups. Notification will be sent to you confirming your randomly selected group number(s). If you choose not to participate or to withdraw from the study at any time, you can do so without penalty or loss of benefit to yourself. The results of the research study may be published but your name will not be used and your results will be maintained in confidence. A summary of the final research report will be provided to you upon request.

"I acknowledge that I understand the nature of the study, the potential risks to me as a participant, and means by which my identity will be kept confidential. I further acknowledge that clicking the I CONSENT BUTTON below indicates that I am 18 years or older, I give my permission to voluntarily serve as a participant in the study described, and that the date and time will be recorded for this electronic submission to be stored and transmitted electronically for the benefit of the research study."

APPENDIX E: IBSPTI COPYRIGHT NOTIFICATION

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Name: Tammé McCowin
Organization: University of Phoenix Doctoral Student Dissertation Research
Address: 10177 Azinger Way, Sacramento, CA 95829
Email Address: tmccowin@email.uophx.edu
Phone: 916.724.9554
Date: 11/06/06

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APPENDIX F: NWCET COPYRIGHT NOTIFICATION

Subject: RE: Request to Use the NWCET Skill Standards
Date: Tuesday, November 7, 2006 10:23 AM
From: Maureen Majury <mmajury@bcc.ctc.edu>
To: Tammé McCowin <tmccowin@email.uophx.edu>
Conversation: Request to Use the NWCET Skill Standards

Hi: I believe you can use the standards and just make sure you cite your work (NWCET skill standards) for anything you include in your study. If you have any other ?s, just let me know. Thanks. Maureen

---

From: Tammé McCowin [mailto:tmccowin@email.uophx.edu]
Sent: Monday, November 06, 2006 9:12 PM
To: Maureen Majury
Subject: Request to Use the NWCET Skill Standards

Hello Maureen:

I am a doctoral student at the University of Phoenix and would like to obtain more information about how I may use the NWCET Skill Standards in my dissertation study. What authorizations or approvals must I obtain to do so. Any information you can provide would be greatly appreciated. Thanks!

Regards,

Tammé McCowin
Sacramento, CA

Division by Zero: Learn it! Live it! Love it!

APPENDIX G: EIGHT-STEP ITEM REVIEW PROCESS

The item review process is a nine-step qualitative and quantitative evaluation activity. This review process is iterative and cyclical. As you execute this process, you will need to read each scale item to determine an item's behavioral characteristics, unitary value, clarity, duality focus, functional purpose, face validity, inter-rater reliability, measurement type, and level of complexity. The review process is divided into two separate stages. The first stage is the qualitative review. The second stage is the quantitative review.

Stage 1: Qualitative Review

The qualitative review includes executing the first six steps in the item review process. To execute these six steps begin by first reading a scale item, then answer the question for each step in a linear lock-step iterative fashion. Repeat each step or revisit a step as frequent as needed until you have answered each of the questions for a particular scale item. Repeat this process for each scale item in the designated scale until all items for a given scale has been reviewed and judged. Stage 1 is iterative and cyclical and will continue until inter-rater reliability can be attained to ensure that items have attained face and content validity. The goal of stage 1 is to produce the initial item pool for pilot testing. Steps 1-5 focus entirely on content validity whereas step six focuses on face validity.

Qualitative Review
Step 1: Determine statement's behavioral characteristics
Step 2: Determine statement's unitary value
Step 3: Determine statement's clarity
Step 4: Determine statement's duality focus
Step 5: Determine statement's functional purpose

Note: *Prior to executing this stage in the process it is important that you review the details of the five review steps below to ensure that you completely understand the purpose of each step. For additional support and examples see Appendix A: Establishing Validity.*

Step 1: Determine statement's behavioral characteristics

a. Does the scale item clearly describe a performance? If no, how may the actionable verb be improved or added to establish clarity of an observable performance?
b. Does the scale item clearly describe a condition? If no, how may the condition be improved or added to establish clarity of the given condition?
c. Does the scale item clearly describe a criterion? If no, is a criterion needed? If a criterion is needed, how may it be improved or added to establish clarity of the given criterion?
d. If one of the three behavioral characteristic(s) of a scale item is missing is it necessary to clearly explicate the scale item? If so, how should the statement be modified to include the missing characteristic(s)?

Step 2: Determine statement's unitary value

a. Does the scale item measure one observable performance?

b. Does the scale item need further refinement to establish its unitary value? If so, how would you refine the statement?

Step 3: Determine statement's clarity
a. Is the scale item clear?
b. Does the scale item need further refinement to enhance its clarity? If so, how would you refine the statement?

Step 4: Determine statement's duality focus
c. Does the scale item duplicate another scale item in another skill cluster or knowledge domain? If so, which one(s)? How does it duplicate other scale items?
d. Could this redundancy, duplication, and/or similarity be overcome by context, condition, or criterion? If yes, how may it be improved upon to reduce redundancy and duplication? If no, should the statement be earmarked as an overlapping competency across skill areas?

Step 5: Determine statement's functional purpose
a. Does the scale item imply several layers of performance? If so, how would you refine the statement to reflect better granularity in the statement?

How to Complete the Qualitative Review Rubric for Each Scale
To begin reviewing scale items for stage 1, you will need to access the qualitative review rubric for each scale. Follow the sequence of steps below to document your expert opinion of each scale item. ***Note:*** *review each scale in the following order and return the reviewed rubric with comments, feedback, and suggestions to the researcher as you complete each one. Review each rubric according to the following sequence: Professional Foundations (PF), Planning and Analysis (PA), Design and Development (DD), Implementation and Management (IM), Digital Media (DM), Technical Writing (TW), and Web Development and Administration (WDA).*

1. Select a scale to review.
2. Open the Qualitative Review Rubric for that given scale.
3. Read a scale item on the scale and follow the qualitative review process steps 1-6 as aforementioned.
4. Write or type comments, feedback, or revisions in the review rubric under the Comments/Feedback/Revisions Column adjacent to each scale item that address each review step as indicated by the questions. ***Note:*** *Use the following rating scale to score each scale item. For items that are rated good or poor provide a detail explanation of the issues that need to be resolved to make the item usable. (e.g. revise item wording, add a new item to the list, delete the item and replace with a better item, delete the item it is irrelevant)*

    a. Minor = 1: No revisions required use the item as is.
    b. Major = 2: Some revisions required, augment the item to improve its validity
    c. Critical = 3: Major revisions required, do not use item as written

5. Repeat steps 3-5 for each scale item in the scale until all items have been reviewed.
6. Send/email an electronic copy of each scale's completed review rubric to the researcher.
7. Researcher reviews each submitted rubric to make appropriate revisions to each scale.
8. Once all review rubrics for each scale has been refined. Researcher will submit refined scales and scale items to validate revisions with expert reviewers.
9. Process repeats as needed until the final item pool is deemed to have attained face and content validity.

Stage 2: Quantitative Review

The quantitative review includes the last three steps in the process. In this stage, expert reviewers will complete three survey instruments. The first instrument determines inter-rater reliability for the initial item pool, response formats, number of scale points, instructions, definitions, and descriptions provided to respondents for each scale. The second instrument determines the measurement type for each scale item in each scale. The third instrument establishes the level of complexity for each scale item in each scale. Stage 2 cannot be executed until the initial item pool has been developed. However, once stage 1 is complete, a URL link will be sent to expert reviewers to complete stage 2. In this stage, reviewers will complete the online survey for each scale to help determine the measurement type and level of complexity of each item for each scale. After completing this phase, a consensus meeting must be held to review the results of each survey to establish consensus on any items that did not receive equivalent scores between expert reviewers. This is necessary to ensure that all reviewers agree on the categories and levels for each item before further validation and reliability can be completed.

Quantitative Review
Step 6: Determine statement's face validity
Step 7: Determine inter-rater reliability of initial item pool
Step 8: Determine statements skill level

Step 6: Determine statement's face validity (survey)

a. Does the scale item represent the competency and performance statement for which it is intended to measure? If no, how may it be improved to increase face validity?
b. Can different respondents easily infer the same purpose, intent, and meaning of the measurement implied by the scale item?

Step 7: Determine inter-rater reliability of initial item pool (survey)

a. Rate the initial item pool for each scale in terms of representativeness or suitability, specificity, clarity, and purpose.

Step 8: Determine statement's skill level (survey)

a. Classify each competency statement into one of six Bloom's cognitive levels.
b. Classify each scale item performance statement into one of six Bloom's cognitive levels.
c. What skill level does each scale item measure? (e.g. novice, advanced beginner, competent, proficient, expert)